



## THE HUMANE SOCIETY OF THE UNITED STATES

February 23, 2024

Bill: SB 983 – Hunting – Lead and Lead-Based Ammunition – Phase-Out  
Committee: Senate Education, Energy, and the Environment  
Position: SUPPORT

Chair Feldman, Vice Chair Kagan, and Members of the Senate Education, Energy, and the Environment Committee:

On behalf of our Maryland members, supporters and volunteers, the Humane Society of the United States offers its wholehearted support for SB 983 to phase out and, on or before December 31, 2026, prohibit the use of lead or lead-based ammunition for hunting in Maryland. We thank Senator Lewis Young for bringing forth this measure of such crucial importance to our state, and particularly appreciate the prioritization of a phase-out of lead ammunition for the hunting of deer because of its dire implications for the humans who consume venison and the wildlife who scavenge hunted deer.

### 1. Lead is highly toxic to humans

Lead is a toxic substance.<sup>1</sup> Lead poisoning has been documented in humans for more than 2,500 years,<sup>2</sup> and its harmful effects on human health are widely known. The Centers for Disease Control states that no level of lead exposure is safe for humans.<sup>3</sup> That is why lead has been removed from various paints, gasoline, pipes and a host of other products over the years. Yet lead exposure through hunting ammunition and tackle continues to pose a threat to human health. Top researchers, medical professionals, and environmental scientists state that lead-based ammunition is the “greatest, largely unregulated source of lead knowingly discharged into the environment in the United States.”<sup>4</sup>

Although the effects of lead exposure are potentially concerning for all humans, young children are most at risk. Lead’s negative impacts on children can include irreversible damage to the brain and nervous system, behavioral problems, anemia, liver and kidney damage, hearing loss, hyperactivity, developmental delays and, in extreme cases, death.<sup>5</sup>

In adults, lead poisoning can cause poor muscle coordination, nerve damage to sensory organs and nerves controlling the body, increased blood pressure, hearing and vision impairment and

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<sup>1</sup> Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention. 2011. Lead CAS ID #: 7439-92-1. <https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22>

<sup>2</sup> Eisler, R. 1988. Lead hazards to fish, wildlife, and invertebrates: a synoptic review. United States Fish and Wildlife Service. Biological Report 85.

<sup>3</sup> Centers for Disease Control and Prevention. 2013. Lead Factsheet. National Biomonitoring Program. [http://www.cdc.gov/biomonitoring/Lead\\_FactSheet.html](http://www.cdc.gov/biomonitoring/Lead_FactSheet.html)

<sup>4</sup> D. Bellinger, et al. 2013. Health Risks from Lead-Based Ammunition in the Environment – A Consensus Statement of Scientists. Microbiology and Environmental Toxicology, UC Santa Cruz. <http://escholarship.org/uc/item/6dq3h64x>.

<sup>5</sup> Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention. 2016. Lead Toxicity, What Are the Physiologic Effects of Lead Exposure? [https://www.atsdr.cdc.gov/csem/lead/docs/CSEM-Lead\\_toxicity\\_508.pdf](https://www.atsdr.cdc.gov/csem/lead/docs/CSEM-Lead_toxicity_508.pdf)

reproductive problems.<sup>6</sup> Failure to treat lead poisoning in the early stages can result in long-term or permanent health damage.

Consuming meat from animals killed with lead ammunition needlessly puts people at risk of lead exposure.<sup>7</sup> Lead ammunition is highly fragmentable and nearly impossible to remove completely from meat.<sup>8</sup> Lead fragments can be found as far as 18 inches from the bullet wound channel.<sup>9</sup> Lead fragments in game meat include not only larger, visible pieces, but also nanoparticles invisible to the naked eye.<sup>10</sup> It is for these reasons that game meat, a common dietary staple for many families throughout the United States, can substantially raise lead levels in humans.<sup>11,12</sup> It is therefore advised that people not eat wild animals shot with lead ammunition in order to avoid possible lead exposure. For the safety of families in need, game meat donated to charitable organizations should not be shot with lead ammunition and should not be processed in facilities that may have lead contamination from other wild-killed animals.<sup>13</sup>

Many states recognize the threat posed by lead-contaminated game meat. The Minnesota Department of Health recommends that pregnant women and children younger than six not eat venison hunted with lead ammunition.<sup>14</sup> North Dakota advises food pantries not to distribute or use donated ground venison due to contamination from lead fragments, and Illinois, Michigan and Wisconsin authorities caution hunters and consumers about the dangers of exposure to lead in venison.<sup>15</sup> And in 2022, a group of public health, environmental, wildlife and veterinary scientists from around the world released an alarming report in the *American Journal of Public Health* that pointed out:<sup>16</sup>

Even though the presence of ammunition-derived metallic lead fragments in donated firearms-hunted meat has been recognized for more than a decade, the vast majority of donated hunted meat is not inspected to discard meat containing lead fragments.<sup>17</sup> An underlying lack of food safety standards for adulterated donated food increases risks to low-income recipients, who are

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<sup>6</sup> *Id.*

<sup>7</sup> Pain, D. J., et al. 2010. Potential hazard to human health from exposure to fragments of lead bullets and shot in the tissues of game animals. *PLoS One*, 5(4), e10315. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0010315>

<sup>8</sup> U.S. National Park Service. 2011. Lead Bullet Risks for Humans & Wildlife.

<https://www.nps.gov/pinn/learn/nature/leadinfo.htm>

<sup>9</sup> Minnesota Department of Natural Resources. Examining Variability Associated with Bullet Fragmentation and Deposition in White-tailed Deer and Domestic Sheep. <http://www.dnr.state.mn.us/hunting/lead/short-summary.html>

<sup>10</sup> Kollander, B. et al (2016). Detection of lead nanoparticles in game meat by single particle ICP-MS following use of lead-containing bullets. *Analytical and Bioanalytical Chemistry*, 409(7), 1877-1885. <https://pubmed.ncbi.nlm.nih.gov/27966171/>

<sup>11</sup> W. Cornatzer et al. 2007. Qualitative and quantitative detection of lead bullet fragments in random venison packages donated to the Community Action Food Centers of North Dakota. *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans*. The Peregrine Fund, Boise, Idaho, USA. DOI:10.4080/ilsa.2009.011

<https://science.peregrinefund.org/legacy-sites/conference-lead/PDF/0111%20Cornatzer.pdf>

<sup>12</sup> Iqbal, S., et al. 2009. Hunting with lead: association between blood lead levels and wild game consumption. *Environmental Research*, 109(8), 952-959. DOI:10.1016/j.envres.2009.08.007 <https://pubmed.ncbi.nlm.nih.gov/19747676/>

<sup>13</sup> W. Cornatzer et al. *Supra* note 15.

<sup>14</sup> Minnesota Department of Health. 2008. Information about lead in venison.

<https://www.health.state.mn.us/communities/environment/lead/docs/leadinvenison.pdf>

<sup>15</sup> North Dakota Department of Health. Lead in Venison. <https://www.ndhealth.gov/lead/venison/>; Illinois Department of Public Health. Environmental Health Fact Sheet, Lead in Venison. <http://www.idph.state.il.us/envhealth/factsheets/lead-in-venison.htm>; Michigan Department of Natural Resources. Precaution About Lead in Venison.

<https://www.michigan.gov/dnr/managing-resources/Wildlife/deer/precaution-about-lead-in-venison>; Wisconsin Department of Natural Resources. Lead Information for Hunters, Consumers and Meat Processors. <https://p.widencdn.net/ryibuw/lead>.

<sup>16</sup> Totoni S, Fabisiak JP, Beasley VR, et al. Biting the bullet: a call for action on lead contaminated meat in food banks. *Am J Public Health*. 2022;112(S7):S651-S654. Acceptance Date: July 28, 2022. DOI: <https://doi.org/10.2105/AJPH.2022.307069>

<sup>17</sup> Totoni S. Exempt from inspection: states ignore lead-contaminated meat in food banks. *Environmental Health News*. October 13, 2020. Available at: <https://www.ehn.org/lead-in-donated-venison-meat-2648176251.html>.

already disproportionately affected by elevated blood lead levels BLLs).<sup>18</sup> Primary prevention is needed for this overlooked source of lead exposure.

## 2. Lead is highly toxic to wildlife

More than 130 species of wild animals have been documented as suffering the effects of lead poisoning from spent lead ammunition and fishing tackle. Animals are exposed to lead in various ways, including foraging spent lead shot from the ground, feeding on lead-tainted gut piles, scavenging carcasses of animals shot with lead ammunition and left behind, or directly consuming spent fishing tackle directly.<sup>19</sup>

Lead poisoning is one of the leading causes of death for bald eagles. Scientists have known for decades that bald eagles can be poisoned by exposure to lead, that poisoned birds ingest lead ammunition fragments, and that lead exposure in bald eagles is associated with hunting seasons when they are more likely to scavenge on lead-tainted gut piles left behind by hunters or the carcasses of animals that hunters shoot but don't recover. The toxicological effects of lead on bald eagles and other scavenging birds are grave and well-established.<sup>20</sup> In birds, a single ingested shotgun pellet or bullet fragment is sufficient to cause brain damage, impairing critical neuromuscular, auditory, and visual responses.<sup>21</sup> Poisoned animals who survive often experience long-term negative effects that make them more susceptible to predation and dangers such as car collisions.<sup>22</sup>

A recent study found that nearly half of eagles tested in the U.S.—46% of bald and 47% of golden eagles—showed signs of chronic lead poisoning.<sup>23</sup> In 2020 the U.S. Fish and Wildlife Service (FWS) estimated a total population of 316,700 bald eagles in the U.S.,<sup>24</sup> so lead poisoning could be jeopardizing as many as 145,683 bald eagles. The FWS also notes that lead poisoning from spent ammunition is the primary cause of death for the California condor, a species the Service estimates numbers only 347 individuals in the wild.<sup>25</sup>

Other research finds that lead exposure increases in female black bears with the number of big game animals hunted by humans in the vicinity and increases with age in both female and male

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<sup>18</sup> Centers for Disease Control and Prevention. Blood lead levels in children aged 1–5 years—United States, 1999–2010. *MMWR Morb Mortal Wkly Rep.* 2013;62(13):245–248. <https://pubmed.ncbi.nlm.nih.gov/23552225/>

<sup>19</sup> Tranel, M. A. et al 2009. Impacts of lead ammunition on wildlife, the environment, and human health—A literature review and implications for Minnesota. In R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans*. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa.2009.0307. <https://science.peregrinefund.org/legacy-sites/conference-lead/PDF/0307%20Tranel.pdf>; S.M. Haig, et al. The persistent problem of lead poisoning in birds from ammunition and fishing tackle. *The Condor* 116(3): 408–428. <https://academic.oup.com/condor/article/116/3/408/5153126>

<sup>20</sup> Golden, et al. (2016). A review and assessment of spent lead ammunition and its exposure and effects to scavenging birds in the United States. In *Reviews of Environmental Contamination and Toxicology Volume 237* (pp. 123–191). Springer International Publishing. [https://link.springer.com/chapter/10.1007/978-3-319-23573-8\\_6](https://link.springer.com/chapter/10.1007/978-3-319-23573-8_6)

<sup>21</sup> S.M. Haig, et al. *Supra* note 17.

<sup>22</sup> Scheuhammer, A.M. et al 1996. The ecotoxicology of lead shot and lead fishing weights. *Ecotoxicology* 5, 279–295. <https://pubmed.ncbi.nlm.nih.gov/24193869/>

<sup>23</sup> Vincent A. Slabe et al., Demographic implications of lead poisoning for eagles across North America. *Science* 375,779–782(2022). DOI:[10.1126/science.abj3068](https://doi.org/10.1126/science.abj3068)

<sup>24</sup> U.S. Fish and Wildlife Service. 2020. Final Report: Bald Eagle Population Size: 2020 Update. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. U.S.A. <https://www.fws.gov/sites/default/files/documents/2020-bald-eagle-population-size-report.pdf>

<sup>25</sup> The U.S. Fish & Wildlife Service: California Condor. <https://www.fws.gov/species/california-condor-gymnogyps-californianus>; California Condor Recovery Program at <https://fws.gov/program/california-condor-recovery>.

black bears.<sup>26</sup> Studies show scavenging carcasses of moose killed by human hunters likely also exposes black bears, brown bears, ravens, golden eagles and bald eagles to lead.<sup>27</sup>

### 3. Effective alternatives to lead ammunition are available

The availability,<sup>28</sup> performance and affordability of non-lead ammunition have never been greater than today. For example, FWS has approved more than a dozen nontoxic shot types for hunting waterfowl. The increased supply has led the price of non-lead shot to fall since lead shot was banned federally for waterfowl hunting in 1991. California's landmark decision in 2013 to become the first state to require non-lead ammunition for taking of any wildlife in the state also spurred the production and availability of non-lead bullets.<sup>29</sup> A survey conducted by the Arizona Game and Fish Department revealed that nearly 80% of hunters rated the performance of non-toxic ammunition to be better than or equivalent to its lead counterpart.<sup>30</sup> And the Texas Parks and Wildlife Department released a multi-year, peer-reviewed study in 2015 concluding that dove hunters using shotshells loaded with lead pellets achieved no advantage in effectiveness over those using shotshells firing non-toxic steel pellets of similar or slightly larger size.<sup>31</sup>

### 4. Conclusion

Marylanders place a high value on public health and on the well-being of their environment and wildlife. Because of the significant risks that lead poses to all of those entities, and the efficacy and availability of non-lead shot and tackle for hunters and anglers, the Humane Society of the United States reiterates our support for SB 983 to phase out the use of lead-based ammunition for hunting in our state.

Thank you for your attention to this important issue.

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<sup>26</sup> Brown L et al. Lead exposure in American black bears increases with age and big game harvest density. *Environ Pollut* 2022 Dec 15;315:120427. DOI: 10.1016/j.envpol.2022.120427. Epub 2022 Oct 13. PMID: 36243189.

<sup>27</sup> Brown L et al. Lead exposure in brown bears is linked to environmental levels and the distribution of moose kills. *Sci Total Environ*. 2023 May 15;873:162099. DOI: 10.1016/j.scitotenv.2023.162099. Epub 2023 Feb 9. PMID: 36764533; Legagneux P et al. High risk of lead contamination for scavengers in an area with high moose hunting success. *PLoS One*. 2014 Nov 12;9(11):e111546. DOI: 10.1371/journal.pone.0111546. PMID: 25389754; PMCID: PMC4229082.

<sup>28</sup> Thomas, V. G. (2014, July). Availability and Use of Nonlead Rifle Cartridges and Nontoxic Shot for Hunting in California, with Reference to Regulations used in Various Jurisdictions & Survey of California Ammunition Retailers to Assess Availability of Nonlead Ammunition. [https://ca.audubon.org/sites/default/files/documents/ab711\\_report\\_final\\_-\\_vernon\\_thomas\\_jul\\_28.pdf](https://ca.audubon.org/sites/default/files/documents/ab711_report_final_-_vernon_thomas_jul_28.pdf)

<sup>29</sup> Press release, December 2013: Liberty Ammunition Increases Planned Production. <https://www.officer.com/home/press-release/11268175/liberty-ammunition-inc-liberty-ammunition-increases-planned-production>

<sup>30</sup> D.J. Case & Associates. (2006). Non-lead Ammunition Program Hunter Survey. In *Final report to the Arizona Game & Fish Department*. Washington, D.C.: Association of Fish and Wildlife Agencies.

<sup>31</sup> Pierce, B. L., et al. (2015). A comparison of lead and steel shot loads for harvesting mourning doves. *Wildlife Society Bulletin*, 39(1), 103-115; Gremse, F., et al. (2014) <https://wildlife.onlinelibrary.wiley.com/doi/epdf/10.1002/wsb.504>;

Performance of lead-free versus lead-based hunting ammunition in ballistic soap. *PloS one*, 9(7), e102015

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0102015>; Trinogga, A., Fritsch, G., et al. (2013). Are lead-free hunting rifle bullets as effective at killing wildlife as conventional lead bullets? A comparison based on wound size and morphology. *Science of the Total Environment*, 443, 226-232 <https://www.sciencedirect.com/science/article/pii/S0048969712013848>.