

Oregon Lakes Association: Policy Regarding Lead in Fishing and Hunting

Background: Lead is a known toxic metal that has for millennia been used for purposes from water conveyance to weighting fishing lines. The chemical symbol for lead is Pb, derived from "plumbum," which gave us the word plumbing. While lead solubility and reactivity in water is low, variations in water chemistry can result in the solubilization of biologically harmful levels of lead (EPA; <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water#getinto>). A drinking water emergency involving elevated lead levels in drinking water occurred in Flint, Michigan, in 2015 after a switch from lake to river water with higher chloride levels resulted in higher solubilization of lead from aging pipes (https://en.wikipedia.org/wiki/Flint_water_crisis#Lead_exposure_findings). Equally, metallic lead shot pellets and the lead in sinkers deposited onto soils and aquatic sediments cannot be deemed as chemically or environmentally inert. Lead will enter into the soluble phase and become available to the food chain (Lenntech, 2017).

While relatively little data have been directly collected regarding the potential impacts of lead deposition in aquatic environments, elevated lead concentrations have been reported in mussels near shooting ranges, and elevated lead levels were found in the interstitial water of shot contaminated sediments (Stansley, et al., 1992). Further, a strong correlation has been found between sediment-lead concentrations and lead concentrations in Mysis crustaceans, suggesting a biological mobilization of lead from lake sediments. In Rainbow Trout (*Oncorhynchus mykiss*) lead has been shown to compete with calcium uptake in the gills disrupting the sodium/calcium ion homeostasis (Rogers & Wood, 2004). Physiological risks include decreases in plasma calcium, as well as bone and scale mineralization, which would be particularly sensitive in calcium poor waters (Wood, pers. comm., 2012-04-12). In addition, it has also been suggested that sediment bacterial communities are affected by elevated lead levels (Evans & Lasenby, 1983). In other investigations, lead has been found in edible muscle of fish species caught in freshwater lakes (Ashraf & Jaleel Tariq, 2008). Asiatic clam (*Corbicula fluminea*) tissue and shells have been found to be reliable and readily accessible indicators of lead levels when used for assessing the bioavailability of metal contaminants in aquatic systems (Clark et al., 2008). Many studies on aquatic invertebrates (e.g., isopods, mussels) have demonstrated that Pb accumulates in shells and other skeletal material (Spehar et al., 1970). Predators of *Corbicula fluminea* include many species of fish, birds, raccoons, crayfish, and flatworms providing a mechanism for bioaccumulation.

In addition to lead mobilization into organisms via solubilization and absorption, a major route for lead entry into wildlife is via direct ingestion of lead shot and fishing weights. Waterfowl and scavengers of carcasses containing lead shot are at high risk. Declines in California condor, bald eagle and golden eagle populations, and lead accumulations in bottom-feeding waterfowl (Scheuhammer and Norris, 1996), were responsible for restrictions on the use of lead shot being introduced by the US Fish and Wildlife Service in 1991 (Wikipedia [https://en.wikipedia.org/wiki/Shot_\(pellet\)](https://en.wikipedia.org/wiki/Shot_(pellet))).

But we are still adding large quantities of lead to the environment and to lakes. Why is this acceptable? Lead is regarded as toxic to living organisms at any level (<https://www.niehs.nih.gov/health/topics/agents/lead/index.cfm>).

Oregon Lakes Association supports a shift away from lead-based shot and fishing weights in all circumstances.

Oregon Lakes Association Resolution 2018-01

Whereas a comprehensive review of lead in fish and wildlife was conducted by Washington Department of Fish and Wildlife in 2006 in a report titled, "Fish and Wildlife Issues Related to the Use of Lead Fishing Gear";

And whereas this report highlights concerns of the use of lead within the industry;

And whereas, as a known toxic metal, lead has already been removed from a number of industries and products;

And whereas notably, gasoline, paint, pencils, and plumbing materials all have such legacies while lead remains in use in fishing and hunting in the form of lead weights and lead shot;

And whereas the summary findings from the Washington State report were stated as follows:

- Lead is a naturally occurring element that can be toxic to most forms of life.
- Lead is not biodegradable and can accumulate in organisms and persist in bones and teeth for decades.
- Lead poisoning occurs in both acute and chronic forms. For humans, even a small exposure, especially for a child, can cause behavioral or cognitive changes.
- In the United States, laws have been adopted limiting lead content of water, paint, and gasoline.
- Ingestion of lead shot and lead fishing gear can cause lead poisoning in many species of wildlife.
- Because of their eating habits, lead poisoning is most common in waterbirds, but has also been reported in many other bird species including raptors, and in painted and snapping turtles and small mammals such as raccoons.
- In birds, lead is ground up in the gizzard, where it is dissolved by digestive acids releasing it into their bloodstream.
- Studies have shown that loons are very susceptible to lead poisoning, and one lead sinker or jig can kill a bird.
- Several countries have enacted laws limiting the use of lead shot, particularly for hunting waterfowl.
- Several countries and several U.S. states have enacted laws limiting the use of lead fishing tackle, mostly based on size.
- There is a growing list of manufacturers and retailers that offer lead-free fishing tackle at a reasonable price.

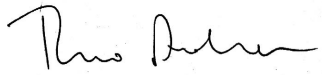
Further, whereas a consensus statement from 30 scientists signed and published in 2013 states the following:

1. Lead is one of the most well-studied of all anthropogenic toxins and there is overwhelming scientific evidence that demonstrates:
 - a. Lead is toxic to multiple physiological systems in vertebrate organisms, including the central and peripheral nervous, renal, cardiovascular, reproductive, immune, and hematologic systems. Lead is also potentially carcinogenic; lead is officially recognized as a carcinogen and reproductive toxin in California, and the International Agency for Research on Cancer, the National Toxicology Program, and the US Environmental Protection Agency have identified lead as likely to be carcinogenic to humans.
 - b. There is no level of lead exposure to children known to be without deleterious effects (CDC, 2012). Exposure in childhood to even slightly elevated levels of lead produce lasting neurological deficits in intelligence and behavior.

- c. Lead is also known to be toxic across different vertebrate organisms, including mammalian and avian species.
- 2. Lead-based ammunition is likely the greatest, largely unregulated source of lead knowingly discharged into the environment in the United States. In contrast, other significant sources of lead in the environment, such as leaded gasoline, lead-based paint, and lead-based solder, are recognized as harmful and have been significantly reduced or eliminated over the past 50 years.
 - a. Lead-based ammunition production is the second largest annual use of lead in the United States, accounting for over 60,000 metric tons consumed in 2012, second only to the consumption of lead in the manufacture of storage batteries (USGS, 2013).
 - b. The release of toxic lead into the environment via the discharge of lead-based ammunition is largely unregulated. Other major categories of lead consumption, such as leaded batteries and sheet lead/lead pipes, are regulated in their environmental discharge/disposal.
- 3. The discharge of lead-based ammunition and accumulation of spent lead-based ammunition in the environment poses significant health risks to humans and wildlife. The best available scientific evidence demonstrates:
 - a. The discharge of lead-based ammunition substantially increases environmental lead levels, especially in areas of concentrated shooting activity (USEPA ISA for Lead draft report, 2012).
 - b. The discharge of lead-based ammunition is known to pose risks of elevated lead exposure to gun users (NRC, 2012).
 - c. Lead-based bullets used to shoot wildlife can fragment into hundreds of small pieces, with a large proportion being sufficiently small to be easily ingested by scavenging animals or incorporated into processed meat for human consumption (Pauli and Burkirk, 2007; Hunt et al., 2009; Knott et al., 2010).
 - d. Lead-based ammunition is a significant source of lead exposure in humans that ingest wild game (Hanning et al., 2003; Levesque et al., 2003; Johansen et al., 2006; Tsuji et al., 2008), and hunters consuming meat shot with lead-based ammunition have been shown to have lead pellets/fragments in their gastrointestinal tract (Carey, 1977; Reddy, 1985).
 - e. Lead poisoning from ingestion of spent lead-based ammunition fragments poses a serious and significant threat to California wildlife.
 - i. Spent lead-based ammunition is the principal source of lead exposure to the endangered California condor, and lead poisoning in condors is preventing their successful recovery in the wild (Church et al., 2006; Woods et al., 2007; Green et al., 2008; Parish et al., 2009; Rideout et al., 2012; Finkelstein et al., 2012).
 - ii. Many other wild scavenging species, such as golden eagles, bald eagles, ravens, turkey vultures, and pumas are known to be exposed to and affected by lead (Wayland and Bollinger, 1999; Clark and Scheuhammer, 2003; Fisher et al., 2006; Craighead and Bedrosian, 2008; Stauber et al., 2010; Kelly and Johnson, 2011; Burco et al., 2012).

Be it Resolved that having considered these findings, the Oregon Lakes Association, a non-profit organization whose mission is to promote the understanding, protection, and thoughtful management of lake and watershed ecosystems in Oregon has determined that there is overwhelming scientific evidence for eliminating the use of lead in fish and wildlife tackle and ammunitions state and nationwide that justifies the elimination of lead based fishing tackle and ammunitions both within the State of Oregon and nationwide. Further, given that the continued use of a toxic metal for such purposes further puts at risk the environment and human health, and that safe alternatives for both lead weights and lead shot are available, that it is the policy and definitive assertion of Oregon Lakes Association that serious progress towards the full transition to the use of such alternatives should be pursued. Also given that regulation has served the elimination of lead in other industries while stimulating the use of and production of alternatives we find regulation as a necessary and reasonable function for the State of Oregon, Tribal Governments, and/or the US Government, and as such we as the Oregon Lakes Association support rulemaking, administrative and/or legislative acts towards the reduction and eventual elimination of lead from fishing gear and hunting ammunitions. Further, as we support local access to cost effective alternatives, we support both incentives and market forces to achieve this goal. In addition, as containment of the dispersal of toxic metals in our environment should not be limited to one class or size of weights or use of lead shots, we support regulation which removes lead from tackle and ammunition from all shapes, sizes and uses of weights and ammunitions.

Signed this 19th day of December, 2018.



Oregon Lakes Association
Prof. Theo Dreher, President

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