



Science Watch - Lead Means Dead for Eagles

“Every single time a lead bullet hits a deer, it fragments into many, many pieces. It only takes a tiny fragment, something the size of the head of a pin, to kill an eagle.” – T. Katzner

Years ago I would have to travel to Connecticut to see a bald eagle (*Haliaeetus leucocephalus*). Nowadays I occasionally see one fly past my Bronx windows overlooking the Hudson River. Thanks to the banning of DDT in 1972 and the passage of the endangered species act in 1973, bald eagle numbers in the US went from 417 pairs in 1963 to 71,467 pairs in 2021, with an estimated 316,700 eagles in the lower 48 states alone. But research published in the February 18, 2022 issue of *Science* says that widespread exposure to lead fragments, some microscopic, from shattered bullets in carcasses scavenged by eagles is severely impacting the US populations of bald and golden eagles (*Aquila chrysaetos*).

Vincent Slabe and Todd Katzner, Conservation Science Global, Bozeman, MT, and the US Geological Survey, Boise, Idaho, respectively, led a team of 28 other researchers from the US Geological Survey and the US Fish & Wildlife Service (USFWS) who collected tissue samples from over 1,200 eagles across the country from 2010 to 2018.

Ingested lead enters the bloodstream after being dissolved by stomach acid and contaminates various tissues. Lead poisoning can cause blindness, convulsions, and ultimately death.

Bones accumulate lead, so they are the best measure of chronic lead poisoning caused by repeated exposure over a lifetime. The team tested the femurs of 448 dead eagles (226 bald, 222 golden) and found that almost half of both species had lead levels indicative of chronic lead poisoning. Acute lead poisoning, caused by short-term high exposure, is best measured in blood, liver or feathers. Of 620 live eagles (237 bald, 383 golden), 28% of bald and 9% of golden had blood lead levels indicative of acute lead poisoning. Liver samples from dead eagles provided similar results. Lead levels in feathers showed that 33% of dead bald eagles and 35% of dead golden eagles suffered at least one acute poisoning during the four weeks it took the feather to grow.

Such high rates of poisoning are slowing the population growth of bald eagles by 3.8% and golden eagles by 0.8%, according to the authors. “Over a 20-year period, you’re talking about thousands of [eagles] that are being removed from the population,” said Katzner. “This is the first study to show this pattern on a continental scale,” said Slabe, and since golden eagle numbers are much lower [only 30,000], the impact from lead poisoning “is actually more alarming to us,” he said. A smaller study published the same month in the *Journal of Wildlife Management* found a similar impact on bald eagle populations in seven states.

Slabe *et al.*, also found that adult eagles were more frequently poisoned than juveniles, which reflects the accumulation of lead in the bones of scavenging birds as they age. In addition,

poisonings were more frequent in the fall and winter when both species are more likely to scavenge.

Any scavenger is potentially at risk. For example, lead poisoning from bullet fragments in carcasses left by hunters also threatens the reintroduction of endangered California condors (see 2022 “*A Vulture ‘Virgin’ Birth*” at <https://www.hras.org/past-sciencewatch-articles>). To combat that, California became the first state to ban lead bullets in 2019. But a nation-wide ban is needed.



A solution is readily available—get hunters to switch to non-fragmenting bullets, like copper or steel. Lead poisoning was once common among waterfowl because the birds ingested shotgun pellets to grind grains in their gizzard. So, lead shot for waterfowl hunting was banned on all US wetlands 30 years ago, replaced by steel shot, and waterfowl numbers rebounded.

Hunters and their families are at risk too. A Center for Disease Control 2008 study found that “people who ate a lot of wild game tended to have higher lead levels than those who ate little or none.”

On the last day of the Obama administration the USFWS issued a directive to phase out all lead ammunition and fishing tackle by 2022. That order was quickly reversed by the Trump administration. Bills to ban lead ammunition on all federal lands were introduced in both the house and the senate in 2021 and 2022, respectively. Both bills face strong resistance from opponents who say there is no “objective” evidence to support a lead ban.

Now there is.

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