March 2, 2026

The Honorable Marc Korman
Chairman, House of Delegates, Environment & Transportation Committee
Room 251, Taylor House Office Building
Annapolis, MD 21401

Re: House Bill 1067 - Lead and Lead-Based Ammunition Phase-Out – FAVORABLE

Dear Chairman Korman and Members of the Committee:

My name is Jim Keen, and I am a veterinarian and Director of Veterinary Science with the non-profit Center for a Humane Economy. I am writing in strong support of HB 1067, the phase-out of lead ammunition for hunting, for the following reasons:

- *Lead is harmful* - Lead poisoning happens when lead builds up in the body over time. Thus leads toxic effects are insidious and slow in onset. Lead can affect every organ system and is particularly harmful to young children and women of childbearing age. There is no safe level of lead exposure. While lead exposure does not cause immediate or obvious symptoms, it can still cause lasting damage. In children, lead exposure is linked to lower IQ, learning difficulties, attention problems, and increased behavioral issues. In adults, lead can contribute to high blood pressure, kidney disease, reproductive problems, nerve damage, and other serious conditions. Once lead enters the body, it does not break down or go away. It can be stored in bones and teeth for decades and can be released back into the bloodstream later in life, including during pregnancy, exposing unborn children. The good news is that lead exposure is preventable.
- *Lead ammunition contaminates meat* - Most modern rifle bullets used for deer hunting are designed to expand when they hit the animal. When lead bullets strike bone, they often break apart into hundreds, or even thousands, of tiny fragments. Many of these pieces are microscopic and cannot be seen, felt, or removed during meat processing. Studies using X-rays and chemical testing have shown that lead fragments can spread several inches away from the bullet's path and contaminate surrounding meat. Ground venison is especially likely to contain lead fragments because meat from multiple areas is mixed. Shotgun ammunition can also leave behind lead pellets or slug fragments in meat. Scientific studies have repeatedly shown that people who eat venison harvested with lead ammunition often have higher blood lead levels than those who do not. Importantly, health authorities do not recognize any safe amount of lead in meat. While no one has documented an acute illness immediately caused by swallowing a visible lead fragment, the concern is long-term, repeated exposure, especially

for families who eat wild game regularly and for food pantry recipients who may rely on donated venison.

- *Lead ammunition toxicity is a shared human, animal, and environmental risk* - Lead ammunition is not just a human health issue. It affects wildlife and the environment as well. Scavengers such as eagles, hawks, and other birds can be poisoned when they feed on gut piles or carcasses left in the field. Mammals can also ingest lead fragments while feeding. Over time, lead accumulates in soil and ecosystems, where it can persist for decades. This is what public health professionals call a "One Health" issue, meaning that the health of people, animals, and the environment are closely connected. Lead ammunition harms all three.
- *Donated venison is frequently contaminated with lead fragments* - Maryland is among the 44 U.S. states with a program to donate venison to food banks and food pantries. However, since 2007, multiple studies and reports have detect lead in donated venison, most recently in New York state. Due to the high frequency of lead contamination in donated venison in Minnesota, the Minnesota Department of Agriculture banned ground venison for food banks and has X-ray screened all donated whole venison cuts since 2008. On average over the past 17 years, 7.1% of donated venison packages have been contaminated with lead from bullet or shot fragments and discarded.
    - Minnesota hunters averaged 195,010 deer shot/year from 2011 to 2021. An average of 37 lb. of meat per deer = 7,215,000 lb. of venison. Using Minn Dept of Ag's 7.1% tainted average means state hunters have consumed up 512,291 lb. (256 tons!) of lead-tainted meat/year.
    - Maryland hunters kill about 80,000 deer each year. If each deer yields 37 lb. of venison, this produces 2,960,000 lb. of venison. If 7.1% of deer venison is lead contaminated (as in Minnesota), then Maryland hunters, their families and friends are consuming (2,960,000 x 0.071 =) 210,160 lb. (105 tons!) of lead-contaminated venison each year.
    - About 40,000 lb. of venison is donated to food banks each year in Maryland from the National Park Service, Farmers & Hunters Feeding the Hungry, & Families Eating Donated Deer. If 7.1% of this venison is contaminated with lead, then (40,000 x 0.071=) then 2,840 lbs. (1.42 tons!) of lead tainted meat is consumed by Maryland food pantry clients each year.
    - Donated venison is exceptionally risky because recipients of donated venison are often low-income pregnant women and children, the groups most vulnerable to lead toxicity. This brief 10-minute video from 2023 by lead ammunition researcher Samantha Totoni provides an excellent overview of the public health problem of lead in donated venison: https://www.youtube.com/watch?v=V50bqMrF3Ng
- *Conclusion* - No ethical or responsible hunter wants to poison their family, their community, or wildlife. Many hunters who continue to use lead ammunition do so simply because they are unaware of the risks, not because they are indifferent to conservation or public health. The good news is that effective, affordable non-lead ammunition alternatives already exist.

These alternatives perform just as well as lead ammunition and dramatically reduce the risk of lead exposure. We have already decided, as a society, that lead does not belong in our gasoline, our homes, our water, or our food. The same common-sense reasoning should apply to hunting ammunition. At this point, science evidence of the risks from lead ammunition are clear. What remains is a policy decision. By supporting SB 181, Maryland can take a practical step to protect hunters, families, food bank recipients, wildlife, and the environment, without compromising hunting traditions or effectiveness

I have included as two addenda:

(I) Some images, including radiographs (X-rays), of lead ammunition contamination.

(II) Plots I created describing Maryland deer population estimates over time, deer harvest numbers, and hunting licenses sold from 1900 to the present.

- The only data not directly extracted from various Maryland DNR online reports is the estimated deer population in Maryland from 1900 to 1987. I used Chat GPT to model this missing deer population data.
- The final plot shows that about 3.3 million deer have been legally harvested in Maryland since 1927. The huge majority of these deer were killed with lead ammunition. The accumulated lead ammunition residue from 98 years of deer hunting will remain as a dangerous environmental toxin *forever*.
- As the Maryland deer population, and therefore the harvested deer population, both increase over time, so does the amount of environmental lead contamination from ammunition. I read that some Maryland hunters harvest five deer per season, all potentially creating Pb contaminated venison for their family's dinner table, 5X more lead than when a single deer was the harvest limit. Likewise, lead contaminated gut piles increase as deer harvest increases, as does the overall ammunition environmental load exposing wildlife.

I respectfully urge the Committee to issue a favorable report on HB 1067.

Thank you for your consideration.

Sincerely,

Jim Keen, DVM, PhD (Epidemiology)

Director of Veterinary Science
The Center for a Humane Economy
Wessington Springs, South Dakota

ADDENDUM I

In 2021, at least five bald eagles in Manchester, Maryland were poisoned after scavenging on hunter-killed deer carcass. https://www.annapoliscreative.com/multiple-bald-eagles-poisoned-after-scavenging-on-deer-carcass-in-manchester-md/

X-rays of deer carcasses shot with lead bullet & copper bullet.

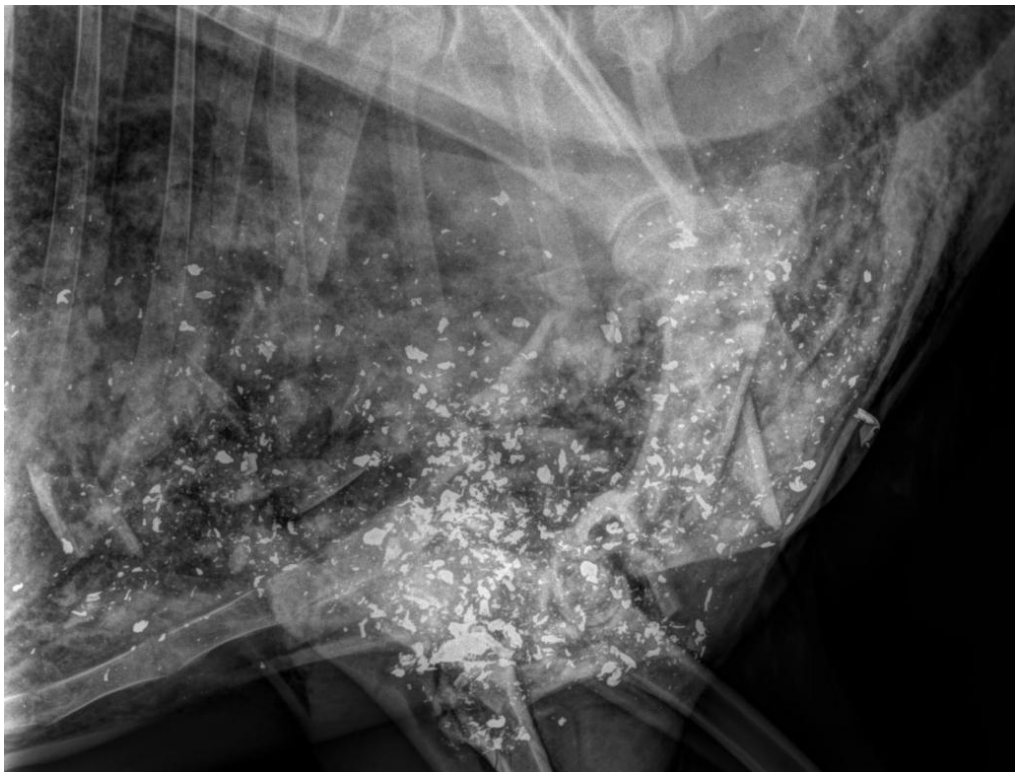
- **Bright white spots = lead fragments**
- **Spread throughout animal's body**
- **Contaminate meat & environment**

30 caliber Winchester magnum lead core w/ copper jacket
- **Highly toxic**
- **Hundreds of fragments**

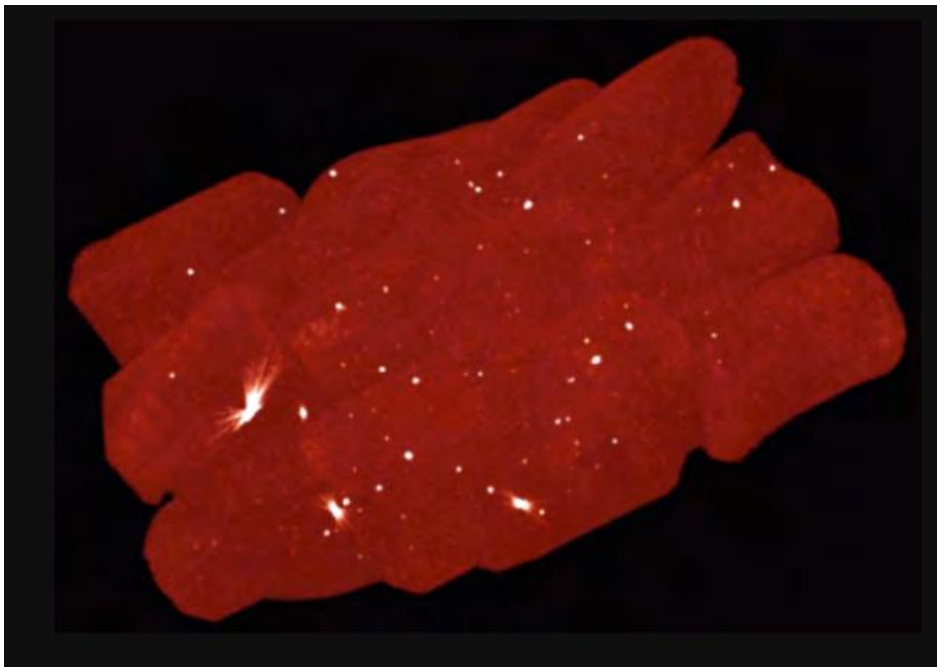
- **No copper bullet fragments**

30 caliber Winchester magnum solid copper bullet
- **Non-toxic**
- **No fragmentation**

Sources: https://www.gma.vic.gov.au/hunting/caring-for-the-environment/environmental-and-health-risks-of-lead-bullets-for-deer-hunting; https://www.usgs.gov/media/images/coppeand-lead-ammunition-comparison



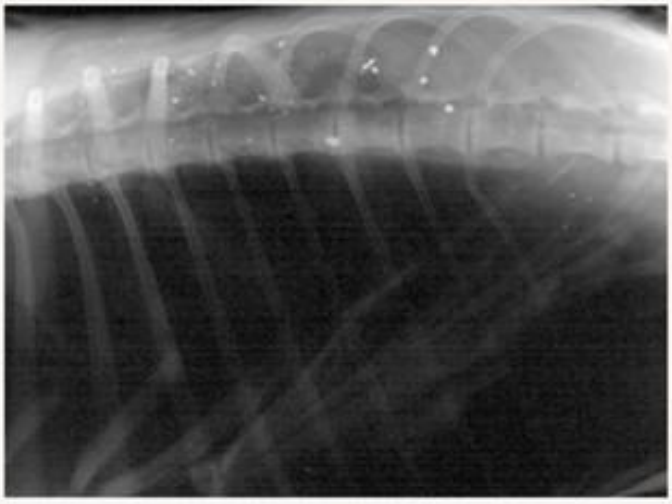
X-ray of lead and bone fragments in chest of Sika Deer shot w/ lead bullet; Lead fragments found up to 18 inches from the wound channel (https://www.gma.vic.gov.au/hunting/caring-for-the-environment/environmental-and-health-risks-of-lead-bullets-for-deer-hunting)



High-definition computed tomography (CT) image of 20 one-pound ground venison packages. Bright spots are metal lead fragments embedded in the meat. This image is from the first report in 2007 of lead contamination of donated venison in North Dakota (Cornatzer et al 2009).

Traditional lead bullet fragmentation on entry

Copper bullet on entry showing zero fragmentation



X-ray showing presence of lead bullet fragments in deer backstrap.

An assortment of lead bullets showing shot fracturing next to similar fired copper variants

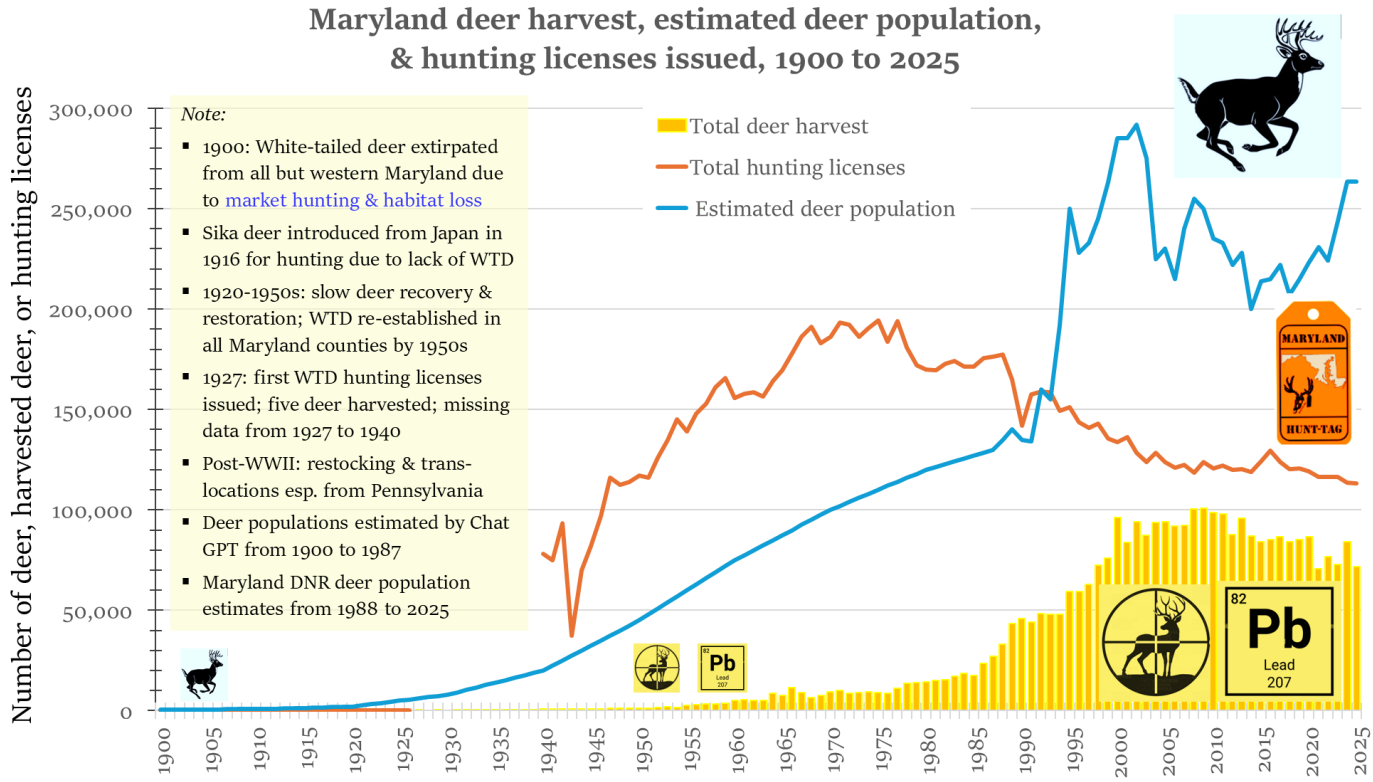
Images from:
https://huntingwithnonlead.org/

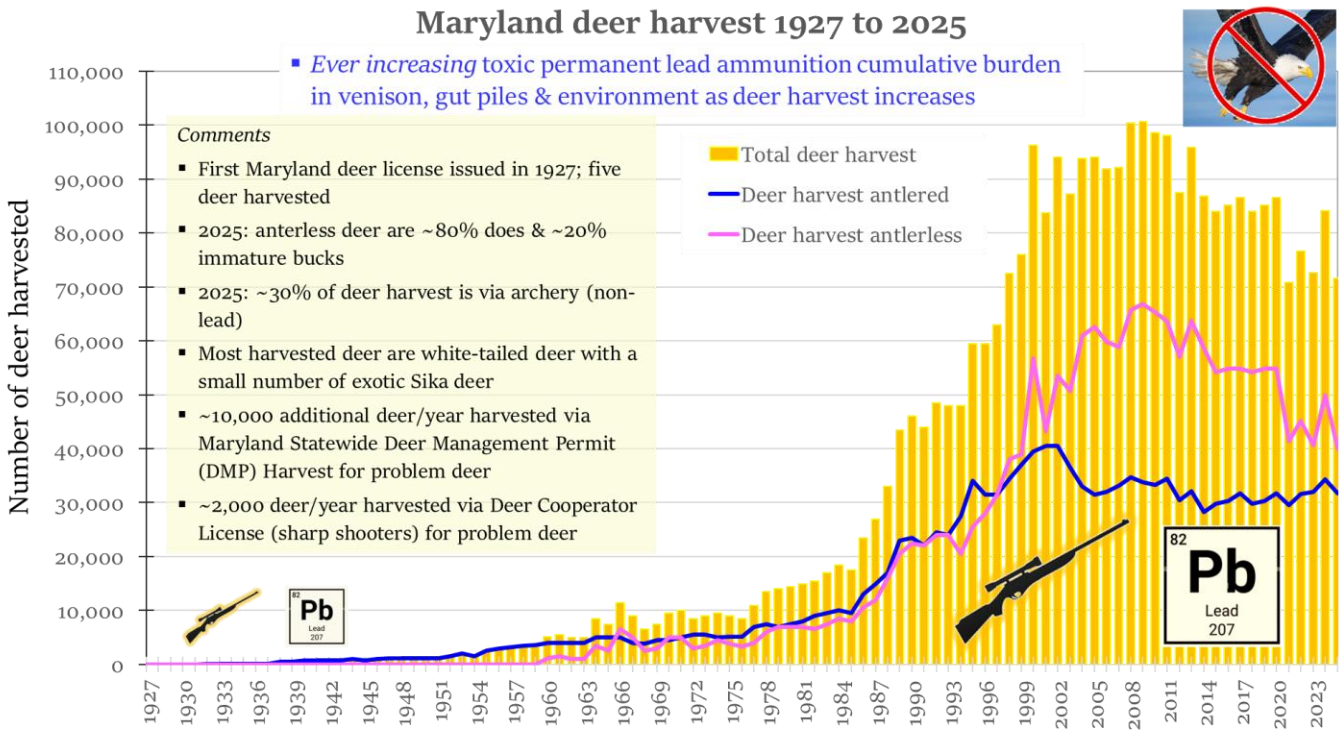
The most common hunting bullet is a lead core with a copper jacket. When an animal is shot, millions of sub-microscopic bullet fragments are dispersed throughout the carcass. This fragmentation occurs regardless of where the animal is shot, but there is more lead fragmentation if the bullet strikes a hard material such as bone. Pb particles with small surface areas increase bioavailability and make detection more difficult.

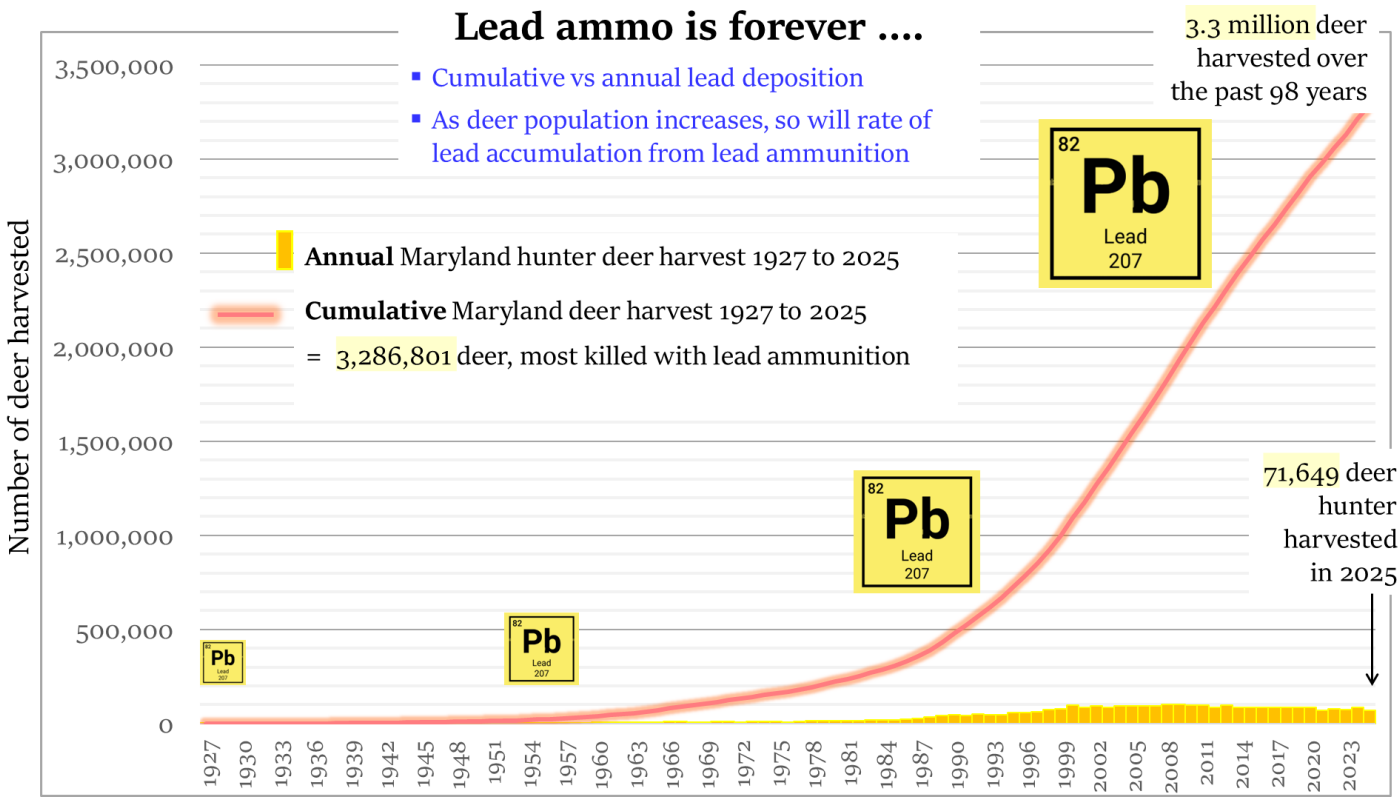
About 95 percent of the 10 billion to 13 billion rounds of ammunition purchased every year in the United States contain lead, which primarily comes from recycled car batteries, according to industry estimates. These bullets are often jacketed with a harder metal like copper or steel.

(https://www.pulse.ng/story/poisoned-wildlife-and-tainted-meat-why-hunters-are-moving-away-from-lead-bullets-20240801025206779 87)

ADDENDUM II


Maryland deer harvest, estimated deer population, & hunting licenses issued, 1900 to 2025
Number of deer, harvested deer, or hunting licenses
Note:
1900: White-tailed deer extirpated from all but western Maryland due to market hunting & habitat loss
Sika deer introduced from Japan in 1916 for hunting due to lack of WTD
1920-1950s: slow deer recovery & restoration; WTD re-established in all Maryland counties by 1950s
1927: first WTD hunting licenses issued; five deer harvested; missing data from 1927 to 1940
Post-WWII: restocking & trans-locations esp. from Pennsylvania
Deer populations estimated by Chat GPT from 1900 to 1987
Maryland DNR deer population estimates from 1988 to 2025
Total deer harvest
Total hunting licenses
Estimated deer population
MARYLAND
HUNT-TAG
82
Pb
Lead
207


Maryland deer harvest 1927 to 2025
Ever increasing toxic permanent lead ammunition cumulative burden in venison, gut piles & environment as deer harvest increases
Number of deer harvested
Comments
First Maryland deer license issued in 1927; five deer harvested
2025: anterless deer are ~80% does & ~20% immature bucks
2025: ~30% of deer harvest is via archery (non-lead)
Most harvested deer are white-tailed deer with a small number of exotic Sika deer
~10,000 additional deer/year harvested via Maryland Statewide Deer Management Permit (DMP) Harvest for problem deer
~2,000 deer/year harvested via Deer Cooperator License (sharp shooters) for problem deer
Total deer harvest
Deer harvest antlered
Deer harvest antlerless
82
Pb
Lead
207


Lead ammo is forever ....
Cumulative vs annual lead deposition
As deer population increases, so will rate of lead accumulation from lead ammunition
3.3 million deer harvested over the past 98 years
Annual Maryland hunter deer harvest 1927 to 2025
Cumulative Maryland deer harvest 1927 to 2025
= 3,286,801 deer, most killed with lead ammunition
71,649 deer hunter harvested in 2025
Number of deer harvested
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023
82
Pb
Lead
207