

COUNTRYSIDE ALLIANCE BACKGROUND NOTE

LEAD SHOT AMMUNITION

WESTMINSTER HALL DEBATE

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Summary

- A change in the law should only happen if there is a change in the evidence.
- The vast majority of UK evidence on lead ammunition has failed to pass rigorous academic scrutiny and cannot be used to justify a change in the existing regulations.
- At least 600,000 people in the UK shoot live quarry, clay pigeons or targets (PACEC 2014).
- Shooting is worth £2 billion to the UK economy (PACEC 2014).
- If lead shot ammunition is banned, or further restricted, it would have serious implications for the gun trade, the rural economy and the natural environment.
- There is no, single, suitable alternative to lead ammunition available at a comparative price. Other materials have ballistic limitations and unquantified risks.
- There are already restrictions on the use of lead shot in all parts of the UK to address international obligations and proven environmental concerns.
- More evidence is required before there are any attempts to change the existing regulations on lead shot ammunition.

1. Background

Lead is a naturally occurring metal and is used extensively in a whole range of products, industrial processes and in lead shot ammunition used in shooting.

There are potential risks involved with lead shot ammunition but it is possible to manage and control those risks and reduce them to negligible levels through enforcing existing regulations and careful monitoring.

Restrictions on the use of lead shot are already in place across the UK to address proven environmental concerns but some environmental groups are now campaigning for further restrictions, or a total ban, on lead ammunition. They argue that lead shot poses such a serious and unmanageable risk to the environment and to human health that new legislation is required. Scaremongering about lead has become a useful way to attack game and sport shooting for some who are fundamentally opposed to shooting in general.

Shooting is hugely important to the rural economy and of great benefit in terms of wildlife management and conservation. Further, unscientific, restrictions could potentially have serious implications for the gun trade, the rural economy and the natural environment. Without lead many shooting activities could be substantially curtailed.

The vast majority of evidence presented to decision makers in support of further restrictions on lead ammunition has failed to pass rigorous academic scrutiny. The Countryside Alliance believes these attempts are unjust, unfair and highlight the way in which science can be used and manipulated to suit a political agenda.

In truth, the true impact of lead ammunition has yet to be scientifically proven and any current findings are not as significant as opponents claim. The Countryside Alliance accepts that lead is toxic and we should take all opportunities to continue monitoring all potential impacts on the environment and human health. If it is proven that lead ammunition is causing a significant and unmanageable risk then mitigation measures, further regulations and phase outs should be considered in that order.

At present there is insufficient evidence to justify changes to the existing regulations and any attempts to do so are in no way based upon science or evidence.

2. Lead Shot and the Alternatives

Lead has always been used as the material of choice for ammunition due to properties that make it ideal for use in projectiles:

- Its high density allows the momentum of the projectile to be retained. This allows the projectile to travel further and impart more energy when the projectile meets the target.
- Lead's soft structure allows it to deform when contacting a target. This causes the projectile to create more efficient and consistent kills when shooting live quarry. This is vital in welfare terms

For many years companies and individuals have been working on alternatives to lead for use in guns. Alternatives to lead are commonly called "non-toxic" but this is a misnomer as the alternatives potentially have greater potential toxicity than lead.

The current alternatives are set out below:

Tungsten

- Tungsten is a much denser metal and harder than lead.
- Most tungsten shot can be fired through normally proofed guns, but the cost of tungsten cartridges can be up to ten times that of lead.
- There are also concerns that tungsten can be dangerous for human and animal health. The US army stopped using training rounds made of tungsten in 2007, following research that suggested that the binding element in tungsten (nickel) may be carcinogenic. In the UK, the Lancet Journal reported a case of a soldier developing seizures having consumed alcohol and trace amounts of tungsten metal.
- The full effects of tungsten on the environment and human health are unknown and more research needs to be undertaken to quantify the risks before advocating it as an alternative to lead. This has led Denmark to introduce a ban on tungsten in ammunition.

Bismuth

- Bismuth is less dense than lead, at 9.7 g/cm³, and does not match the ballistic performance of lead. Also being less malleable it does not deform in the target, but can fragment. Slightly larger shot is required to retain energy at the target, reducing the pattern of the shot.
- The cost of bismuth is around five times that of lead.
- Despite the chemical make-up resembling arsenic, bismuth has relatively low toxicity but the risks are unquantified.

Steel

- Steel shot is actually made of iron and is comparable to lead in terms of price. However, being much less dense than lead it shares very different ballistic capabilities. As such, larger shot is required to retain energy at the target, thus reducing the number of pellets in a given load.
- The reduced load density and hardness of steel greatly reduces its effectiveness and raises concerns about animal welfare.
- The properties of steel load cartridges mean they are not suitable for use in traditional British shotguns which are extensively used for shooting in the UK.
- It should be noted that Denmark has banned steel shot in some forested areas owing to the risks of processing timber that might contain steel shot.

3. The Effects of Lead Ammunition on the Environment

The Countryside Alliance accepts that there are potential environmental risks from lead shot ammunition. However, it is possible to manage and control those risks and reduce them to negligible levels through enforcing the existing regulations and careful monitoring without the need for a complete ban or further restrictions.

It is well known that owing to the unique way that certain waterbirds feed, some species are susceptible to ingesting lead if it is deposited in their feeding area. This has led to international agreements and the introduction of legislation in all parts of the UK in order to restrict the exposure of lead shot ammunition to waterbirds. The Countryside Alliance, along with other shooting and conservation groups, continuously campaigns to ensure that shooters use lead legally across all parts of the UK.

The majority of the evidence used to justify increasing restrictions, or a complete ban on lead shot ammunition, is outdated and heavily reliant on research undertaken in other countries.

A recent unpublished report written by the RSPB and WWT from the Oxford Lead Symposium claims that 50,000-100,000 wildfowl are dying every winter because of lead

poisoning. These figures mainly relate to research that was carried out between 1960 and 1983 before the current restrictions on lead shot were introduced. In addition nearly all wildfowl species referenced in the Report are migratory and there is no way of knowing where the lead found in their digestive systems was picked up. Recent figures from DEFRA (2015) on wintering wildfowl population in England show that the majority of species of migratory birds are on the rise and have achieved stable conservation statuses which suggests that mitigation measures introduced in the UK are effective.

Newth *et al.* (2012) showed that between 1971 and 2010 13% of swans died as a result of lead poisoning but this incorporates data from before both lead shot and lead fishing weight restrictions were brought in. The in-depth statistics on mute swans showed a significant reduction in deaths, 25% (n=12) between 1971 and 1987, 4.6% (n=65) between 1988 and 1999 and 2% (n=100) between 2000 and 2010.

Much of the research is based on Californian condors in the deserts of the United States of America. The condors are known to be particularly affected by lead poisoning and to date no mitigation measures have proven effective at reducing the decline of this species which is why the Californian State has no choice but to phase out the use of lead ammunition. The UK's Predatory Bird Monitoring Scheme (PBMS) monitors lead and mercury levels in scavengers. The most recent findings of the PBMS (Walker *et al.* 2014) shows that the blood lead concentration thresholds of the UK's main scavengers, red kites and buzzards, are not being exceeded. Further monitoring by the PBMS is necessary to make sure no thresholds are being exceeded.

4. The Effects of Lead on Human Health

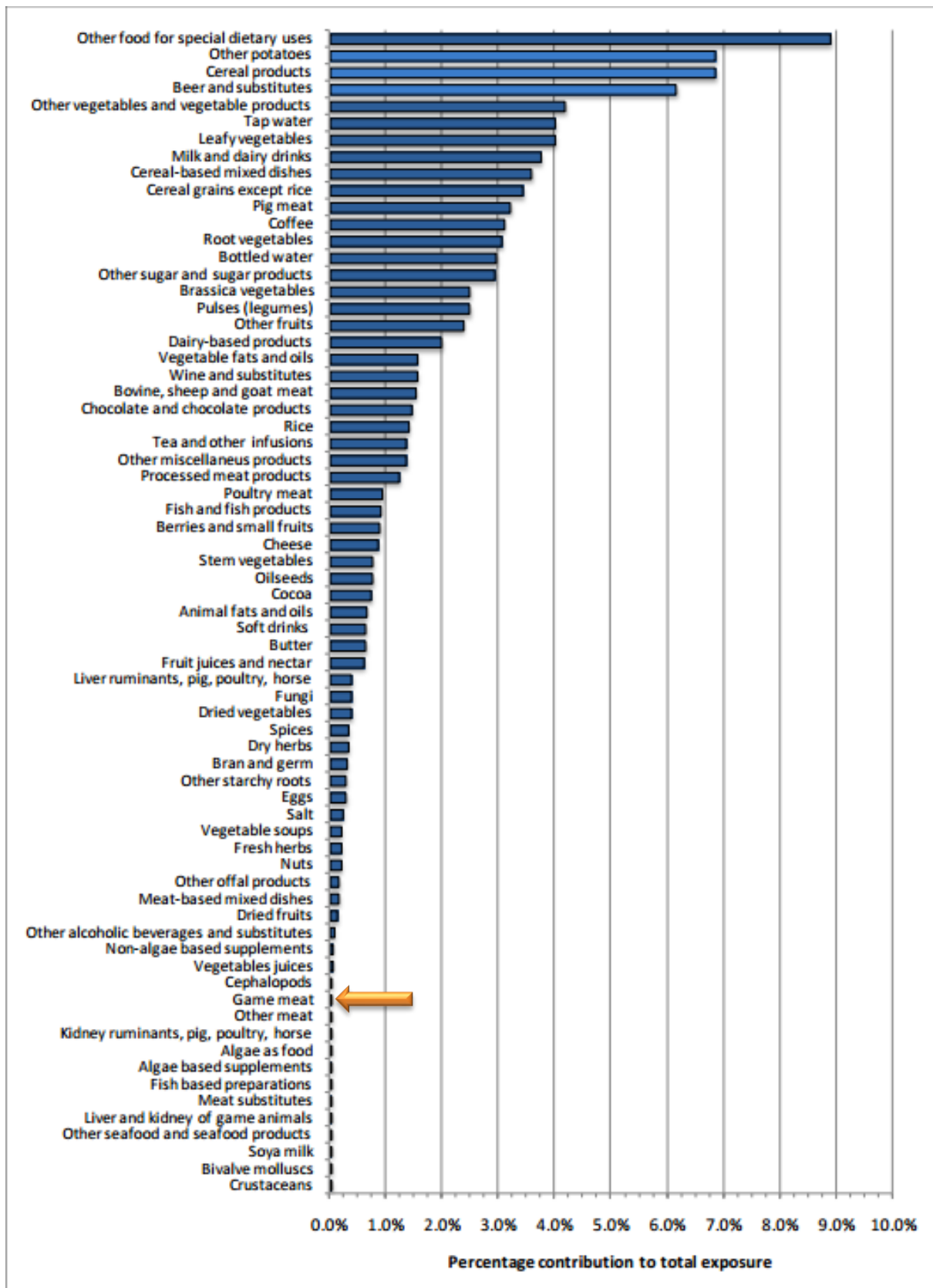
Lead is a toxic element and can be found in all food types at a variety of levels. The most comprehensive report on the effects of lead on public health, undertaken by the European Food Standards Agency (EFSA) (2012), concluded that lead from game meat represents 0.1% of average total dietary lead exposure (Figure 1). The report shows that the average European consumer is exposed to 62% more lead from 'beer and substitutes' compared to 'game meat.'

There is a potential risk of obtaining more lead from your diet if you are a frequent consumer of wild game. However, the impact of the risk is yet to be sufficiently examined, and there are many unanswered questions, for example the bio-accessibility of the lead in game compared to lead in other meats. The current quoted figures range from 1-20%, meaning the 1.181mg/kg mean lead concentration found in samples of game meat in Green & Pain (2012) will in fact be in the range of 0.0118-0.236mg/kg.

Lead sits alongside a number of other food types which the FSA guidelines (2012) recommend that vulnerable groups such as pregnant women and young children should avoid such as oily fish and tuna due to their high mercury levels.

The opportunities for reducing the lead in game meat by improving game handling is just one mitigation measure that could be implemented to reduce the level of risks to a satisfactory level. Cutting out the bruised meat and any bullet channels has the benefit of removing any excess lead that has broken away from the pellet, and is the current given advice in Sweden.

Figure 1: Percentage contribution to total exposure of lead in the diet from certain food types (EFSA,2012)



Studies into the effect of blood lead concentration due to the consumption of wild game are anything but conclusive. Out of the 10 completed studies, 6 showed a significant effect, 3 showed no significance and 1 study showed a partial effect in men only. There have been no studies carried out in the UK on blood lead levels and the impact of lead shot ammunition. The findings from all 10 existing reports at Table 1 demonstrate significant differences in sex and age, and of those 6 studies that showed significant effects with game consumption, the significance only came with one or more game meals a week. Although the combined results are inconclusive all studies showed that eating game less than once a week showed no significant differences in blood lead level. There is no doubt that further studies need to be completed in this area, particularly in the UK.

Study, Country	Sampling Year and number of samples	Association between blood lead and frequency of game consumption	Reference
Greenland	1993-1994 (162 adult men and women)	Yes	Bjerregaard <i>et al.</i> 2004
Switzerland	2000 (73 adults)	No	Haldimann <i>et al.</i> 2002
Greenland	2003-2004 (50 adult men)	Yes	Johansen <i>et al.</i> 2006
Fish and Game Study, Norway	2003-2004 (184 adults)	Yes, but only in men	Birgisdottir <i>et al.</i> 2013
MoBa validation study, Norway	2003-2004 (119 pregnant women)	No	VKM, 2013
Lake Mjosa study, Norway	2004-2005 (64 adults)	No	VKM, 2013
North Dakota, USA	2008 (736 adults and children)	Yes	Iqbal <i>et al.</i> 2009
Riksmaten, Sweden	2010-2011 (273 adults)	Yes	Bjeremo <i>et al.</i> 2013
Lead and Game Study, Norway	2012 (147 adults)	Yes	Meltzer <i>et al.</i> 2013
Swedish hunters and families	2013 (113 adults)	Yes	Forsell <i>et al.</i> 2014 (report in Swedish)

Table 1: Table to show all previous studies recording connections between blood lead concentration and game consumption

The threshold for neurodevelopmental impacts on children and the possibility of a 1 point or more IQ reduction is 12µg/L. The RSPB and WWT report from the Oxford Lead Symposium claims that there are 4,000 - 48,000 children under the age of eight at risk of exceeding this threshold by continuing to consume their current levels of gamebirds. The data used for these figures is based on an unpublished and unreliable survey. The results of this survey claimed that more wild game was being consumed than is actually shot annually within the UK which suggests that people who took part in the survey did not record their wild game intake accurately.

The concentration of lead in blood has decreased dramatically over the last three decades due to prohibition of lead in petrol, paint and seams of tinned food. In 1976-1980 the geometric mean blood lead concentration among children in the NHANES (US) was 150 µg/L but this has decreased to less than 20 µg/L, in 2007 in Southern Sweden the geometric mean blood lead concentration in school children decreased from 60 µg/L in 1978 to approximately 25 µg/L 15 years later (1996) and the mean concentration of lead in blood reported in most European countries is now in the range 20-30 µg/L (EFSA, 2012). This

large reduction shows the effects on the population from lead in petrol and resulting ban. However, the comparison of lead in petrol to lead in wild game is impossible to make, seeing that the average lead levels cannot reduce much further, especially with the amount of lead being picked up in the rest of the diet.

5. Existing Legislation and International Agreements

Regulations on ammunition are a devolved matter and there are restrictions on the use of lead shot ammunition across all parts of the United Kingdom.

These restrictions have been introduced in response to international agreements which the UK is a signatory party. These agreements reflect proven environmental concerns about the impact of lead shot on waterbirds and are supported by the Countryside Alliance. The main agreements are summarised below:

Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)

- An international treaty aimed at reducing the amount of lead ammunition used in wetland areas.
- Administered by the United Nations Environment Programme (UNEP), it brings together countries across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago and the wider international conservation community in an effort to establish coordinated conservation and management of migratory waterbirds throughout their entire migratory range.
- The AEWA brought forward a resolution to ban lead shot over wetlands by 2000.
- The AEWA holds no legislative power over the signatory parties, and as a result there are still at least eight European countries still to bring in their own regulations.
- The Countryside Alliance wishes to see all countries who are signatories of AEWA bring in the correct regulations and see 100% compliance.

Convention on the Conservation of Migratory Species (CMS)

- An environmental treaty also administered by the UNEP to enforce the AEWA.
- The CMS brings together the countries through which migratory animals pass and provides the legal foundation for internationally coordinated conservation measures throughout a migratory range.
- The CMS adopted Resolution 11.15 (Preventing Poisoning of Migratory Birds) in 2014 with guidelines stating a full ban on lead ammunition should be implemented within the next three years, however and importantly, the resolution stated “it is for each Party to determine whether or how to implement the recommended actions, considering the extent and type of poisoning risk, whilst having regard to their international obligations and commitments including those under the Convention.”
- The Countryside Alliance believes that the current lead shot regulations in the UK are adequate to comply with our international obligations and are proportionate to the potential risks to migratory waterbirds in this country.

To comply with the AEWA, the Westminster Parliament and devolved administrations have implemented legislation to restrict the use of lead shot ammunition and the Countryside Alliance believes no further restrictions are necessary. The regulations are summarised below:

England

- [The Environmental Protection \(Restriction on Use of Lead Shot\) \(England\) Regulations 1999](#), Amended [2002](#) and [2003](#).
- Prohibits the use of lead shot for all wildfowl, with further restrictions below the High Water Mark of Ordinary Spring Tides and over specific SSSIs.

Scotland

- [The Environmental Protection \(Restrictions on Use of Lead Shot\) \(Scotland\) \(No.2\) Regulations 2004](#).
- Prohibits the use of lead shot on or over any area of wetland for any shooting activity. For the purpose of these regulations wetlands are based on the RAMSAR definition.

Wales

- [The Environmental Protection \(Restriction on Use of Lead Shot\) \(Wales\) Regulations 2002](#).
- Prohibits the use of lead shot for all wildfowl, with further restrictions below the High Water Mark of Ordinary Spring Tides and over specific SSSIs.

Northern Ireland

- [The Environmental Protection \(Restriction on Use of Lead Shot\) Regulations \(Northern Ireland\) 2009](#)
- Prohibits the use of lead shot on or over any area of wetland for any shooting activity. For the purpose of these regulations wetlands are based on the RAMSAR definition.

6. Implications of a Complete Ban

The UK is home to variety of shooting activities from game and rough shooting, pest control and wildlife management, clay pigeon shooting, to target and rifle shooting disciplines. These activities make a significant contribution to our social, environmental and economic life. At least 600,000 people in the UK shoot live quarry, clay pigeons or targets every year and shooting is worth £2 billion to the UK economy (PACEC 2014). Shooting and conservation go hand in hand and those who shoot spend 3.9 million work days on conservation – the equivalent of 16,000 full-time jobs (PACEC 2014). If lead shot ammunition is banned, or further restricted, it would have serious implications for the gun trade, the rural economy and the natural environment.

The UK has a unique game shooting tradition with a much greater focus on inland shooting than other European countries. As such, any further restriction or ban on lead shot would have a disproportionate effect on shooting in the United Kingdom compared to other European countries.

The UK has a very long tradition of shooting and has led the world in the development of the shotgun. A ban on lead shot ammunition would have a seriously negative impact on the shooting industry because most of the guns made by the historic British gun makers, and many from abroad, are unsuitable for use with alternatives to lead that are economically comparable. The alternatives to lead with comparative ballistic capability can cost up to 10 times more. The cost of a ban on lead ammunition in the EU has been calculated to be in the region of **€4.7 billion over 25 years** (European Chemicals Agency, 2013)

7. Lead Ammunition Group (LAG)

The Lead Ammunition Group (LAG) was set up following concerns about the impacts of lead ammunition on the environment and human health. The LAG was meant to provide a detailed report and risk assessment within a year. However, after five years of the

Countryside Alliance's participation it was clear that the process was flawed, the risk assessments were not approved by the whole group and the draft report was based on un-agreed findings and conclusions. The feeling that no actions taken would change the outcome the Countryside Alliance were left with no choice but to resign from the Group, along with a half the other members (Gun Trade Association, Country Land and Business Association, National Game Dealers Association and the Game and Wildlife Conservation Trust)

Despite this, the LAG's Chairman submitted the report to DEFRA which the majority of the Group had no part in drafting, and which drew incorrect conclusions many of which were based on evidence that had not been agreed. That report cannot yet be made public whilst it still under consideration. This has not stopped the LAG from releasing a letter on their website containing its final recommendation for phasing out of lead ammunition, and in doing so has ignored its terms of reference as set by DEFRA. DEFRA withdrew from the Secretariat of the Group in 2011 and the LAG does not have Government sponsorship.

An alternative report on lead ammunition has been submitted to DEFRA which has been produced by those organisations which resigned from the LAG. The alternative report concludes that the current evidence is insufficient to justify a total ban on lead ammunition and suggests that further research needs to be undertaken in order to take this debate forward. It is now for Defra and Food Standards Agency to act on the findings as they see necessary.

8. Approach of Other Countries

The UK has a unique shooting tradition with a much greater social, economic and environmental role than many other countries and as such comparison with other countries is of limited use. The approach to lead ammunition in four other countries is summarised below for reference.

Denmark

- Denmark led the way in banning toxic materials and forcing a shift to alternatives in all markets.
- They were the first country to ban the use and trade of lead ammunition in 1996.
- Steel shot is not allowed to be used in forest areas, and tungsten shot was banned in 2014 because of the carcinogenic properties of some of the binding properties used.

Norway

- Norway was the second country to ban the use and trade of lead ammunition in 2005.
- After only nine years the ban was repealed because of the lack of evidence of any real harm and none of the alternatives being as effective as lead ammunition.
- The repeal meant that the use of lead ammunition was allowed everywhere except clay pigeon grounds and over wetlands (as per AEWA).

Austria

- In 2014 the Austrian Ministry for the Economy announced they would no longer be investigating a ban on lead ammunition.
- They argued that a ban would have a considerable economic impact and that the threat from lead shot does not justify such a move.
- Other arguments raised included the poor performance of non-lead ammunition, the lack of alternative ammunition for some calibres of gun and the fact that shot accounts for just 2% of the total lead dispersed into the environment.

USA (California)

- California is the first state in America to begin a phase out of lead ammunition, beginning in 2015 with bans on public land and on certain species, the full phase out will be complete by 2019.
- The reason behind this ban is because of the Californian Condor, of which there are only 425 left in the wild. This species is known to be particularly affected by lead poisoning and to date no mitigation measures have proven effective at reducing the decline of this species.

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