



February 3, 2026

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 181 – Lead Ammunition – Phase-Out – FAVORABLE

Dear Mr. Chairman,

On behalf of Animal Wellness Action, the Animal Wellness Foundation, and the Bethesda-based Center for a Humane Economy, I write in support of SB 181, by Senator Karen Lewis Young, to phase out the use of highly toxic and irreducible lead ammunition in sport hunting over the next three years.

With an atomic number of 82, the poisonous characteristics of lead have been understood by people throughout the world for more than 2,000 years. Its intrusion into the body has the potential to diminish the function of every organ in the body, but it is best known for its effects on the brain and cognitive function. According to one peer-reviewed study published in 2022 in the Journal Proceedings of the National Academy of Sciences, exposure to leaded gasoline lowered the IQ of about half the population of the United States, focusing on people born before 1996 — the year the U.S. banned gas containing lead.

“Within the brain, lead-induced damage. . . can lead to a variety of neurological disorders, such as brain damage, mental retardation, behavioral problems, nerve damage, and possibly Alzheimer’s disease, Parkinson’s disease, and schizophrenia,” [according to the National Institutes of Health](#).

Lead poisoning, or plumbism, is a serious threat to humans and animals, with lead exposure long known to be found in food, soil, water, cannabis, paint, gasoline, and a vast array of other products. With more than 100,000 hunters in Maryland, there is a volunteer pool that distributes it farther and wider in lethal amounts more than any prior form of commercial lead use – leaving a toxic lead across most of the open space in our great state. There is no scientific debate about the extraordinarily detrimental effects of lead on human health and wellness and wildlife.

Because of the extreme threat to public health, the U.S. removed lead from toys to furniture to house paint to gasoline (with that transition completed finally in 1996). With safer, affordable, and high-performance alternatives to lead ammunition available, it’s time to embrace these other elements and alloys in rounds and shot that do not produce lasting threats to wildlife and human health.

In weighing the inestimable costs of neurological capacity and other irreversible effects to people who in consume lead, along with the lingering, painful deaths of countless thousands of animals, are we indeed serious about comparing those existential public and animal health consequences with the minor incremental cost of non-toxic ammunition (< \$5 or \$10/per year for the average hunter) that is now widely available and regularly purchased online and delivered to our doorsteps?

And when we add up the other costs that hunters bear to pursue their passion for hunting – the costs of licensing, clothing, hunting equipment, transportation, processing of game meat, and, in many cases, leasing of private lands, the incremental ammunition costs are negligible. The scales are tipped in the extreme on one side of this debate. This is not a close call when we balance the interests.

And let's remember the power of market forces. As demand for non-toxic ammunition increase – as it will if you pass SB 181, cost differences between lead and non-lead ammunition are likely to evaporate, given the wide underlying low costs of mining and manufacturing these other metals. We saw that with the ban on lead ammunition in waterfowl hunting.

And to look at it through a different lens, let's remember that California began to phase in its lead ammunition ban in 2015 and completed it in 2019. A year before the ban began to be implemented, California sold 284,759 hunting licenses; the year after the ban took effect, it sold 286,276 licenses – an increase of 1500 licenses in a state that has been slowly seeing a decline in hunting participation, as we've seen in many states.

If arsenic or polonium or mercury or plutonium were abundant metals and if they had the right weight and ballistic properties for good ammunition, would we ever think about equipping hunters with any one of those elements and allowing them to go afield with them and then allow them to consume the game they kill with it? Perhaps the core purpose of hunting is to procure game meat for the table, and no form of lead use ever had such a direct route into body and with such high volumes of lead as lead ammo used for wild-game consumption.

Over 40 states operate game meat donation programs associated with food banks, facilitating the distribution of roughly 1 million kilograms (1,100 tons) of game meat annually (Buenz et al. 2024). Add millions of others to the lead exposure list beyond the hunters using lead and sharing it with family and friends.

Remember, Maryland has a wanton waste law. The state essentially obligates a hunter not to leave a shot animal behind, and the presumption, grounded on hunting ethics and the responsible use of wildlife, is that the hunter will ready it for consumption or sharing it for consumption. In doing so, we are all but mandating that hunters and the recipients of their generosity consume lead in their diet even though we know 1) no level of lead is considered safe, and 2) it is impossible to cleanse the care of lead, which fragments on its way to the target and disperses even more widely when it hits the target.

A single round can shatter into millions of small fragments up to 18 inches away from the bullet's trajectory, especially when it strikes bone. One recent study shows that lead dust cannot even be picked up by a microscope or X-ray, never mind the human eye. High-velocity ballistic-tip lead bullets left an average of 141 fragments in a mean of 11 inches from the wound channel, according to one state fish and wildlife agency study.

In the United States, we have two federal agencies -- the U.S. Food and Drug Administration and the U.S. Department of Agriculture -- responsible for assuring food safety rules to keep us safe from dangerous substances in foods. But neither food safety agency would ever allow the levels of lead that impregnate the carcass of a deer or a dove that hunters take home for the pot or pan.

On SB 181, you'll hear from people who served as leaders or top scientists with the U.S. Fish and Wildlife Service and the National Park Service and from public health experts at Johns Hopkins University who say that that we must put an end to the use of lead ammunition in sport hunting. Even the Maryland Hunting and Trapping Guide warns hunters about the toxic effects of lead in the carcasses of the animals they shoot with lead.

In Maryland, the lead ingestion problem is worse than ever because of the growth in deer hunting. Deer kills increased by 270% from 1989-2025 (from 34,000 to 85,000 deer); even after adjusting for deer taken with archery equipment or copper bullets, it's estimated that more than 60,000 lead-contaminated gut piles litter the state, threatening wildlife and hunting families relying on game meat.

### **For humans or wildlife, no amount of lead in our environment is safe.**

- As noted above, fragments of lead or dust are nearly impossible to remove from meat, even with professional processing. [One study](#) showed “all [deer] carcasses showed metal fragments” with risk to “ten million hunters, their families, and low-income beneficiaries of venison.” Hunting writer Ted Williams [noted in the outdoor publication \*Hatch\*](#), two “health departments impounded 17,000 pounds of donated, lead-impregnated venison.”
- The most common form of lead exposure today is from hunting ammunition and fishing tackle. Over 500 studies are definitive in documenting risk to 134 species (including humans), [according to the National Park Service](#). Animals consume spent lead ammunition or fishing tackle by foraging from the ground, feeding on the remains of lead-contaminated carcasses, or ingesting lead sinkers and jigs.
- A [2022 study](#) in *Science* examined 1,210 bald and golden eagles across 38 states and found that nearly half of them had “bone lead concentrations above thresholds for chronic poisoning.” Wildlife rehabilitation facilities take in an unyielding stream of lead-poisoned hawks, ravens, turkey vultures, and mourning doves.
- In October 2023, the U.S. Fish and Wildlife Service (USFWS) published a [final rule](#) relating to hunting on wildlife refuges and concluded that lead is an unmistakable threat to wildlife and to hunting family and friends. The rule noted that “lead ammunition, including bonded lead ammunition, fragments when it hits an animal, and this distributes tiny pieces of lead within a wide radius in the soft tissues of the harvested animal... These tiny fragments of lead are then consumed by humans eating the game meat and scavenger species eating carcasses or gut piles left behind. In this tiny, fragmented form and acted on by digestive enzymes and acids, the lead derived from ammunition can then shed particles that enter the blood stream and affect systems throughout the body, presenting both chronic and acute health risks.”

### **Lead phase-outs work, and alternative ammo available and cost-effective.**

- USFWS banned lead shot for waterfowl hunting in 1991. Lead poisoning mortality for mallards dropped 64% in short order, and studies show that we may have annually sparing more than 3 million ducks and geese from deadly lead poisoning. Maryland, long known as a waterfowl hunting mecca on the Atlantic Flyway, saw no drop-off in waterfowl hunting participation, but more ducks and geese survived, enhancing hunting success because birds were more abundant. Ten years later, research found lower blood and bone lead levels in waterfowl.
- It's time to complete work in phasing out lead. Thirty-five states regulate, to varying degrees, lead ammunition use. [California phased it out completely](#), with [beneficial effects on wildlife](#) and no disruption in hunting participation. Six states are soon to consider petitions to ban lead ammunition formulated by Animal Wellness Action and partnering organizations.
- Nationwide, millions of hunters already use alternative forms of ammunition, that these forms of ammo are widely accepted by state and federal wildlife agencies and are widely recognized as having equal or superior killing power. In a [survey](#) by the Arizona Game and Fish Department, 93.1% of hunters said the overall performance of non-toxic ammo was equal or superior to lead; 89.1% said they would use it again.
- The Texas Parks and Wildlife Department released a peer-reviewed [study](#) in 2015 comparing lead and steel shot loads in dove hunting. The researchers found “no relationship between ammunition type and level of hunter satisfaction” and “no difference in doves bagged per shot, wounded per shot, bagged per hit, or wounded per hit among the 3 ammunition types.”
- Lead alternatives such as steel, copper, and bismuth are widely available, and often cheaper than premium lead. Where lead has been banned – such as the nationwide ban on leader for waterfowl hunting – demand for alternative ammunition increased and price points declined.

All prior debates about balancing public health and safety against costs to consumers and industry for commercial uses of lead have been settled in favor of public health. Let's keep that streak going.

I respectfully urge the Committee to issue a favorable report on SB 181.

Sincerely,

Wayne Pacelle  
President  
Animal Wellness Action

Appendix I – Images of Lead-Poisoned Bald Eagles





Appendix II – Timeline on Lead and the Humane Experience

**Time to Get the Lead Out:  
A Brief History of Lead-Related Harms and Lead Abatement**

**c. 6500 B.C.:** Lead is thought to have been discovered and first mined in Anatolia (a region of what is now Turkey).<sup>i</sup> Its use becomes widespread due to its density, malleability, and resistance to corrosion.

**c. 200 B.C.:** Greek botanist Nicander documents colic and paralysis in lead-poisoned people.<sup>ii</sup>

**c. 100 A.D.:** Greek physician Dioscorides writes that ingesting lead or inhaling its fumes makes the mind “give way.”<sup>iii</sup>

**c. 500 B.C. to 300 A.D.:** Lead is used to build the Roman aqueducts. Roman engineer Vitruvius reports that “water conducted through earthen pipes is more wholesome than that through lead,” which “may be verified by observing the workers in lead, who are of a pallid color.”<sup>iv</sup>

**July 18, 1610:** Italian Baroque artist Caravaggio dies at the age of 38. In 2010, a forensic analysis of remains believed to be his suggests he may have been poisoned by lead in his paints.<sup>v</sup>

**1696:** In part of what is now Germany, the physician Eberhard Gockel traces a colic epidemic to wine sweetened with “sugar of lead,” a mixture of vinegar and litharge (a lead oxide). As a result, the Duke of Württemberg issues an edict banning the use of lead in winemaking.<sup>vi</sup>

**1757:** Théodore Tronchin of Geneva, the personal physician to French Enlightenment philosophers Voltaire, Rousseau, and Diderot, identifies lead poisoning as the source of an outbreak of the disease known as “Poitou colic” in western France in the 1610s.<sup>vii</sup>

**1760s:** The personal physician to King George III, Sir George Baker, traces a common and sometimes fatal illness known as “Devon colic” to the consumption of cider produced with lead equipment.<sup>viii</sup> His findings are met with resistance by cider manufacturers, but by the late 1810s lead is removed from the cider-making process and Devon colic is virtually eradicated.

**July 31, 1786:** Benjamin Franklin writes a letter to a friend about the “bad Effects of Lead taken inwardly,” enclosing a copy of a Massachusetts law banning lead in the production of rum.<sup>ix</sup>

**March 26, 1827:** German classical composer Ludwig van Beethoven dies at the age of 56. In 2005, studies on his hair by the U.S. Department of Energy find lead levels 100 times higher than normal, suggesting lead poisoning may have contributed to his death.<sup>x</sup>

**1839:** French physician Louis Tanquerel des Planches studies 1,200 lead poisoning cases at a Paris hospital and reports that workers exposed to lead fumes are at even greater risk than those working with lead in solid form. To describe the neuropsychiatric results of lead poisoning, he coins the term “encéphalopathie saturnine,” from which “encephalopathy” is later derived.<sup>xi</sup>

**1904:** In the July edition of its monthly publication, paint manufacturer Sherwin-Williams notes that a French expert had determined lead-based paint is “poisonous in a large degree, both for the workmen and for the inhabitants...”<sup>xii</sup> The same year, William James Furnival publishes a treatise noting the risks of lead in the ceramics industry and containing lead-free ceramic recipes.<sup>xiii</sup>

**1909:** France, Belgium, and Austria ban the use of white lead interior paints.<sup>xiv</sup>

**1922:** The League of Nations bans white lead interior paint.<sup>xv</sup>

**c. 1923:** Leaded gasoline is introduced to prevent engine knocking and valve seat wear.

**1924:** In one week in late October, 80% of workers at a Standard Oil plant in New Jersey die or suffer severe neurological symptoms such as palsies and hallucinations after prolonged exposure to leaded gasoline fumes. Leaded fuel production is halted for nine months the following year, and multiple jurisdictions (including New York state, New York City, and Philadelphia) temporarily ban leaded gasoline. New York City’s ban remains in place for three years.<sup>xvi</sup>

**1971:** Congress passes the Lead-Based Paint Poisoning Prevention Act, prohibiting the use of lead-based paints in federally supported residential construction or renovation projects.<sup>xvii</sup>

**1978:** Lead-based paint is effectively phased out in the U.S. by a Consumer Product Safety Commission regulation that also affects painted toys and furniture. The agency cites a need “to reduce the risk of lead poisoning in children who may ingest paint chips or peelings.”<sup>xviii</sup>

**1991:** The Bush Administration’s Fish and Wildlife Service finalizes a rule first announced by the Reagan Administration<sup>xix</sup> to prohibit the use of lead ammunition for all waterfowl hunting nationwide. The rule

follows decades of research showing a decrease in waterfowl populations due to collateral poisonings of fowl that ingest spent lead ammunition while foraging.

**1992:** Congress passes the Residential Lead-Based Paint Hazard Reduction Act, requiring pre-sale disclosures of possible hazards to buyers of homes that may contain lead paint.<sup>xx</sup>

**1996:** The U.S. completes a 20-year phase-out of leaded gasoline.<sup>xxi</sup>

**2000s:** Lead exposure in childhood is linked to violent crime by several peer-reviewed studies published during the decade.<sup>xxii</sup> One uses a regression analysis of murder rates in U.S. cities from 1985-1994 to conclude that “murder could be especially associated with more severe cases of childhood lead poisoning.”<sup>xxiii</sup> Another finds “the reduction in childhood lead exposure in the late 1970s and early 1980s was responsible for significant declines in violent crime in the 1990s.”<sup>xxiv</sup>

**2004:** The U.S. House of Representatives holds oversight hearings after the *Washington Post* runs a front-page story about lead levels in Washington, D.C., drinking water found to be at least 83 times higher than the acceptable limit.<sup>xxv</sup> The contamination is traced to a change in the treatment chemical used for the city’s pipes.

**2008:** President George W. Bush signs the Consumer Product Safety Improvement Act, which incorporates the Lead-Free Toys Act, reducing the allowable amounts of lead in toys.<sup>xxvi</sup> The same year, the Bush EPA issues its Lead Renovation, Repair, and Painting Rule, requiring certification for renovators whose work disturbs lead paint in homes, preschools, or child care facilities built before 1978.<sup>xxvii</sup>

**2016:** President Obama and Michigan Governor Rick Snyder each declare states of emergency after aging lead pipes poison the drinking water of 100,000 people (including about 12,000 children) in Flint, Michigan, when a state-appointed official changes the city’s water supply.<sup>xxviii</sup>

**2020:** The Trump Administration’s EPA issues its final Lead-Free Rule to implement a series of statutes enacted since 1986 limiting the amount of lead in plumbing fittings and fixtures (valves, joints, faucets, etc.).<sup>xxix</sup>

**2021:** Algeria becomes the last country on Earth to fully remove lead from gasoline.<sup>xxx</sup>

**2022:** The Biden Administration’s Fish and Wildlife Service publishes a final rule to require nontoxic lead-free ammunition be used for hunting on certain federal lands.<sup>xxxi</sup>

<sup>1</sup> Mark Miller, “Oldest Known Lead Artifact was Found with Skeletons, Suggesting Mystical Significance,” *Ancient Origins*, 5 Dec. 2015: <https://www.ancient-origins.net/news-history-archaeology/oldest-known-lead-artifact-was-found-skeletons-suggesting-mystical-020642>

<sup>1</sup> J.M.S. Pearce; “Burton’s Line in Lead Poisoning,” *Eur Neurol* 1 Feb. 2007; 57 (2): 118–119. <https://doi.org/10.1159/000098100>

<sup>1</sup> *Ibid.*

<sup>1</sup> Tim Harford, “Why did we use leaded petrol for so long?,” *BBC World Service*, 27 Aug. 2017: <https://www.bbc.com/news/business-40593353>

<sup>1</sup> Tom Kington, “The mystery of Caravaggio's death solved at last – painting killed him,” *The Guardian*, 16 June 2010: <https://www.theguardian.com/artanddesign/2010/jun/16/caravaggio-italy-remains-ravenna-art>

<sup>1</sup> Josef Eisinger, "Lead and Wine: Eberhard Gockel and the *Colica Pictonum*," *Medical History*, 1982, 26:279-302.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1139187/pdf/medhist00086-0053.pdf>

<sup>1</sup> T. Tronchin, *De colica Pictonum* (Geneva, 1757): <https://archive.org/details/decolicapictonum00tron/page/n5/mode/2up>

<sup>1</sup> R. M. S. McConaghey, "Sir George Baker and the Devonshire Colic," *Medical History* 11, no. 4 (1967): 345–60.  
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<sup>1</sup> SL Tackett, "The Franklin letter on lead poisoning," *J Chem Educ* 1981;53:274.

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<sup>1</sup> O. Walusinski, "Louis Tanquerel des Planches (1810-1862) and the history of discovering lead poisoning in the nervous system," *Revue Neurologique*, Vol. 178, Issue 6, pp. 521-531 (2022): ISSN 0035-3787,  
<https://doi.org/10.1016/j.neurol.2021.08.009>.

<sup>1</sup> Richard Guenther, "Dangers of White Lead," Hathitrust, Sherwin Williams Co. (1904):  
<https://babel.hathitrust.org/cgi/pt?id=nyp.33433066401898&view=lup&seq=110>

<sup>1</sup> WJ Furnival, *Leadless Decorative Tiles, Faience, and Mosaic, comprising notes and receipts on the History, Materials, Manufacture & Use of Ornamental Flooring Tiles, Ceramic Mosaic, and Decorative Tiles and Faience* (1904): W.J. Furnival, Stone, Staffordshire.

<sup>1</sup> Steven G. Gilbert and Bernard Weiss, "A rationale for lowering the blood lead action level from 10 to 2 microg/dL," *Neurotoxicology* Vol. 27,5 (2006): 693-701. doi:10.1016/j.neuro.2006.06.008

<sup>1</sup> *Ibid.*

<sup>1</sup> David Rosner and Gerald Markowitz, "A 'Gift of God'?: The Public Health Controversy over Leaded Gasoline during the 1920s," *American Journal of Public Health* Vol. 75, No. 4, April 1985:  
<https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.75.4.344>

<sup>1</sup> P.L. 91-695.

<sup>1</sup> U.S. Consumer Product Safety Commission press release, "CPSC Announces Final Ban on Lead-Containing Paint," 2 Sept. 1977: <https://web.archive.org/web/20100819015700/http://www.cpsc.gov/CPSCPUB/PREREL/prhtml77/77096.html>

<sup>1</sup> Earl Gustkey, "Outdoor Notes: Lead Shot Outlawed in Waterfowl Hunting Areas, Starting in 1991," *The Los Angeles Times*, 27 June 1986: <https://www.latimes.com/archives/la-xpm-1986-06-27-sp-20586-story.html>

<sup>1</sup> P.L. 102-550.

<sup>1</sup> Elin Hofverberg, "The History of the Elimination of Leaded Gasoline," *Library of Congress Blogs*, 14 Apr. 2022:  
<https://blogs.loc.gov/law/2022/04/the-history-of-the-elimination-of-leaded-gasoline/>

<sup>1</sup> Wayne Hall, "Did the elimination of lead from petrol reduce crime in the USA in the 1990s?," *F1000Research* Vol. 2, 156. 16 Jul. 2013: doi:10.12688/f1000research.2-156.v2.

<sup>1</sup> Rick Nevin, "Understanding international crime trends: The legacy of preschool lead exposure," *Environmental Research* Vol. 104, Issue 3 (2007) pp. 315-336, ISSN 0013-9351: <https://doi.org/10.1016/j.envres.2007.02.008>

<sup>1</sup> Jessica Wolpaw Reyes, "Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime," *The B.E. Journal of Economic Analysis & Policy* 7, no. 1 (2007): <https://doi.org/10.2202/1935-1682.1796>

<sup>1</sup> David Nakamura, "Water in D.C. Exceeds EPA Lead Limit," *The Washington Post*, 30 Jan. 2004:  
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<sup>1</sup> P.L. 110-314.

<sup>1</sup> U.S. Environmental Protection Agency, Federal Register Vol. 73, No. 78 (Tuesday, April 22, 2008) Pages 21692-21769: <https://www.epa.gov/lead/lead-renovation-repair-and-painting-program-rules#rrp>

<sup>1</sup> Leonard N. Fleming, “Darnell Earley: The man in power during Flint switch,” the *Detroit News*, 16 March 2016: <https://www.detroitnews.com/story/news/michigan/flint-water-crisis/2016/03/14/darnell-earley-flint-water-crisis/81788654/>

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<sup>iv</sup> Tim Harford, “Why did we use leaded petrol for so long?,” *BBC World Service*, 27 Aug. 2017: <https://www.bbc.com/news/business-40593353>

<sup>v</sup> Tom Kington, “The mystery of Caravaggio's death solved at last – painting killed him,” *The Guardian*, 16 June 2010: <https://www.theguardian.com/artanddesign/2010/jun/16/caravaggio-italy-remains-ravenna-art>

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<sup>viii</sup> R. M. S. McConaghey, “Sir George Baker and the Devonshire Colic,” *Medical History* 11, no. 4 (1967): 345–60. <https://doi.org/10.1017/S0025727300012497>.

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