Wildlife and Human Health Risks from Lead-Based Ammunition in Europe
A Consensus Statement by Scientists

On 22 March 2013 a group of eminent scientists signed a consensus statement on **Health Risks from Lead-Based Ammunition in the Environment** *with a particular focus on impacts in the USA* **http://www.escholarship.org/uc/item/6dq3h64x**. *The statement below, based upon the USA statement, is intended to perform a similar function, but with a focus on impacts in Europe.*

We, the undersigned, with scientific expertise in lead and human and/or environmental health, draw attention to the overwhelming scientific evidence, summarised below, on the toxic effects of lead on human and wildlife health. In light of this evidence, we support action in Europe to reduce and eventually eliminate the release of lead to the environment through the discharge of lead-based ammunition, in order to protect human and environmental health.

1) Lead is a non-essential toxic metal that occurs naturally, but has been widely distributed by human activities. Today, most exposure to lead in the general population across the European Union (EU) is from the diet (EFSA 2010) because other sources of exposure, such as plumbing, paints and petrol have been reduced by regulation. Lead is one of the most well-studied contaminants and overwhelming scientific evidence demonstrates that:
    a. Lead is well established to be toxic to multiple physiological systems in humans and other vertebrate animals. The most sensitive systems are the haematopoietic, nervous, cardiovascular and renal systems (EFSA 2010). In addition, The International Agency for Research on Cancer classified inorganic lead as *probably carcinogenic to humans* (Group 2A) (IARC 2006).
    b. No 'safe' blood lead level in children has been identified below which negative health effects cannot be detected (CDC 2012). Absorption of lead leading to even slightly elevated levels injures the developing human brain and is associated with lasting effects on intelligence (IQ) and behaviour.
2) Due to lead's harmful effects, most previously significant sources of lead in the environment in Europe, such as leaded petrol, lead-based paint, and lead-based solder, have been significantly reduced or eliminated over the past 50 years. EU standards of lead in drinking water have been, and continue to be, substantially reduced to protect public health (SCHER 2011). Lead-based ammunition is the most significant unregulated source of lead deliberately emitted into the environment in the EU.
    a. The release of toxic lead into the environment via the discharge of lead-based ammunition is largely unregulated. Other major categories of lead consumption, such as leaded batteries and sheet lead/lead pipes, are largely regulated in their environmental discharge/disposal.
3) The discharge and accumulation of spent lead-based ammunition in the environment poses significant health risks to humans and wildlife. The best available scientific evidence demonstrates that:
    a. The discharge of lead-based ammunition substantially increases environmental lead levels, especially in areas of concentrated shooting activity (Mellor & McCartney 1994; Rooney *et al*. 1999).
    b. While regulations exist and are effective in restricting the use of lead gunshot in some EU countries (Denmark and the Netherlands), most EU countries have only partial or limited restrictions on lead ammunition use. Emissions of ammunition-derived lead to the environment remain because of lack of regulation and, where regulations exist, poor compliance and lack of effective enforcement (AEWA 2012). For example, compliance with regulations introduced in 1999 restricting the use of lead gunshot for shooting wildfowl in England has been shown to be very low with 70% of locally-sourced wildfowl purchased having been shot illegally with lead

(Cromie *et al.* 2010). Despite this, there have been no primary prosecutions and only one secondary prosecution for non-compliance with the regulations.

c. Birds such as gamebirds and wildfowl ingest spent lead gunshot mistakenly for food or the grit that helps them to grind up food in their muscular gizzards. Ingestion of lead gunshot by waterfowl is associated with increased death rates (Tavecchia *et al*. 2001). Large numbers of birds of these kinds suffer and die annually in Europe because of poisoning due to ingested ammunition-derived lead (Mateo 2009).
d. Lead-based gunshot and bullets used to shoot wildlife can fragment into numerous small pieces within the animal, some of which may be distant from the wound tract; many of these are sufficiently small to be easily ingested by scavenging animals or incorporated into meat prepared for human consumption (Hunt *et al*. 2009; Grund *et al.* 2010; Knott *et al*. 2010; Pain *et al.* 2010).
e. Although the effects of ingestion of spent lead ammunition are best documented for waterfowl, they have also been reported for more than 60 bird species from other taxonomic groups (Pain *et al.* 2009). Lead poisoning from the ingestion of spent lead-based ammunition fragments in carrion and prey animals is a significant source of poisoning and mortality in predatory and scavenging birds of prey, including European vultures (Donázar *et al.* 2002; Mateo 2009) and the white-tailed eagle *Haliaeetus albicilla*, in parts of the EU (Pain *et al.* 1993, 1997; Fisher *et al.* 2006; Nadjafzadeh *et al.* 2013).
f. Lead-based ammunition is a significant source of lead exposure in humans that ingest wild game (Hanning *et al*. 2003; Johansen *et al*. 2006; Tsuji *et al*. 2008), and blood lead levels in people consuming game meat shot with lead-based ammunition have been shown to be elevated in European countries and elsewhere, in proportion to the amounts and frequency of game consumed (Dewailly *et al*. 2001; Iqbal 2009; Meltzer *et al.* 2013; Bjermo *et al.* 2013).
g. High concentrations of ammunition-derived lead are often found in edible tissues of both small and large game animals shot with lead ammunition and can be present in tissues at a considerable distance from obvious wounding so that they are difficult to remove during food preparation (Pain *et al*. 2010; FSA 2012a). Meat from game animals contaminated in this way is consumed by people associated with shooting and, in some countries (such as in the UK), is also sold in supermarkets and other food outlets to consumers who are largely unaware of associated risks.
h. Several EU countries have produced advice on the risks to human health of frequent consumption of game meat shot with lead ammunition, particularly to young children, pregnant women or women wishing to become pregnant (BfR 2011; AESAN 2012; FSA 2012b; VKM 2013).

4) Non-toxic alternatives to lead ammunition have been developed, are widely available, and perform well (Thomas 2013). The sport of shooting and its associated trade in ammunition and other supplies appears to remain viable in countries where the use of lead shot in ammunition has already been banned (e.g. within Europe, lead shot in ammunition has been banned for all shooting since 1993 in the Netherlands, since 1996 in Denmark and since 2005 in Norway).

Based upon (1) overwhelming evidence for the toxic effects of lead in humans and wildlife, even at very low exposure levels, (2) convincing data that the discharge of lead-based ammunition into the environment poses significant risks of lead exposure to humans and wildlife, and (3) the availability and suitability of several non-lead alternative products for hunting, we support a phase out and eventual elimination of the use of lead-based ammunition and its replacement with non-toxic alternatives.

Signed,

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Suggested citation

Group of Scientists, 2014. Wildlife and Human Health Risks from Lead-Based Ammunition in Europe: A Consensus Statement by Scientists. Available from:
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