

Technical report

Alternatives to lead shot: Assessing supply and demand

September 2022



This paper has been produced for the Lead Ammunition All Party Parliamentary Group, to assess the availability of alternatives to the use of lead shot cartridges in hunting.

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The All-Party Parliamentary Group on Lead Ammunition works to raise parliamentary awareness of the negative impacts of lead ammunition use on human and animal health, wildlife conservation and the wider environment. It works with experts to explore solutions to these problems.

More information can be found at: www.leadammunitionappg.org

This Report was researched by Wildlife & Countryside Link and Wildfowl & Wetlands Trust

This is not an official publication of the House of Commons or the House of Lords. It has not been approved by either House or its committees. All-Party Parliamentary Groups are informal groups of Members of both Houses with a common interest in particular issues. The views expressed in this report are those of the group.

Policy relevance

The Health and Safety Executive (HSE) is consulting on a proposed restriction on lead ammunition¹, after identifying through the UK REACH process² that its use poses an unacceptable risk to human health and the environment. The consultation proposals include a ban on the use of lead shot cartridges in hunting, with a phase in period of 18 months. The Government is expected to make a decision on the proposals in 2023, suggesting that any ban on lead shot could be in force by late 2024.

A number of organisations opposed to a ban have argued that this transition period is too short. They have argued that disruption to global supply chains caused by Covid, and increased demand for military as opposed to sporting ammunition caused by the Russian invasion of Ukraine, limit the availability of alternatives to lead shot and will continue to do so.³

This paper explores these claims and, more widely, assesses the current GB supply⁴ of alternatives to lead shot (also referred to as 'non-toxic shot' in this report) and likely trajectories for that supply over the coming years. It concentrates on the lead shot component of the HSE consultation, as it is likely to be the first element of the wider lead ammunition restriction to come into force and has been subject to the most discussion to date. Other measures in the consultation, to ban lead bullets for hunting and to implement varying restrictions for lead ammunition types used in target shooting mostly have longer phase in periods proposed for them. We hope to assess the GB supply of non-toxic ammunition for these activities in future reports.

If agreed by Ministers, a ban on the use of lead shot for hunting will be the first-measure covering all land types⁵ to be implemented in GB to tackle pollution from lead ammunition. The question of whether alternatives to lead shot will be available in sufficient quantity to meet demand on the implementation of a ban requires early examination. This paper brings together a range of evidence to inform this consideration.

¹ https://consultations.hse.gov.uk/crd-reach/restriction-proposals-004/supporting_documents/Annex%2015%20restriction%20dossier%20%20lead%20in%20ammunition.pdf

² <https://www.hse.gov.uk/reach/about.htm>

³ See for example: <https://www.countryside-alliance.org/news/2022/5/tim-bonner-lead-ban-moves-closer>

⁴ Under the Northern Ireland Protocol EU REACH continues to regulate the Northern Ireland market and so any EU restriction will apply in Northern Ireland. This report therefore focusses on Great Britain (GB). The EU is also currently considering a restriction on the use of lead ammunition in all habitats.

⁵ Restrictions on the use of lead shot in certain habitats were introduced in England in 1999, Wales in 2002 and Scotland in 2004.

The current supply of alternatives to lead shot

In early August 2022 the authors of this paper visited the websites of GB ammunition suppliers, including www.justcartridges.com, www.allcocksoutdoorstore.co.uk and www.johnforsey.co.uk, to assess the availability of alternatives to lead shot.

All retailers had alternatives to lead shot in stock, principally steel⁶ but with bismuth and 'BioAmmo Blue' (a new alloy mixture of bismuth, aluminium, tin and zinc) shot also available. Just Cartridges, the largest online retailer, had 36 products on offer in their non-toxic shot for gamebird shooting section, with 3 further products listed as being out of stock. The majority of the non-toxic products on sale from Just Cartridges (33 out of 39) came from GB manufacturers.

Just Cartridges also provided the option of viewing all products, both lead and non-toxic, on sale grouped by manufacturer. The following major GB based manufacturers were included:

- Lyevale Express had 35 products listed on the website, of which 10 were non-toxic (28.5%)
- Hull had 26 products listed on the website, of which 5 were non-toxic (19%).
- Gamebore had 42 products listed on the website, of which 9 were non-toxic (21.4%)

Eley had 52 products listed on the website, of which 9 were non-toxic (17.3%).

In total 21.6% of the products on sale from GB ammunition manufacturers were non-toxic.

The remaining 6 non-toxic products on sale from Just Cartridges were imported from Bio Ammo (a Spanish manufacturer), Jocker (a French manufacturer) and RC (an Italian manufacturer).

Cartridge prices across different online retailers were consistent, with steel and lead ammunition priced at very similar levels, and bismuth priced more expensively.

Priced by the 1000, Lyevale Express cartridges for 12 gauge guns came to:

- Steel: £386⁷
- Lead: £396⁸
- Bismuth: £1,389⁹

BioAmmo Blue was sold at £599 for 1,000 cartridges.¹⁰

This survey of online retailers allows us to state that, prior to the start of the 2022 GB shooting season:

- A wide range of alternatives to lead shot were on sale, with the vast majority being in stock.
- The majority of these alternatives came from GB manufacturers.
- Over 20% of ammunition products from GB manufacturers sold by the leading online retailer of game cartridges were made from alternatives to lead.
- Steel shot cartridges are sold at lower prices than lead cartridges.

The low price of steel shot, which is currently cheaper than lead shot, would appear to provide some headroom for manufacturers to pass on any increased costs associated with scaling up steel use in their manufacturing onto consumers. This headroom may also prove useful for

⁶ In countries and situations where lead shot is already banned, steel shot is the most commonly used non-toxic alternative, and the current HSE report predicts the same for the UK situation.

⁷ <https://www.justcartridges.com/product/hunting-steel-12ga-2/>

⁸ <https://www.justcartridges.com/product/supreme-game-12ga-2/>

⁹ <https://www.justcartridges.com/product/ultimate-bismuth-12ga-2/>

¹⁰ <https://www.justcartridges.com/product/blue-12ga-67mm-2/>

absorbing any increased costs associated with minor components required for non-toxic shot manufacture (such as propellant).

Findings from the online survey were supported by supplementary information gathered through phone conversations with three suppliers (Just Cartridges, Francis Lovell & Co Ltd. and Eley). Just Cartridges provide next-day delivery to customers nationwide. Despite availability of non-toxic shot, a leading cartridge manufacturer suggested that only approximately 10% of UK gunshops with accounts with them have ordered non-toxic loads.

The trajectory of supply

Since regulations on lead shot were first introduced in England in 1999, GB manufacturers have made significant advances in the development and availability of the non-toxic alternatives. This progress has accelerated over the past two years.

A 2015 paper from Thomas, presented to the Oxford Lead Symposium, records that that in 2014, less than 6% of cartridges produced by UK manufacturer Gamebore were made from alternatives to lead.¹¹ In 2022 over 20% of Gamebore cartridges sold by Just Cartridges were made from non-toxic shot, implying a much a higher rate of production.

A review of alternatives to lead shot, written by the founder of Just Cartridges in April 2022, considers future trajectories and concludes that steel "*will be the market leader*" due to its affordable cost and highlights new steel "*products coming on stream from all the UK manufacturers*".¹² The review goes on to note the increased availability of bismuth, now supplied by "*the big four UK manufacturers*", whilst noting the higher cost. The new 'Blue' product from BioAmmo, which only came onto the market in 2021¹³, is also covered.

This optimism about the future trajectory of non-lead ammunition can be found also in statements from shooting and game conservation organisations. In the words of a 2020 piece from the Game & Wildlife Conservation Trust (GWCT): "*Recent technological developments have made non-lead shot more effective, more widely available and more affordable.*"¹⁴

This is echoed in a piece from the same year from the British Association for Shooting and Conservation (BASC): "In Denmark, the Netherlands and Flanders, where the use of lead shot is illegal, those who shoot report no problems with effectiveness. In these areas more than 95% of those who shoot use steel shot, and that is likely to be the most popular alternative in the UK."¹⁵

In the words of a further piece from BASC from early 2022: "Exciting alternatives to lead shot are continually coming to the market to great acclaim. The development of a range of biodegradable wads has opened the door to a new stream of products."¹⁶

¹¹ http://www.oxfordleadsymposium.info/wp-content/uploads/OLS_proceedings/papers/OLS_proceedings_thomas.pdf

¹² <https://shoothub.gunsonpegs.com/articles/shoot-owners/lead-free-shot-what-shoots-need-to-know>

¹³ <https://www.gunsonpegs.com/articles/cartridges/s/non-toxic-shot-cartridges/a-case-of-the-blues-a-case-of-the-blues-is-bio-ammos-new-alloy-the-future-of-non-toxic-game-cartridges>

It should be noted that zinc, which BioAmmo currently contains in small amounts, may present environmental risks. These need to be further assessed.

¹⁴ <https://www.gwct.org.uk/media/1094670/Moving-away-from-lead-shot-QA.PDF>

¹⁵ <https://basc.org.uk/lead/guide-to-using-non-lead-shot/>

¹⁶ <https://basc.org.uk/the-lead-shot-transition-solid-progress-on-the-ground/>

A number of recent initiatives by the shooting and food retail sectors have promoted non-toxic shot, seemingly creating momentum and driving an increase in the availability of alternatives to lead.

A key factor appears to have been commitments from supermarkets and other food retailers to end the sale of game shot with lead beginning with Waitrose in 2019¹⁷ and followed by others including Marks and Spencer and the National Game Dealers Association. The decision by leading shooting and game conservation organisations (including GWCT and BASC) to back a voluntary five-year phase out of lead shot for hunting quarry in February 2020 appears to have sent a helpful signal to industry to support the growing demand for non-toxic shot.

New regulations effecting European Union members and Northern Ireland (under the NI protocol) also appear to have had an impact, including an EU REACH restriction on the use of lead shot in wetlands due to come into force in February 2023. A wider EU restriction is also currently being considered. These policy drivers appear to be stimulating the production and availability of a wide range of non-lead ammunition in Europe.

Finally, it should be noted that there is no evidence that that the war in Ukraine is inhibiting the upward trajectory of supply for non-toxic shot in the GB. As reported above, the vast majority of non-toxic shot products surveyed in August 2022 were in stock. The GB manufacturers responsible for most of these products principally manufacture ammunition for hunting and sporting purposes, with no military ammunition lines. The production of military ammunition requires different factory processes, as military ammunition uses different powders to that of shotgun cartridges and the projectiles are single items, as opposed to steel shot used in hunting cartridges. There is no sign that these manufacturers are switching to military production, at the expense of hunting and sporting ammunition.

Demand from shooters

It has been suggested in the past that non-toxic shot inhibits the experience of game shooters compared to lead, and that as such demand for non-toxic shot will be limited.

The most comprehensive analysis of these claims can be found in the Mondain-Monval et al. study (2015) of a decade of shooting statistics from the Camargue, France. The paper concluded that "*after 11 years of hunting with non-toxic shot, there was unexpectedly no clear pattern in trends of individual effectiveness among hunters.*"¹⁸

A double-blind comparative study of the effectiveness of steel and lead shot for shooting doves has also been conducted in the USA (Pierce et al, 2014). The study concluded that "*Hunters were unable to distinguish the ammunition type being used in the field, and we detected no relationship between ammunition type and level of hunter satisfaction. Field analyses detected no difference in doves bagged per shot, wounded per shot, bagged per hit, or wounded per hit among the 3 ammunition types.*"¹⁹

A further study from the USA (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.²⁰

¹⁷ <https://www.theguardian.com/business/2019/jul/29/experts-call-for-ban-on-lead-shot-as-waitrose-overhauls-sale-of-game>

¹⁸ <https://link.springer.com/article/10.1007/s10344-014-0897-x>

¹⁹ <https://www.researchgate.net/publication/268988767>

²⁰ <https://onlinelibrary.wiley.com/doi/10.1002/wlb3.01001>

The question of gamebird shot lethality was also considered in a BASC commissioned Cranfield University study (2020) which 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.*"²¹

Following on from these studies, guidance on using the non-lead alternatives effectively has been issued by shooting organisations to their members.²² As reported in the BASC guide to moving away from lead shot, 92% of those attending BASC's Sustainable Ammunition Workshops had no concerns about using steel once they had tried it. 97% said they would be confident using steel for quarry or clay shooting.

Historically concerns have also been raised about the impact of steel ammunition use on the barrels of antique guns, which were made for softer lead shot and in some cases cannot be altered.

As set out by a December 2020 GunsOnPegs shooting magazine article, the "*remarkable*" progress in the availability of steel ammunition over recent years has seen "*options come on to the market that are suitable for older guns*"²³, including the 'Grand Prix Traditional Steel'. This new product from Eley uses a shot cup to keep steel shot from marking barrel walls and has, as described by the manufacturer, been designed to "*open up shooting a standard steel load in traditional, nitro-proofed guns, meaning that a future remains for old English shotguns*"²⁴.

A small number of very old guns, made before 1954, may still not be able to use (or be adopted to use) these new steel products, principally Damascus barreled guns manufactured before the 1880s²⁵. For these guns, softer non-toxic ammunitions are available, albeit at a higher cost. This small price detriment for a minority of a minority of gun owners should be put into the proper context – in the words of a 2021 BASC opinion piece:

*"Steel is currently the most widely available and cheapest alternative to lead. For many shooters, it is a perfectly good replacement... At the same time, those with a special attachment to an older gun won't have to break the bank to get a box of bismuth or tungsten matrix for the odd special occasion."*²⁶

This sentiment is echoed in a further 2021 opinion piece from the Field Magazine:

*"We need to put the cost of shooting with bismuth into perspective...[it]is a price I am prepared to pay to continue using my Damascus-barrelled gun"*²⁷

Concerns about the impact of non-toxic shot on the experience of game shooters have therefore largely been addressed over recent years, aided by education and outreach from shooting organisations around the voluntary phase out, and by innovation from manufacturers. Shooter and retailer demand for non-toxic shot is growing and looks set to continue to do so.

²¹ <https://basc.org.uk/lead-vs-steel-a-question-of-lethality/>

²² See: GWCT: Moving Away from Lead: A Practical Guide <https://www.gwct.org.uk/advisory/lead-ammunition/moving-away-from-lead-shot/> and BASC Guide for Using Non-Lead shot for Quarry Species. <https://basc.org.uk/lead/guide-to-using-non-lead-shot/> and <https://basc.org.uk/both-barrels-busting-the-steel-myths/>

²³ <https://www.gunsonpegs.com/articles/cartridges/s/non-toxic-shotgun-cartridges/steel-cartridges-for-older-guns>

²⁴ <https://www.eleyhawk ltd.com/game-load/grand-prix-traditional-steel-pro-eco>

²⁵ <https://www.vintageguns.co.uk/magazine/damascus-barrels-for-steel>

²⁶ <https://basc.org.uk/what-does-the-transition-away-from-lead-mean-for-young-shots/>

²⁷ <https://www.thefield.co.uk/shooting/steel-shot-and-vintage-guns-45758>

The international context

The increase in demand for and the availability of alternatives to lead shot seen in GB can also be seen in other European countries. A 2016 study by Thomas et al. found 13 European companies manufacturing non-toxic ammunition.²⁸ A 2019 study by Kanstrup & Thomas found 22 European companies manufacturing non-toxic shot.²⁹

These studies also draw on European precedents to demonstrate that, whilst voluntary commitments may help kickstart the production of more alternatives to lead shot, regulation is required to sustain demand and secure a full phase out of lead. A 2020 paper from Kanstrup & Thomas observes:

*"The ammunition industry has already created effective lead ammunition substitutes that are effective and cost-competitive...From the industry's perspective, the demand issue is central to a successful transition. It stimulates competition among producers, product development, and competitive pricing. Large-scale demands for a given product facilitate producer's changing the assembly process from one cartridge gauge/calibre to another; including the quality testing that is required. A partial requirement (only certain areas/taxa), and voluntary adoption of non-lead ammunition by hunters, offer no assurance of product demand, an assurance that only regulation and enforcement can provide."*³⁰

As the 2019 Kanstrup & Thomas study argues, the decisive impact of regulation on demand has already been demonstrated in countries where lead ammunition has been banned:

*"The collective experience of Denmark, Canada, and the USA indicate that the demand for non-lead products will be stimulated by any intergovernmental initiatives to regulate lead ammunition for hunting and target shooting, especially when such initiatives are accomplished through well-enforced national regulation."*³¹

Denmark banned lead shot in 1996, with a ban on all lead ammunition due to come into place in 2024. A 2019 study by Kanstrup of hunter attitudes towards non lead shot over the previous 25 years found:

*"Hunters were initially negative towards the change. Resistance was driven by concern about the quality, safety issues, and expensive cost of non-toxic alternatives, compounded by lack of organizational leadership and tensions between stakeholders. As a result of the widening appreciation of the environmental effects of dispersed lead shot and the introduction of new generations of alternative shot types, hunter attitudes became positive and constructive."*³²

The sufficiency of effective alternatives to lead shot after the Danish ban has helped keep the numbers of Danish shooters stable. As reported by Kanstrup in a 2015 paper:

*"Today, 30 years after the first regulation of lead shot and almost 20 year after the total ban, the number of hunters in Denmark is the highest (177,000) since registration was introduced in the 1930s."*³³

²⁸ <https://link.springer.com/article/10.1007/s10344-016-1044-7>

²⁹ <https://link.springer.com/article/10.1007/s13280-019-01151-8>

³⁰ https://link.springer.com/epdf/10.1186/s12302-020-00368-9?sharing_token=fif0eseObwYjUreRF-M8xm_BpE1tBhCbnbw3BuzI2RPIUCuwFACTvAQtWQo7MpowISulOo3Mf1b7xOAoYHdFG_lgpifdxYF2OWAhtb8YwqFXdrChm1ewcLdGM6Xk5PQIUrf3zxXtnk-ZFf14XPSi824R0_LsgcW_T7AvJneGfU%3D

³¹ <https://link.springer.com/article/10.1007/s13280-019-01151-8>

³² <https://link.springer.com/article/10.1007/s13280-018-1125-9>

³³ http://www.oxfordleadsymposium.info/wp-content/uploads/OLS_proceedings/papers/OLS_proceedings_kanstrup.pdf

In short, regulatory change in Denmark spurred the sustained development of alternatives to lead shot and secured widespread acceptance of their use, achieving a successful transition whilst maintaining the numbers of people involved in shooting. A similar, albeit less developed, trend can perhaps be seen in California, which passed legislation banning lead ammunition for hunting in 2013³⁴, with varying phase in timelines for different ammunition types. In 2020 the number of hunting licenses in the State increased, reversing decades of decline.³⁵

Kanstrup & Thomas's 2019 paper on the availability and prices of non-toxic shot cartridges in the European retail market provides further evidence of step-change in availability of non-toxic shot that regulation achieves. The paper studied availability of non-lead shotgun cartridges in 29 European countries, finding an average of two brands of non-lead cartridge available in each country. Denmark and the Netherlands (which banned lead shot in 1993), the only two European countries where lead shot was completely prohibited, were clear exceptions, with 16 and 4 brands available, respectively.³⁶ Another example of this trend can be found in Italy, where a recent partial ban on lead ammunition has resulted in the market share of alternatives for lead increasing by 50%.³⁷

We may shortly have further evidence of the catalytic effect regulation has on demand for alternatives to lead shot. The European Chemicals Agency proposal for a banning of all lead ammunition across the EU is due to be considered by the European Commission in 2023.³⁸ Should a ban be approved we can expect manufacturers in EU countries to significantly scale-up production of non-toxic shot. This will also increase availability of non-toxic shot in GB, given that we already import shot from EU manufacturers (see material on RC, Jocker and BioAmmo brands above).

International supply chains

The international non-toxic shot trade is well established and has been stimulated by the regulation of lead shot in many countries around the world (Avery & Watson, 2009, Stroud 2015).³⁹ ⁴⁰ Earliest regulatory steps to eliminate the risks posed by lead ammunition were undertaken in the USA, with progressive regulation from 1971 until 1991/92, when a nationwide non-toxic shot requirement for waterfowl hunting was introduced. As a result, there were at least four early major manufacturers of steel shotgun cartridges in the USA and significant advances in the efficiency of non-lead (principally steel) ammunition have been made over the last 20 years. Most of these cartridges are available in the UK, alongside the growing stream of products from GM manufacturers set out above.

However, it has been suggested that this rosy picture of growing availability of alternatives to lead shot at home and abroad, to be turbo-charged by regulation, could be spoilt by supply factors affecting steel, the main component in the steel cartridges that form the main alternative

³⁴ https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB711

³⁵ [Hunters in California ditch the lead and keep the conservation heritage](#)

³⁶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6675809/>

³⁷ Industry information from 2017, quoted in UK REACH consultation document.

³⁸ <https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e1840159e6>

³⁹ <https://assets.peregrinefund.org/docs/pdf/research-library/2009/2009-ilsa-0115-Avery.pdf>

⁴⁰ http://www.oxfordleadsymposium.info/wp-content/uploads/OLS_proceedings/papers/OLS_proceedings_stroud.pdf

to lead. Do recent increases in steel costs require extensions to proposed HSE timelines for transitioning away from lead shot for hunting?

The majority of steel used for ammunition in GB and Europe is imported from China⁴¹, the world's top exporter of steel. Global supply chain issues over the past year, caused by a rapid surge in demand for products after manufacturing slowdowns during Covid-19, saw the price of steel increase sharply in early 2021.⁴²

Evidence is lacking that recent steel scarcity is likely to last long enough to inhibit changes in ammunition type in the medium to long term. Temporary fluctuations in supply are a common feature across all imports, with steel no exception. As recently as June 2021, the House of Commons Library observed: "*The recent fall in international demand for steel, combined with continuing growth in production has created a glut of steel on the international market.*"⁴³

There are signs that the subsequent scarcity of steel may now be easing, with steel production in China ramping up sharply to meet demand. As reported by Reuters in June 2022: "*China's steel product exports stood at 7.76 million tonnes in May, the highest since April 2021. Some Chinese traders have ramped up exports to Europe to fill a shortfall caused by the Ukraine war.*"⁴⁴ Figures from statistica show that global steel production is keeping pace with demand.⁴⁵ In the words of one analyst, "*the high prices observed in 2021 are a once in a decade phenomenon...At a global level it is unlikely to be reproduced for a long time*".⁴⁶

In light of the above, it seems unlikely that the increase in the price of steel seen in 2021 will be sustained over a period of years across highly changeable international markets. Given the low cost of steel shot any further short-term fluctuations in prices are likely to be highly absorbable, avoiding significant supply impacts.

The experience of other European countries strongly indicates that demand is the critical factor in the viability of upping steel shot production. As the above section demonstrates, regulation led to sustained increases in the production of steel shot in Denmark in the decades after 1996, despite short term fluctuations in the price of steel over that time period.⁴⁷

Unlike regulation-induced demand, international steel supply factors are unlikely to have critical impacts on the supply of alternatives to lead ammunition over the coming years. As such, the case for extensions to phase out timelines on supply grounds is not convincing.

Conclusion

This review of the supply of and demand for alternatives to lead shot observes that:

⁴¹ https://echa.europa.eu/documents/10162/69550ac2-4e97-6e68-9a1c-25ea1d264863_p235

⁴² <https://fortune.com/2021/07/08/steel-prices-2021-going-up-bubble/>

⁴³ <https://researchbriefings.files.parliament.uk/documents/CBP-7317/CBP-7317.pdf>

⁴⁴ <https://www.reuters.com/article/china-economy-trade-ironore-idUSKBN2NQ0H4>

⁴⁵ <https://www.statista.com/statistics/267264/world-crude-steel-production/#:~:text=As%20the%20global%20economy%20expands,million%20metric%20tons%20in%202020>

⁴⁶ <https://www.fastenerandfixing.com/insight/steel-prices-have-boomed-in-2021-but-it-won-t-last-forever/#:~:text=Global%20average%20scrap%20prices%20have,curbed%20scrap%20generation%20and%20collection.>

⁴⁷ See <https://tradingeconomics.com/commodity/steel>

- There is currently a supply of effective and affordable alternatives to lead shot in GB, with around 20% of shot cartridges on sale online from leading GB manufacturers now being non-toxic.
- This supply has increased considerably over the past two years, seemingly driven by the demand arising from a mosaic of shooting and commercial commitments to move away from lead shot, and the development of restriction proposals in the UK and EU.
- Concerns about the effectiveness of using non-toxic shot for hunting have largely been addressed.
- The experience of European countries suggests that the implementation of regulation is the critical step needed to encourage further demand, provoke subsequent further increases in supply and to secure a complete transition from lead.
- International steel supply issues seen in 2021 are unlikely to inhibit the expansion of steel shot products to meet the increased demand that will follow from regulation.

Given the above, we believe that alternatives to lead shot will be available in sufficient quantity to meet demand on the implementation of a ban. The rapid growth of alternatives to lead shot in GB in just two years (from 2020 to 2022), evidence of the galvanizing effect of regulation in countries that have implemented bans, and the lack of critical supply issues all suggest that an eighteen month phase out period for lead shot is viable.

A ban on lead shot, coming into force by late 2024 and aligning with the voluntary phase out date announced by shooting organisations in 2020, appears to be deliverable. In the words of one shooting industry expert consulted during the production of this report:

"Full regulation of lead shot will bring much needed certainty to the shooting industry while further stimulating the supply of non-lead alternatives to the UK market. This transition is necessary to safeguard the future of the industry as shooters move to more sustainable ammunition types. The UK is known for the high standards and quality of its Fieldsports – changing to non-toxic ammunition will enhance both and benefit the environment".