Lead-Free Wildlife

THE HUMANE SOCIETY OF THE UNITED STATES

Environmental Impacts of Lead Ammunition

Ammunition from hunting is a major source of lead released into the soil and aquatic environments.[i] [ii] [iii] Lead is one of the most serious environmental hazards,[iv] a potent neurotoxicant that is hazardous to the environment when it makes its way into the air, soil and water. In small amounts, lead occurs naturally in the environment. But its widespread use has resulted in elevated concentrations in the ecosystem. At such levels, lead is toxic to plants and micro-organisms, contaminates soil particles and enters surface waters through erosion, remaining there for up to two years.

Lead from ammunition can enter the environment through two ways: atmospheric transport (e.g. particles from lead dust) or direct deposit onto the ground (e.g. spent ammunition).[v] Heavy rain may cause lead in surface soil to migrate into ground water and eventually into water systems.[vi] Further, plants exposed to lead can absorb the metal dust through their leaves and can also take lead particles from the soil.[vii]

Lead-based ammunition can negatively affect the environment in the following ways:

Effects of Lead on the Ecosystem

Lead stresses ecosystems by depositing it in vegetation, ground and water surfaces, and it can decrease species diversity in both terrestrial and aquatic species.[viii] Spent ammunition is a major source of lead deposited into ecosystems, and in some cases may increase its solubility, bioavailability and toxicity.[ix]

There are three ways in which lead can adversely affect ecosystems: 1) populations of micro-organisms may be wiped out at soil lead concentrations of 1,000 parts per million (ppm) or more; 2) populations of plants, micro-organisms and invertebrates may be affected by lead concentrations of 500-1,000 ppm, allowing for more lead-tolerant populations of species to take their place; and 3) the addition of lead to vegetation and animal surfaces can prevent the normal biochemical process that purifies the calcium pool of grazing animals and decomposer organisms.[x]

Effects of Lead on the Soil

Lead accumulates in the soil, where it may be retained for several years.[xi] In terrestrial ecosystems, it tends to accumulate on the upper layer of the soil surface, but over time it may reach the root zone. An uneven distribution of lead may hinder the chemical breakdown of inorganic soil fragments, which makes the lead more soluble and more easily taken up by plants.[xii]

Effects of Lead on Plants

Plants take in lead mostly through the soil and sometimes through the leaves. The amount of lead consumption is largely influenced by the state of growth of the vegetation, and some species of plants have the capacity to accumulate high concentrations of lead.[xiii] Lead causes an imbalance of enzymes, decreases mineral and water intake, changes hormonal levels and can even affect the membrane structure of the plant. The result is often stunted growth or death of the plant.[xiv]

Effects of Lead on Waterways

Once lead has entered the soil, it can travel into aquatic systems, including both surface water and groundwater. After heavy rains, lead can detach from soil particles and leech into surface waters. Movement into waterways usually occurs near areas with elevated lead levels and occurs slowly in normal conditions.[xv] One major source of waterborne lead is from lead shot left behind from hunting near lakes and ponds.[xvi]

Contaminated Drinking Water in Cape Cod

Research has concluded that the physical abrasion of lead ammunition through soil is a significant factor of lead contamination at shooting ranges and has the ability to contaminate groundwater in close proximity to these areas.[1]

In 1997, the EPA halted live firing of lead ammunition at Camp Edwards, which sits on the 22,000-acre Massachusetts Military Reservation (MMR), due to concerns that military training was causing substantial damage to the groundwater. The MMR is located over a sole source aquifer that provides drinking water for the residents of Cape Cod. The water was found to be contaminated by the heavy amount of ammunition use.

In early 2000, the EPA issued a precedent-setting administrative order to clean up spent ammunition after testing showed the presence of lead seeping into Cape Cod's underground water supply.[2]

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