THE WILDLIFE SOCIETY

FACT SHEET

Impacts of Lead (Pb) on Wildlife

An x-ray of a Bald Eagle displays lead shot in the digestive tract. Eagles accumulate lead by scavenging on wildlife that have been shot with lead ammunition (Credit: USGS).

"In many settings, minimizing or restricting the use of lead ammunition and fishing tackle would be beneficial to waterbirds, scavenging birds, upland birds, and possibly other species."

- Sources and Implications of Lead Ammunition & Fishing Tackle on Natural Resources (The Wildlife Society Technical Review, 2008)

Lead (Pb) has been used in ammunition and fishing tackle for centuries. Although lead is naturally occurring, it has no essential biological function[1] and high concentrations such as those found in ammunition and tackle pose several direct and indirect threats to wildlife.

Spent lead ammunition and tackle are dangerous when ingested by wildlife and have long-term environmental impacts. Lead ammunition and tackle can be ingested directly by wildlife or dissolved into the soil. Once in the soil, lead is biologically incorporated into plants and invertebrates which are then ingested by wildlife.[4,5,6]

Bans in the 1990s on the use of lead shot for hunting waterfowl in North America were successful in reducing lead exposure to waterfowl species.[2, 14] However, the continued use of lead tackle and lead ammunition in other hunting pursuits maintains some risk for wildlife. Mortality rates linked to lead intoxication in wildlife remain high in some localized areas despite some legislative action to phase out its use.

Threats of Lead (Pb) to Wildlife

Ingestion of spent ammunition and lost fishing tackle by reptiles, birds, and mammals has been documented to cause a range of negative effects in individuals. These individual-level impacts potentially cause population-level effects in some species, particularly waterfowl, eagles, condors, doves, and loons.[11]

Scavengers such as condors, vultures, and eagles[3] can be exposed to lead by consuming carcasses of animals harvested with lead ammunition.[11]

Lead can remain relatively stable and intact for decades or centuries. However, under certain environmental conditions, (e.g., acidic or basic water or soil) lead from ammunition or tackle can be released, methylated, and taken up by plants or animals. This process can cause a range of biochemical, physiological, and behavioral effects in some species of invertebrates, fish, amphibians, reptiles, birds, and mammals.[3]

The remains of lead fishing weight are found in a loon gizzard. Since 1987, nearly half of the adult loons found dead or dying on New England freshwater lakes submitted to the Tufts University Wildlife Clinic have been diagnosed with lead poisoning[12] (Credit: Sheila Schmeling, FWS).

Effects of Lead Exposure on Wildlife[3]

Toxic levels of lead can cause:

- damage to nervous system
- paralysis
- death

At lower levels, lead is known to cause a variety of sublethal effects such as:

- damage to tissues and organs
- damage to immune system
- damage to reproductive system
- high blood pressure
- neurological impairment

Current Regulation of Lead Ammunition and Tackle

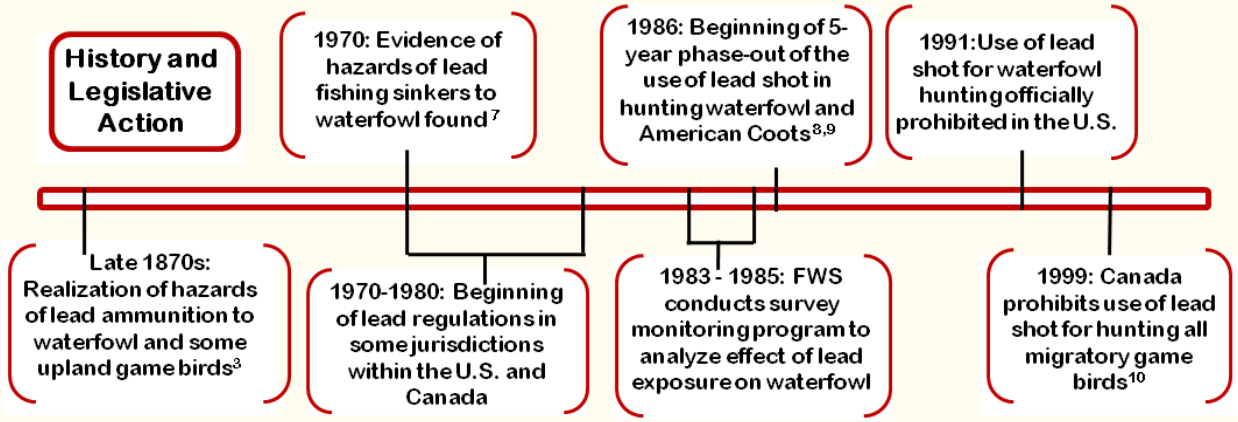
The U.S. prohibited lead shot in the hunting of waterfowl and coots in 1991. Environment Canada banned the use of lead shot for hunting most migratory game bird species in 1999.[14] Several states have added additional regulations to the use of lead ammunition. For example, California created non-lead zones in the range of California condors in 2007. More recently, California passed a law to prohibit all lead ammunition state-wide by 2019.[15]

Parks Canada banned the use of small lead sinkers in all national parks and wildlife areas in 1997.[16] Some U.S. states have issued regulations on lead fishing tackle. In New York, for example, the sale of lead sinkers weighing less than half an ounce is prohibited.[17]

Alternatives to Lead

There has been an extensive effort in the development, testing, and regulation of alternatives to lead-based ammunition in recent years. Manufacturers have developed non-toxic ammunition that can be used safely in all gauges of modern shotguns, as well as non-toxic rifle bullets. Dozens of substitutes for lead fishing tackle have entered the marketplace in recent years. Non-toxic substitutes for tackle and ammunition include bismuth, steel, tin, and tungsten.

The endangered California condor (*Gymnogyps californianus*), a scavenger, is one species that is greatly affected by lead accumulation[13] (Credit: USFWS).



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