# UK REACH: Public Consultation on Lead in Ammunition
# Wildlife and Countryside Link response 08.12.23

Wildlife and Countryside Link (Link) is the largest nature coalition in England, bringing together 80 organisations to use their joint voice for the protection of animals and the natural world.

## Executive summary

We welcome the proposed restriction on the sale and use of lead shot in live quarry shooting and largely for target shooting. This effective, proportionate, enforceable measure will reduce the levels of toxic lead in our environment and in the human food chain. With voluntary measures having failed[1], and environmental harms accruing at a time of ecological crisis, a legal restriction is urgently required.

In addition to voicing support for the lead shot restriction, our response makes the following recommendations:

- The transition period for the restriction on the use of lead shot in live quarry shooting should not be longer than 18 months. This time period is the only proportionate response to scale of the environmental risk and is eminently achievable.
- A restriction should be applied to the use of lead bullets in live quarry shooting. There is strong evidence of the public willingness to pay to avoid the adverse environmental, animal welfare and human health risks associated with the use of lead bullets. These adverse effects are well documented with regular additions to the scientific literature.
- There should be no derogation for the use of lead ammunition for humane dispatch.
- The proposed derogations for the use of lead shot and lead bullets in outdoor target shooting should be tightened up, to prevent abuse and ongoing risks from these activities.

Throughout our response, we emphasise how proportionate restrictions on lead ammunition are. Restricting the use of lead ammunition will deliver huge benefits, removing a dangerous source of harm to threatened wildlife species, reducing avoidable suffering amongst wild, domestic and companion animals and preventing a poison from entering the human food chain. These benefits far outweigh the limited costs of transition away from lead, which will be borne by manufacturers and shooters with ample time and resources to accommodate the switch.

To date the costs of lead ammunition use have been borne by poisoned animals, the animal welfare and conservation organisations who have to deal with the consequences of this poisoning, and by the public facing a health risk their food chain and a diminished natural world. Restrictions will be to the overwhelming advantage of society at large and the wildlife people cherish.[2]

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[1] https://conservationevidencejournal.com/reference/pdf/11620

[2] See June 2023 polling for public views on the importance of the environment: https://www.wcl.org.uk/nature-2030-launch-research-and-report.asp

## Response to consultation questions

### Transition periods

***The Agency is considering a 5-year transition period before the entry into force of the proposed restriction on target shooting with shotguns. Due to the voluntary agreement to transition away from lead ammunition for use in live quarry shooting by 2025, the Agency is considering a shorter (e.g., 3-year) transition period for this use.***

***Please provide information you have regarding the viability, difficulties and benefits of a shorter transition period for the use of lead ammunition in live quarry shooting with shotguns***

HSE, as the Agency for UK REACH (referred to as the Agency for the remainder of this response) is right to conclude the environmental and human health risks from the use of lead shot for live quarry shooting are not currently adequately controlled. It is also right to conclude that a restriction in this area would be effective. In April 2022 the Agency defined 'effectiveness' in this context as being capable of reducing risks to an acceptable level within a reasonable period of time, in a manner proportional to the risk.[3] A transition of three-to-five years for the restriction would fail this effectiveness test.

The environmental risk posed by the use of lead shot for live quarry shooting is acute. The mid-range estimates contained in the opinion background paper (which we would consider to be underestimates) suggest that over 400,000 terrestrial birds and 50,000 wetlands birds are at risk of death annually in the UK from primary ingestion of lead shot.[4]

This scale of population loss should be viewed through the lens of the 2023 State of Nature report, an authoritative stocktake on the state of UK wildlife, drawn from extensive biological monitoring. The report shows a long-term decline in the average abundance of terrestrial and freshwater species of -19% since 1970, with a short-term decline of -3% between 2010 and 2020. Wintering waterbirds have fared particularly badly, with their abundance falling by around a third over the past twenty years. The report explicitly states that some of these waterbird species *''are declining due to poisoning from lead ammunition''*.[5]

[3] https://consultations.hse.gov.uk/crd-reach/restriction-proposals-004/supporting_documents/Annex%2015%20restriction%20dossier%20%20lead%20in%20ammunition.pdf p19

[4] https://consultations.hse.gov.uk/crd-reach/lead-in-ammunition/supporting_documents/Lead%20in%20Ammunition%20Background%20Document%20%20Draft%20SEA.pdf p121

[5] https://stateofnature.org.uk/wp-content/uploads/2023/09/TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf p13 & 14

The index of wild bird populations in the UK shows a similar picture, with figures released in November 2022 showing a long-term decline in all bird populations of -15%, with short term declines in wetland (-3%) and wintering waterbirds (-9%).[6]

The Agency's own opinion background paper contains estimates of annual birds of prey deaths in the UK due to lead poisoning (usually due to secondary poisoning from prey or carrion), alongside estimates of the breeding population. Birds of prey populations in the UK are still well under-natural strength, barely recovering from near-extinction levels in the early 20th century caused by a combination of persecution and chemical pollution.[7]

The background paper estimates illustrate the toll lead poisoning is taking on these still fragile species. Out of a breeding population of 1168, 37 adult and juvenile goshawks are thought to die each year from lead poisoning. Out of a breeding population of 60,516 sparrowhawks – a species which recently went from green to amber status on the list of UK Birds of Conservation Concern[8] - 212 adult and juveniles are estimated to die from lead poisoning.[9] The impacts on larger birds of prey which take larger prey and scavenge more will be more significant still.

Lead pollution impacts go beyond birds. There is growing evidence that lead accumulates in the tissues of fish, causing sub-lethal stress relating to haematology[10], oxidative stress, neurotoxicity and immune responses[11]. Further evidence suggests that lead poisoning affects metamorphosis[12], and results in

[6] https://www.gov.uk/government/statistics/wild-bird-populations-in-the-uk/wild-bird-populations-in-the-uk-1970-to-2021#:~:text=The%20latest%20data%20shows%20that%20for%202022%3A&text=the%20woodland%20bird%20index%20was,13%25%20below%20its%201994%20value

[7] https://www.ntu.ac.uk/about-us/news/news-articles/2022/06/expert-blog-a-short-history-of-our-relationship-with-raptors

[8] https://www.bto.org/understanding-birds/birdfacts/sparrowhawk

[9] https://consultations.hse.gov.uk/crd-reach/lead-in-ammunition/supporting_documents/Lead%20in%20Ammunition%20Background%20Document%20%20Draft%20SEA.pdf p129-132

[10] Tewari, H., Gill, T.S. and Pant, J., 1987. Impact of chronic lead poisoning on the hematological and biochemical profiles of a fish, *Barbus conchonius*(Ham). *Bulletin of environmental contamination and toxicology*, *38*(5), pp.748-752. https://pubmed.ncbi.nlm.nih.gov/3580589/

[11] Lee, J.W., Choi, H., Hwang, U.K., Kang, J.C., Kang, Y.J., Kim, K.I. and Kim, J.H., 2019. Toxic effects of lead exposure on bioaccumulation, oxidative stress, neurotoxicity, and immune responses in fish: A review. *Environmental toxicology and pharmacology*, *68*, pp.101-108. https://pubmed.ncbi.nlm.nih.gov/30884452/

[12] Jofré, M.B., Antón, R.I. and Caviedes-Vidal, E., 2012. Lead and cadmium accumulation in anuran amphibians of a permanent water body in arid Midwestern Argentina. *Environmental Science and Pollution Research*, *19*, pp.2889-2897. https://pubmed.ncbi.nlm.nih.gov/22351257/

haematological[13, 14] and biochemical alterations in amphibians[15, 16]. The accumulation of lead in body tissues of fish and amphibians will further impact predatory aquatic birds such as egrets, herons and kingfishers, feeding at the top of the food web.

These aquatic impacts are likely to be compounded by an increase in pollution from weights used in fishing. Although the use of lead weights is restricted[17], the Institute of Fisheries Management have observed recent trend of some fishers using large, coated lead weights, where the coating is likely to degrade in the water, resulting in lead exposure.

The uncontrolled use of lead ammunition in live quarry shooting risks further negative impacts on a range of vulnerable wild species, at a time of biodiversity crisis. A transition of three-to-five years, as proposed by the consultation, is not a proportionate response to this risk.

A shorter transition for the use of lead shot for live quarry shooting, of around 18 months as originally proposed by the Agency, would represent a proportionate response. Assuming a Government decision is made in 2024, it would allow the restriction to come into effect before 2026, allowing it to contribute towards the achievement of the Environment Act target to halt the decline in species abundance by 2030. A transition of longer than 18 months will make the target, and other related biodiversity targets, harder to meet.[18]

It seems that the newly proposed three-to-five-year transition follows arguments from ammunition manufacturers that anything less than this would be impractical. It is concerning that the Agency appears to have taken this assertion, from organisations with a clear financial interest in a slower transition, at face value.

It is to be expected that ammunition manufacturers will seek to minimise the disruption to their current operations, through an elongated timeframe for change. It is instructive to note that ammunition manufacturers opposed the five-year voluntary phase out of lead ammunition announced by shooting organisations in February 2020, again on the grounds that not enough time

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[13] Fink, N. and Salibián, A., 2005. Toxicological studies in adult amphibians: effects of lead. *Applied Herpetology*, *2*(3), pp.311-333. https://www.researchgate.net/publication/233611967_Toxicological_studies_in_adult_amphibians_Effects_of_lead

[14] Rosenberg, C.E., Peri, S.I., Arrieta, M.A., Fink, N.E. and Salibián, A., 1998. Red blood cell osmotic fragility in *Bufo arenarum* exposed to lead. *Archives of physiology and biochemistry*, *106*(1), pp.19-24. https://pubmed.ncbi.nlm.nih.gov/9783056/

[15] Fink, N. and Salibián, A., 2005. Toxicological studies in adult amphibians: effects of lead. *Applied Herpetology*, *2*(3), pp.311-333.

[16] Arrieta, M.A., Bruzzone, L., Apartín, C., Rosenberg, C.E., Fink, N.E. and Salibián, A., 2004. Biosensors of inorganic lead exposure and effect in an adult amphibian. *Archives of environmental contamination and toxicology*, *46*, pp.224-230 https://pubmed.ncbi.nlm.nih.gov/15106674/

[17] https://www.legislation.gov.uk/uksi/2015/815/pdfs/uksiem_20150815_en.pdf

[18] https://www.gov.uk/government/news/delivering-on-the-environment-act-new-targets-announced-and-ambitious-plans-for-nature-recovery

had been provided.[19] Whilst the precise nature of the excuse changes (a steel shortage in 2020, the conflict in Ukraine in 2023), the request for more time remains identical, driven by a desire to avoid the extra costs that the requirement to transition at pace will bring.

These extra costs are reasonable, and in line with the principle that the polluter should pay. This is one of the five environmental principles that the Environment Act 2021 applies across Government.[20] Those profiting from actions that result in increased lead pollution, to the detriment of the general public, should bear responsibility for the costs of mitigation.

In this instance it is unlikely that the costs, which manufacturers can pass onto shooters, will be excessive.

The voluntary phase out was announced nearly four years ago, the start of the formal restriction process two and a half years ago. This constitutes good time to prepare for a switchover to non-lead shotgun ammunition for live quarry shooting. It appears that many manufacturers have been doing that, significantly increasing their non-lead stock lines.[21] The majority of these lines will use steel, a material that is cheaper than lead, providing reasonable headroom for transition costs. The price of a day's shooting at a commercial estate typically started at around £2,000 per gun in the 2022 season,[22] which suggests that consumers will have further headroom to absorb transition costs.

It is also pertinent to note that the European Union has just passed a new ban on the use of lead ammunition in and around wetlands, with wider restriction currently being considered.[23] UK manufacturers are already having to prepare their manufacturing to change to respond to the export market, making changes for the domestic market less onerous.

Temporary increased costs for manufacturers, after years of preparation time, partly passed onto consumers with considerable financial resources, do not constitute an impracticability barrier to the restriction coming into force in 2026.

A restriction with an 18-month transition period is a proportionate, practical response to the environmental risks posed by the use of lead shot for live quarry shooting.

**Humane dispatch derogation**

***Do you possess information regarding the need for a derogation on the use of lead ammunition for humane dispatch (i.e. in instances where animals/livestock require humane dispatch, which may***

[19] https://gamebore.com/news/announcements/joint-statement-uk-cartridge-manufacturers
[20] https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement
[21] https://leadammunitionappg.org/wp-content/uploads/2022/09/Alternatives-to-lead-shot-Assessing-supply-and-demand.pdf
[22] See for example: https://www.dawnay.co.uk/sporting/prices-availability/
[23] https://www.birdlife.org/news/2023/02/14/press-release-lead-ammunition-finally-banned-from-wetlands-across-the-eu/

***occur for example: on-farm; in transit; in markets, lairages or collection centres; or as a result of accidents on the public highway, at racecourses, shows or exhibitions)?***

***Please provide your information relating to humane dispatch in the box below***

The background document to the Agency opinion does not provide sufficient information as to why a derogation for the use of lead ammunition for humane dispatch is being considered. The suggestion that non-lead-ammunition is not suitable for humane dispatch needs to be supported by robust evidence, which has not been provided through the published consultation documents.

The evidence available to Link strongly suggests that non-lead ammunition has a similar or better lethality (the ability to kill quickly, rather than to merely wound) to lead.

Two studies consider the qualities of steel shot compared to lead shot. A British Association for Shooting and Conservation (BASC) commissioned Cranfield University study (2020) concluded: *''The relative lethality of steel shot versus lead used in shotgun cartridges has indicated that, when fired into a target mimicking the physiology of a pheasant, there is little difference in pellet penetration when using recommended shot sizes.''*[24] A further study, Ellis & Miller (2022), has found that crippling rate (birds wounded but not killed outright) declined from 23% with lead shot to an average of 13% with steel.[25]

Three studies consider the qualities of copper bullets compared to lead bullets. Field studies carried out in 2009 by the RSPB and the University of Cambridge compared the effects of both copper and lead bullets on deer, concluding that *''no significant differences were found in accuracy or killing power''*.[26] A 2014 study by Gremse et al found *''similar terminal ballistic behavior''* between lead and copper bullets[27]. A further 2019 study by Stokke et al concluded that *''the relative killing efficiency of lead and copper bullets is similar''*.[28]

Guidance on humane slaughter states that killing shots should always take place against soft ground, so that ricochets do not take place, ensuring the safety of the shooter whatever the type of ammunition used.[29]

A derogation for humane dispatch would undermine the efficacy of the wider restriction. It opens the door to shooters claiming that their shot was for humane motivations, hindering effective enforcement. In light of the strong evidence that non-lead ammunition can kill just as humanely as lead, the derogation proposal should be rejected.

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[24] https://basc.org.uk/lead-vs-steel-a-question-of-lethality/
[25] https://onlinelibrary.wiley.com/doi/10.1002/wlb3.01001
[26] https://www.conservationevidence.com/reference/pdf/2301
[27] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4100882/
[28] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6675831/
[29] https://www.hsa.org.uk/methods/free-bullet-firearms

**Monetised benefits associated with restricting lead bullets for live quarry shooting**

***Do you have information regarding the monetary benefits associated with reducing the risk of secondary poisoning of raptors from the use of lead bullets e.g., from WTP-based evaluations or similar?***

***Please provide your information relating to monetised benefits in the box below***

It is not clear why the Agency believes that a comparison of the costs and benefits of restricting use of lead bullets for live quarry shooting is not possible.

As the Agency opinion confirms, the primary environmental risk from lead bullet use in live quarry shooting is secondary poisoning to scavenging birds of prey, with the effects likely to be most acute in the largest and most long-lived birds of prey species, such as eagles.[30] The evidence that lead bullets present a high secondary poisoning risk has been further strengthened by a new study (published in July 2023) by Haase et al, which found that lead bullets tend to shatter and/or fragment widely on reaching the bodies of Roe deer, increasing the chances of scavenging birds of prey subsequently encountering lead.[31] The implications of this for the risk lead bullets pose to human health should also be noted.

Birds of prey include iconic and much-loved UK species, and it would seem entirely appropriate to use public willingness to pay (WTP) model to help estimate the benefits of a restriction aimed to reduce their secondary poisoning risk. Although bullet tonnage levels are lower than when it comes to shot, the impact is concentrated on birds of prey, which should aid rather than hinder analysis.

A highly relevant WTP model is also existent, in the form of Christie and Rayment's paper *"An economic assessment of the ecosystem service benefits derived from the SSSI biodiversity conservation policy in England and Wales"* (2012).[32] The paper found that people in England and Wales were willing to pay £956 million annually to secure the levels of ecosystem services and benefits currently delivered by SSSI conservation activities, and a further £769 million to secure the benefits that would be delivered if SSSIs were all in favourable condition (2012 figures).

This willingness to pay for a healthy environment in England and Wales could be used to estimate the value placed in the health of some of the most iconic species within that environment. Given the low numbers of many birds of prey species, even the death of a few birds would constitute a reduction of already rare wildlife. Public willingness to pay is likely to veer towards the generous in these circumstances. It is instructive to note recent polling of public attitudes to the reintroduction of white-

[30] https://consultations.hse.gov.uk/crd-reach/lead-in-ammunition/supporting_documents/Lead%20in%20Ammunition%20Restriction%20Opinion%20Document%20%20Draft%20SEA%20Opinion.pdf p36
[31] https://link.springer.com/article/10.1007/s44187-023-00052-w
[32] https://www.sciencedirect.com/science/article/pii/S2212041612000095

tailed eagles to Southern England, which has found *''exceptionally high levels of support''* for the project, with 93% of respondents being supportive.[33]

Use of the Christie & Rayment model would help to fill in some of the gaps inherent in the exclusive use of Carson et al WTP model elsewhere in the opinion. The Carson model is based on the willingness of US citizens to pay for remediation of the ecological damage caused by the Exxon Valdez oil spill in 1989.[34] This data, as well being as old and based on the views of a non-UK population, also applies to the public view of ecological damage at sea, removed to some extent from most people's everyday life on land.

Complementary use of the Christie & Rayment WTP model could provide a more up-to-date and specifically UK view of the value of healthy ecosystems, focussed on the terrestrial environment where lead pollutions effects are most concentrated. A highly relevant paper, ''Wildlife, human and environmental costs of using lead ammunition: An economic review'' (2019) by Pain et al found a public willingness to pay to avoid lead poisoning of wildfowl across Europe of over €2 billion. This should also be factored into the Agency's assessment.[35]

The Agency should also look to factor in public willingness to pay for improved animal welfare. Given the unnecessary wild animal suffering caused by both primary and secondary lead poisoning, and strong pro-welfare sentiments amongst the majority of the UK population[36], it is reasonable to assume a willingness to pay to reduce this suffering.

This willingness to pay is likely to be particularly apparent when of lead impacts on companion animals is also highlighted. A 2016 study by Høgåsen et al found that domestic dogs (and likely domestic cats) can suffer from lead poisoning when fed/scavenging on game shot with lead.[37] A 2023 study by Pain et al found that dogs and cats are exposed to extremely high levels of lead from shot in some UK pet foods.[38]

Studies of public willingness to pay for companion animal food produced according to high welfare standards could provide a useful input, to help gauge willingness to pay for lead restrictions on an animal welfare basis. A 2023 University of Cambridge study of this question found *''an overall positive mean willingness to pay for welfare-friendly pet food.''*[39] It would be reasonable to factor this WTP for such welfare improvements, alongside WTP for environmental improvements.

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[33] https://cdn.forestresearch.gov.uk/2023/02/WTE-public-perceptions-final-report-Dec-2022-1.pdf
[34] https://link.springer.com/article/10.1023/A:1024486702104
[35] https://pubmed.ncbi.nlm.nih.gov/30879269/
[36] https://www.hsi.org/news-resources/polling-reveals-millions-of-brits-put-protecting-animals-from-cruelty-amongst-top-three-most-important-policies-that-will-influence-their-votes/
[37] https://www.researchgate.net/publication/305639837_Lead_intoxication_in_dogs_Risk_assessment_of_feeding_dogs_trimmings_of_lead-shot_game
[38] https://link.springer.com/article/10.1007/s13280-023-01856-x
[39] https://www.cambridge.org/core/journals/animal-welfare/article/can-dogs-help-chickens-pet-owners-willingness-to-pay-for-animal-welfarefriendly-pet-food-in-the-united-states/530CC86A1A599E2FC568AF877A79F1E1

The Agency should look again at the case for a lead bullets restriction for live quarry shooting, drawing on the latest evidence of harms and relevant environmental and animal welfare willingness to pay models, demonstrating the societal expectation to reduce unnecessary harms.

**General comments**

The decision to omit lead bullets for live quarry shooting from any restriction is extremely disappointing.

The arguments advanced for this omission are not compelling. As set out in our response to question 3, it should be possible to run a meaningful cost and benefit analysis of a restriction on lead bullets for live quarry shooting. This analysis could draw on the latest evidence of the environmental, human health and animal welfare harms from secondary poisoning, and relevant existent models on public willingness to pay to avoid those harms.

The second argument advanced in the opinion suggests that the continued sale of lead bullets for indoor target shooting (and for outdoor target shooting in sites with controls in place, as proposed elsewhere in the opinion) will undermine the enforceability of any restrictions. This argument also falls short. In cases of clear environmental and human health risk, as is the case with lead bullets for quarry shooting, a restriction with some enforceability challenges is better than none. This is supported by evidence from Scotland. A 2023 study by Green et al found that Scotland's restrictions on use of lead shot in wetlands had reduced lead pollution by around 50%, despite the enforceability issue created by lead shot being legal in Scotland outside of wetlands.[40] Whilst something is still better than nothing, it remains the case that complete restrictions on sale and use are the only way to ensure effective enforceability and near 100% elimination of risk.[41]

The key facts remain thus. Lead bullets fragment significantly on impact with animal bodies, to an extent whereby removal of all lead elements is very challenging, allowing a harmful poison to enter the animal and human food chain. Effective non-toxic alternatives to lead bullets are readily available, including copper bullets which offer similar lethality to lead. The case for a restriction is clear.

The restrictions on both lead shot and lead bullets for outdoor target shooting are welcome, but the proposed derogations require some tightening.

The derogation to allow individual athletes, as identified by the appropriate sporting body, to continue to purchase lead shot direct from the manufacturer could be abused. The current wording could allow limitless numbers of people to be identified as athletes needing to take advantage of the derogation. There is nothing in the current wording to prevent this escalating to such a level as to perpetuate the current amount of lead pollution from outdoor target shooting.

[40] https://raptorpersecutionscotland.files.wordpress.com/2023/09/green-et-al-cej20-40_46.pdf
[41] See https://conservationevidencejournal.com/reference/pdf/9454

To avoid this, strict conditions should be set making it clear that athletes only qualify for the derogation if there is a realistic chance of them being chosen to take part in a specific competition which strictly requires the use of lead. An annual cap on the number of athletes qualifying for the derogation should be put in place. This should be calculated on the basis that, if the cap was fully met, this would result in lead pollution from outdoor target shooting using lead shot being 1% or less of the current level.

The identity of the enforcing authority should be confirmed, and sufficient funding provided by Government to allow effective enforcement, including close monitoring of sales of lead shot from manufactures to identified athletes.

The Government should also formally request that sports shooting bodies to change their rules to end the artificially created dependence on lead-shot in some target shooting competitions. The derogation should be seen as a temporary measure, to cease as soon as target shooting competitions change their rules to reflect environmental realities.

The derogation to allow lead bullets to be used for outdoor target shooting when sites have controls in place also needs close monitoring. The enforcing agency should again be named and funded to carry out regular checks of sites operating under the derogation, including checks of the controls themselves. This close enforcement is necessary, as the initial motivation for clean-up on ranges is likely to be financial rather than being driven by a desire to minimize environmental risks. A period of close enforcement will serve an educational role, as well preventing risks.

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This response is also supported by Wales Environment Link and by the following Wildlife & Countryside Link members:

The RSPB
The Wildlife Trusts
National Trust
Wildlfowl & Wetlands Trust
Buglife
Froglife
Whale and Dolphin Conservation
Institute of Fisheries Management
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