

Lead ammunition

Lead has long been known to be a poison and has been banned from most consumer products including petrol and paint. Lead poisoning from spent ammunition (shotgun pellets and bullets) is a significant problem for the health and welfare of a wide range of wild birds, including waterbirds, predators, carrion-eaters and gamebirds. Despite a partial ban on lead shot, lead remains a significant cause of mortality and presents health risks to a range of species.

It is estimated that the minimum annual direct cost associated with the effects of continued use of lead ammunition on wildlife, people and the environment across Europe is £400m to £1.17 billion.¹

RSPB position

The existing partial bans on the use of lead shot over wetlands and/or for shooting wildfowl in the UK countries are nowhere near adequate to address the risk of lead poisoning to wildlife. Our concerns about the impact of lead in the environment led us to phase out lead ammunition use for vertebrate control on land managed by the RSPB with uses of the most immediate concern ceasing about ten years ago; this process will be completed by the end of 2020.

A [consortium of shooting organisations](#) now supports a switch to ammunition that is free of lead and single-use plastics by everyone taking live quarry with shotguns. RSPB welcomes this initiative but believes that it **should be extended to all ammunition** (not only shotgun cartridges) and, given repeated evidence of non-compliance with existing regulations concerning wetlands, that it is necessary to **underpin it with a statutory ban on the usage of all forms of lead ammunition in the UK.**

Background

Most ammunition – bullets, shotgun pellets and airgun pellets – has traditionally been made with lead or lead alloys. Birds can ingest spent lead shotgun pellets directly by mistaking them for food or grit. Lead from shotgun pellets or bullets can be ingested when birds prey upon shot and injured animals, or scavenge shot animals that have not been retrieved, or their viscera when discarded by hunters. People who eat game shot with lead ammunition can also be exposed. Deposited lead from ammunition also contaminates the environment and where shooting occurs regularly or at high intensity, soil and sometimes water lead concentrations tend to be elevated. Where this occurs, there is likely to be lead uptake by soil biota and certain other animals².

Lead affects most body systems in animals, including the nervous and circulatory systems, and low levels of exposure can affect a bird's immune system and behaviour. In some circumstances, swallowing even a single lead pellet can kill a bird.

¹ Pain, D.J., Dickie, I., Green, R.E. *et al.* 2019. Wildlife, human and environmental costs of using lead ammunition: An economic review and analysis. *Ambio* 48: 969–988.

² Pain, D. J. & Green, R. E. 2015. An evaluation of the risks to wildlife in the UK from lead derived from ammunition. In: Lead Ammunition Group (2015). Lead Ammunition, Wildlife and Human Health. A report prepared for the Department for Environment, Food and Rural Affairs and the Food Standards Agency in the United Kingdom. Appendix 1, 263-382. <http://www.leadammunitiongroup.org.uk/wp-content/uploads/2015/06/LAG-Report-June2015-Appendices-without-Appendix-6.pdf>

Exposure to even low levels of lead can have permanent adverse effects on cognitive function in children³. The UK Food Standards Agency states that: “[There is no agreed safe level for lead intake. Independent scientific expert groups advise that exposure to lead should be reduced as far as possible](#)”. Lead is considered by the European Food Safety Authority (EFSA) as a ‘non-threshold’ substance for some effects in humans⁴ meaning that ‘safe’ exposure levels cannot be set.

Scale of the problem

[Thousands of tonnes of lead shotgun pellets](#) are used in the UK each year and dispersed into the environment.⁵ The degradation of lead shot is a slow process (tens to many hundreds of years). The prevalence of environmental lead as a result of hunting activities is therefore historic, pervasive, and accumulating.

50,000-100,000 waterbirds (c.1.5-3.0% of the wintering population) are estimated to die each winter as a direct result of lead poisoning in the UK⁵ and there is concern that lead poisoning is affecting the populations of some of these⁶. Several hundred thousand wildfowl a year may suffer welfare effects.

Many bird species of conservation concern have been recorded as suffering from lead poisoning in the UK or are known to be affected in other areas where they have been studied. These include various species of waterbird, the grey partridge, red grouse, marsh harrier and white-tailed eagle.^{1,5,7} The possible effect of ingested lead shotgun pellets on the population of the common pochard, a declining species listed as globally threatened, is of special concern.⁶ Clearly, avoiding unnecessary mortality of these species is a conservation priority.

There is increasing evidence of exposure of scavenging birds to lead from ammunition in the UK⁸. An RSPB study found that, on average, a whole carcass of a deer killed using a lead bullet contained 356 bullet fragments. The digestive organs, which are usually discarded by hunters for scavengers to feed on, contained an average of 180 fragments.⁹ Most of these fragments were very small. At least 80% of metallic bullet-derived lead fragments in the discarded organs were within the size range eaten by scavenging birds.

Many lead fragments are sufficiently small and distant from obviously injured tissue that professional butchers did not remove them when trimming venison for human consumption.¹⁰ Of the deer carcasses examined, 90% contained bullet fragments, mostly <2mm. Lead shotgun pellets also fragment when they hit gamebirds, ducks and other small game animals.¹¹

Concerns over food contamination with lead and protecting market supplies resulted in Forestry Commission England switching in 2016 to non-lead ammunition for all of the deer and feral boar management undertaken by their Wildlife Rangers. Forestry and Land Scotland is phasing out the use of lead ammunition used by its own staff and contractors for deer management due to concerns of

³ Canfield, R.L., Henderson, C.R., Cory-Slechta, D.A., Cox, C., Jusko, T.A. and Lanphear, B.P. 2003. Intellectual impairment in children with blood lead concentrations below 10 µg per deciliter. *New England Journal of Medicine* 348: 1517-1526.

⁴ EFSA Panel on Contaminants in the Food Chain (CONTAM); Scientific Opinion on Lead in Food. *EFSA Journal* 2010; 8(4):1570. [151 pp.]. doi:10.2903/j.efsa.2010.1570. Available online: www.efsa.europa.eu

⁵ Pain, D.J., Cromie, R. and Green, R.E. 2016. Poisoning of birds and other wildlife from ammunition-derived lead in the UK. [Proc. Oxford Lead Symposium](#).

⁶ Green, R.E. & Pain, D.J. 2016. Possible effects of ingested lead gunshot on populations of ducks wintering in the UK. *Ibis* 158 (4): 699-710. doi:10.1111/ibi.12400

⁷ Fisher, I.J., Pain, D.J. and Thomas, V.G. 2006. A review of lead poisoning from ammunition sources in terrestrial birds. *Biological Conservation* 131: 421-432.

⁸ Taggart, M.A., Shore, R.F., Pain, D.J., Peniche, G., Martinez-Haro, M., Mateo, R., Homann, J., Raab, A., Feldmann, J., Lawlor, A.J., Potter, E.D., Walker, L.E., Braidwood, D.W., French, A.S., Parry-Jones, J., Swift, J.A. & Green, R.E. 2020. Concentration and origin of lead (Pb) in liver and bone of Eurasian buzzards (*Buteo buteo*) in the United Kingdom. *Environmental Pollution* 267 (2020) 115629 - <https://doi.org/10.1016/j.envpol.2020.115629>.

⁹ Knott, J., Gilbert, J., Hoccom, D.G. and Green, R.E. 2010. Implications for wildlife and humans of dietary exposure to lead from fragments of lead rifle bullets in deer shot in the UK. *Science of the Total Environment* 409(1): 95-99.

¹⁰ Hunt, W.G., Burnham, W., Parish, C.N., Burnham, K.K., Mutch, B. and Oaks, J.L. 2006. Bullet fragments in deer remains: Implications for lead exposure in avian scavengers. *Wildlife Society Bulletin* 34: 167-170.

¹¹ Pain, D.J., Cromie, R.L., Newth, J., Brown, M.J., Crutcher, E., Hardman, L.H., Hurst, L., Mateo, R., Meharg, A.A., Moran, A.C., Raab, A., Taggart, M.A. & Green, R.E. 2010. Potential Hazard to Human Health from Exposure to Fragments of Lead Bullets and Shot in the Tissues of Game Animals. *PLoS ONE* 5(4):e10315. doi:10.1371/journal.pone.0010315

food contamination and harm to wildlife such as wildfowl and raptors¹². NatureScot has also taken the decision to phase out the use of lead ammunition on National Nature Reserves and for wildlife management (eg goose management schemes).

Effective, safe and reasonably-priced non-toxic alternatives to lead shotgun pellets and lead bullets are now widely available. There are no technical reasons not to ban the sale and use of lead in ammunition.

Alternatives to lead ammunition have advanced significantly in recent decades. Copper is the primary alternative to lead for bullets used in rifle ammunition for larger vertebrate control, such as deer, although smaller calibre rifles are also used for foxes and rabbits. For shotgun pellets used for wildfowling, grouse, pheasant and other small game shooting, steel is the most widely used alternative. A range of alternatives are available for airgun pellets, generally used in conservation projects for humane dispatch.

Current regulations

In the UK, the regulatory regime is limited to partial bans on the use of lead shotgun ammunition. In England¹³ and Wales¹⁴ use of lead shot is banned for shooting certain species (ducks, geese, coot, moorhen) anywhere, and shooting any species over the foreshore or named wetland SSSIs. In Scotland¹⁵ and Northern Ireland¹⁶, use of lead shot is banned for any shooting over any wetland, as defined by the Ramsar Convention¹⁷ although the Ramsar definition is modified and weakened in the regulations making the consistent identification of relevant wetlands confusing. Lead shot use away from wetlands remains legal.

Even where regulations have been introduced, compliance can be very poor. A study of compliance with existing wetland and waterfowl-based regulations in England¹⁸ commissioned by Defra, found that 70% of ducks sampled (344/492) had been shot with lead, 10 years after the regulations were introduced in 1999. A more recent compliance study found no improvement, even after a campaign by shooting organisations to encourage compliance¹⁹. In Scotland the regulations are such that no effective monitoring of compliance is possible, although there is no reason to suppose it is any better than in England.

¹² Pain, D.J., Swift, J., Green, R. & Cromie, R. 2020. The tide is turning for lead ammunition. *British Birds* 113: 110-118.

¹³ Environmental Protection (Restrictions on Use of Lead Shot) (England) (Amendment) Regulations 2003 - <http://www.hms.gov.uk/si/si2003/20032512.htm> [first enacted in 1999]

¹⁴ The Environmental Protection (Restriction on Use of Lead Shot) (Wales) Regulations 2002 - <http://www.hms.gov.uk/legislation/wales/wsi2002/20021730e.htm>

¹⁵ The Environmental Protection (Restriction on Use of Lead Shot) (Scotland) (No.2) Regulations 2004 - <http://www.opsi.gov.uk/legislation/scotland/ssi2004/20040358.htm>

¹⁶ The Environmental Protection (Restriction on Use of Lead Shot) Regulations (Northern Ireland) 2009 - www.opsi.gov.uk/sr/sr2009/plain/nisr_20090168_en

¹⁷ Wetlands are defined as, regardless of size, any areas of foreshore, marsh, fen, peatland with standing water, regularly or seasonally flooded fields, and other water sources whether they be natural or man-made, static or flowing, fresh, brackish or salt.

¹⁸ Cromie, R.L., Loram, A., Hurst, L., O'Brien, M., Newth, J., Brown, M.J. and Harradine, J.P. 2010. Compliance with the Environmental Protection (Restrictions on Use of Lead Shot) (England) Regulations 1999. *Report to Defra, Bristol*.

¹⁹ Cromie, R., Newth, J., Reeves, J., O'Brien, M., Beckmann, K. & Brown, M. 2015. The sociological and political aspects of reducing lead poisoning from ammunition in the UK: why the transition to non-toxic ammunition is so difficult. <http://oxfordleadsymposium.info/proceedings/>