

Committee for Risk Assessment (RAC)

Opinion

on an Annex XV dossier proposing restrictions on

LEAD IN GUNSHOT

ECHA/RAC/RES-O-000006671-73-01/F

Adopted

9 March 2018

9 March 2018

RES-O-0000006671-73-01/F

Opinion of the Committee for Risk Assessment

on an Annex XV dossier proposing restriction on the use of lead gunshot in or over wetlands within the EU

Having regard to Regulation (EC) No 1907/2006 of the European Parliament and of the Council 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (the REACH Regulation), and in particular the definition of a restriction in Article 3(31) and Title VIII thereof, the Committee for Risk Assessment (RAC) has adopted an opinion in accordance with Article 70 of the REACH Regulation on the proposal for restriction of

Chemical name(s):	Lead
EC No.:	Not applicable
CAS No.:	Not applicable

This document presents the opinion adopted by RAC. The Background Document (BD) provides support to both RAC and SEAC opinions, giving detailed ground for the opinions.

PROCESS FOR ADOPTION OF THE OPINIONS

ECHA on a request from the Commission or proposing restriction according to Article 69(2) has submitted a proposal for a restriction together with the justification and background information documented in an Annex XV dossier. The Annex XV report conforming to the requirements of Annex XV of the REACH Regulation was made publicly available at <http://echa.europa.eu/web/guest/restrictions-under-consideration> on **21 June 2017**. Interested parties were invited to submit comments and contributions by **21 December 2017**.

ADOPTION OF THE OPINION OF RAC:

Rapporteur, appointed by RAC:

Bert-Ove LUND

Co-rapporteur, appointed by RAC:

Michael NEUMANN

The opinion of RAC as to whether the suggested restrictions are appropriate in reducing the risk to human health and/or the environment was adopted in accordance with Article 70 of the REACH Regulation on **9 March 2018**.

The opinion takes into account the comments of interested parties provided in accordance with Article 69(6) of the REACH Regulation.

The opinion of RAC was adopted ***by consensus***.

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OPINION OF RAC

The restriction proposed by the Dossier Submitter is:

Brief title: restriction on the use of lead gunshot in or over wetlands.

Lead and lead compounds	<ol style="list-style-type: none"> 1. Shall not be used in gunshot for shooting with a shotgun within a wetland or where spent gunshot would land within a wetland. 2. Lead gunshot shall not be in the possession of persons in wetlands. 3. For the purposes of paragraphs 1 and 2: <ul style="list-style-type: none"> • “shotgun” means a smooth-bore gun, • “gunshot” means pellets used in quantity in a single charge or cartridge in a shotgun; • “lead gunshot” means any gunshot made of lead, or any alloy or compound of lead with lead comprising more than 1% of that alloy or compound; • “wetlands” are defined according to Article 1(1) of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). 4. Paragraphs 1 and 2 shall apply 36 months from entry into force of the restriction. 5. Member States may, on grounds of human health protection and environmental protection, impose more stringent measures than those set out in paragraphs 1 and 2. Member States shall inform the Commission of such measures.
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THE OPINION OF RAC

RAC has formulated its opinion on the proposed restriction based on an evaluation of information related to the identified risk and to the identified options to reduce the risk as documented in the Annex XV report and submitted by interested parties as well as other available information as recorded in the Background Document. RAC considers that the restriction proposed by the Dossier Submitter on lead in gunshot is an appropriate Union-wide measure to address the identified risk in terms of the effectiveness, in reducing the risk, practicality and monitorability as demonstrated in the justification supporting this opinion.

However, RAC has the following suggestions:

- The scope of the restriction will be clearer if the definition of ‘wetland’ according to the Ramsar Convention is included in the restriction text (i.e., *wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water with the depth of which at low tide does not exceed six metres*). This would also address any misunderstandings in relation to the scope of the restriction and designated ‘Ramsar sites’. The proposed restriction is not limited to designated Ramsar sites, but rather all wetlands

that fit the definition, irrespective of their status.

- The REACH definition of 'use' explicitly includes 'keeping' (Article 3(24)).¹ The Dossier Submitter considers that the term keeping is equivalent to 'possession'. Following this rationale, a restriction on 'use', without further qualification, implies a restriction on any of the uses defined under REACH, including 'possession'. The proposed restriction is intended to prohibit any use of lead gunshot within a wetland (including possession) and the shooting of lead gunshot into a wetland from outside of a wetland ('*use [...] where spent gunshot would land within a wetland*'). Other uses, e.g. possession, outside of a wetland are not intended to be restricted on the basis that this would increase the scope of the restriction beyond wetlands; this understanding is supported by the fact that the socio-economic analysis was also made based on the above rationale. However, RAC notes that the proposed wording of paragraphs 1 and 2 may introduce ambiguity as it could be interpreted that the restriction on 'use' outside of a wetland is wider than intended. Thus, the meaning of use and possession are not equivalent or interchangeable in the proposed wording. RAC considers that it is important that the wording of the restriction should unambiguously indicate what precise uses (e.g. shooting/possession) of lead shot are restricted and where (inside or outside of a wetland).
- The proposal by the Dossier Submitter does not include a fixed "buffer zone" around wetlands. Consequently it is the responsibility of the hunter/shooter, based on their expertise and local knowledge, to make sure that no lead is deposited in wetlands when hunting/shooting (see §1). There is some support in RAC for this flexible approach although the FORUM has indicated difficulties with enforcement. There was some support in RAC for quantitatively defining a fixed buffer zone (e.g. 300 metres) around wetlands where shooting towards wetlands would not be allowed, although there are also enforcement and scope issues associated with this approach.
- In relation to paragraph 2, RAC has discussed a fixed buffer zone around a wetland where possession of lead gunshot would be prohibited, and noted that this could offer a further enforcement possibility.
- The evaluation of this proposal by RAC is based on the assumption that possession of lead gunshot by consumers / professionals can be regulated under REACH.
- The proposed restriction on possession should be interpreted as 'possession while hunting/sport shooting'; RAC has not discussed if paragraphs 1 and 2 could be merged and if a) use in gunshot for shooting and b) possession while hunting/sport shooting could be restricted in the same manner and within the same area (e.g. fixed buffer zone).
- Regarding paragraph 4 on entry into force, RAC strongly supports a shorter transitional period than the 3 years proposed by the Dossier Submitter. The reason being that each year of delay results in an estimated additional release of in the order of 4 000 tonnes of lead to wetlands and the associated death of in the order of 1 million birds.
- RAC emphasises the clear advantages of an obligatory labelling requirement for all shotgun cartridges containing lead as is currently the case for shotgun cartridges containing steel gunshot. They could also be labelled to ensure that it is clear that the use of lead gunshot in wetlands is not permitted within the EU and communicate the risks that they are associated with (e.g. poisoning of waterbirds).
- The proposed restriction aims to harmonise the existing diverse Member State approaches, but it is also important that Member States may impose more stringent

¹ Use under REACH is defined as any processing, formulation, consumption, storage, **keeping**, treatment, filling into containers, transfer from one container to another, mixing, production of an article or any other utilisation.

measures (e.g., with respect to buffer zones or to a total ban).

- The effectiveness and practicality, including enforceability, of the proposed restriction would be further increased by including all uses of lead gunshot within the scope of the proposal (i.e. uses in both wetlands and terrestrial habitats) (option 1 in section E.1.2 of the Background Document²). However, RAC notes that the development of such a restriction proposal was clearly not included in the Commission's request to ECHA.

² See also Table 5.1 in Annex XV report.

JUSTIFICATION FOR THE OPINION OF RAC

IDENTIFIED HAZARD, EXPOSURE/EMISSIONS AND RISK

Justification for the opinion of RAC

Description of and justification for targeting of the information on hazard(s) and exposure/emissions (scope)

Summary of proposal:

The proposed restriction aims to address the risks posed by the use of lead gunshot in wetlands. The scope is limited to wetlands as that was set out in the request from the Commission to the Dossier Submitter (ECHA). The Dossier Submitter did not specifically consider any risks from lead gunshot in non-wetland habitats (i.e. in terrestrial habitats). Consequently, the proposed restriction entails a ban on the use of lead gunshot within all European wetlands and where spent (fired) lead gunshot would land within a wetland even if the use (i.e. shooting) takes place outside of a wetland. It includes the use of lead gunshot for both shooting at targets (e.g. clay pigeons) and live quarry. The Dossier Submitter aims to simplify enforcement, and hence maximise the realised risk reduction potential of the restriction, by also prohibiting the possession of lead shot within a wetland. The proposal includes all gunshot containing more than 1% lead. A transitional period of 36 months after entry into force is proposed to allow producers of cartridges/gunshot to adjust to this restriction.

The proposal describes the risks resulting from the use of lead gunshot in wetlands to both the environment and human health. Concerning human health, lead is considered a non-threshold substance and Annex I of REACH only requires a qualitative assessment of risks to be carried out for such substances (Annex I para 6.5). In contrast, the risk to waterbirds through primary ingestion of spent lead pellets dispersed into wetlands (where pellets are mistaken for food or grit) is assessed quantitatively. The risk assessment also considers a risk, via secondary poisoning, to species that either predate or scavenge birds contaminated with lead gunshot (either as embedded or ingested gunshot, or accumulated lead in tissues from the dissolution of embedded or ingested gunshot).

The proposed restriction aims to harmonise the existing diverse Member State approaches to address the risks from the use of lead gunshot in wetlands. It is primarily justified based on the acute and sub-lethal effects, principally death, that occur in waterbirds after ingesting lead gunshot. As a result of the scope of the restriction, it will only address those risks where ingestion occurs within a wetland. The Dossier Submitter acknowledges that certain species of waterbirds (including certain AEWA-listed waterbirds) are also known to feed outside of wetlands and may therefore still be exposed to lead gunshot should this be used outside of a wetland. The proposed restriction will also reduce the prevalence of 'embedded' or 'shot-in' lead gunshot in waterbirds that may subsequently be consumed by predators/scavengers in either wetland or terrestrial environments, or by humans.

In recognition of these risks, several Member States have already enacted more stringent restrictions on the use of lead gunshot within their territory than proposed here, i.e. restrictions that extend beyond wetlands. The text of the restriction proposed by the Dossier Submitter does not seek to compel Member States to revoke these existing measures.

The proposed restriction has been justified by the Dossier Submitter primarily on the basis of the identified risks to waterbirds. However, the Dossier Submitter also identifies human health concerns related to the use of lead gunshot in wetlands arising via indirect exposure (humans via the environment). One concern arises by consuming waterbirds that have been shot with lead gunshot. Another is the general condition of wetland environments, including potential contamination of sources of drinking water with lead. For the general population, food and water are considered to be the most important sources of exposure to lead (EFSA, 2013). Consumption of game meat can potentially contribute disproportionately to overall dietary exposure (EFSA, 2013). Addressing these latter concerns are also considered by the Dossier Submitter to be benefits of the proposed restriction. The risks to human health from the use of lead gunshot were not quantitatively assessed in this Annex XV report, as sufficient data were not available to do so.

RAC conclusion(s):

The purpose of the restriction is clear and the reasons for limiting the scope to wetlands as requested by the Commission is understood. RAC is of the opinion that restricting possession of lead shot in addition to restricting its 'use' in wetlands will increase the enforceability and, therefore, the risk reduction potential of the proposal. The effectiveness and practicality, including enforceability, of the proposed restriction would be further increased by including all uses of lead gunshot within the scope of the proposal (i.e. uses in both wetlands and terrestrial habitats) (option 1 in section E.1.2 of the Background Document). However, RAC notes that the development of such a restriction proposal was clearly not included in the Commission's request to ECHA. Similarly, a restriction option to prohibit the use of lead gunshot to hunt specified wetland bird species (e.g. ducks, geese), in line with current regulations in some Member States (option 3 in section E.1.2 of the Background Document), was not within the mandate from the Commission as such hunting can occur outside of wetlands.

The public consultation resulted in supportive comments from individuals, NGOs, scientific organisations, single experts and scientists, but also from national agencies. Also some organisations representing hunters support on a general level the proposed restriction and commented only on specific issues in relation to the scope, the Ramsar definition of a wetland (and specifically the inclusion of peatland), and the impact of the restriction (discussed in the following sections). Some comments explicitly supported the Ramsar Convention definition of a wetland and emphasised the need to address the risks posed by lead gunshot in peatland.

It is acknowledged by RAC, that 24 out of 28 Member States have already implemented different types of restrictions, some of them beyond the scope of the proposed restriction (i.e. total bans on the use and placing on the market of lead gunshot). Many comments also support a wider restriction, e.g. a total ban for the additional protection of soil and terrestrial ecosystems. The merit in having an EU harmonised restriction is clear considering that the breeding and/or overwintering areas (and the flyways between them) for many European waterbird species (including AEWA-listed species) occur across multiple Member States of the European Union, that lead is highly toxic to human health with no threshold and that any emission to the environment must therefore be minimised.

Ingestion of spent gunshot leads to the poisoning of a large number of waterbirds annually. An EU-wide restriction on the use of lead gunshot in or nearby wetlands, where spent gunshot would fall within a wetland, will therefore prevent waterbird species from ingesting lead pellets whilst foraging in wetland habitats. It will also prevent waterbirds that are shot and wounded (but not killed) in wetlands from having lead shot embedded in their tissues, and subsequently

exposing predatory or scavenging species. The proposed restriction also protects wetland ecosystems in general and species that consume waterbirds (scavenging and predatory birds as well as humans).

Wetlands are defined differently in different Member States in relation to hunting restrictions, but the proposed use of an internationally accepted, broad definition is likely to simplify the implementation of the restriction, increasing its effectiveness and is therefore supported by RAC.

The scope of the restriction also includes the use of lead gunshot in areas nearby wetlands when spent gunshot would land within a wetland, but without further defining these areas, for example in terms of distances from the wetland. RAC notes that gunshot can travel up to 300 meters from the point of shooting to the point of deposition. The absence of precise distances from a wetland in the proposal was based on the recognition that many factors will affect the potential for lead gunshot to fall within a wetland when it is used outside of a wetland³, but most notably whether the lead shot was fired in the direction of the wetland or away from it. This may result in uncertainty as to whether a point of shooting outside of a wetland is inside or outside of the scope of the restriction. This uncertainty may complicate understanding by those shooting (affecting compliance) as well as during any enforcement, and could reduce the effectiveness of the proposal.

Description of the risk(s) addressed by the proposed restriction

Information on hazard(s)

Summary of proposal:

Mortality can result from either acute (short-term) or chronic (long-term) exposure to lead. Acute lethal poisoning can occur after the ingestion of one shot. In such cases, mortality generally occurs rapidly after ingestion without the bird becoming noticeably intoxicated, typically within 1-3 days. Birds dying from acute lead poisoning are typically found to be in good to excellent condition with good to excellent deposits of fat. Individuals may have a large amount of lead gunshot in the gizzard and show multiple areas of myocardial infarction (areas of pale-pink, dead heart muscle).

Chronic lethal poisoning, as described in USFWS (1986), occurs as the result of a bird ingesting 1 to 15 pellets, most often 1 or 2, and developing a progressive (non-reversible) illness that requires two to three weeks to eventually result in mortality. The most reliable gross indications of lead poisoning are considered to be impaction (blocking) of the alimentary tract with food, submandibular oedema, necrosis of heart muscle and bile staining of the liver. Based on extensive field studies, Bellrose (1959) identified specific mortality rates in seven classes defined on the number of ingested lead shot. Mallards with 1, 2, 3, 4, 5, 6, or > 6 ingested shot, were estimated to have a relative mortality increase of 9, 23, 30, 36, 43, 50 and 75%, respectively, compared to controls.

Lethal or sub-lethal effects are caused in predatory or scavenging birds (as well as other wildlife) by secondary poisoning through eating contaminated waterbirds that have lead gunshot embedded in their tissues (after being wounded) or digestive tract (through

³ e.g. shot size, barrel/chamber pressure generated by the cartridge [standard proof/magnum proof]; trajectory of the shot; barrel choke used, etc.

ingestion) or where embedded or ingested gunshot results in elevated tissue concentrations.

RAC conclusion(s):

RAC concludes in line with the Dossier Submitter that the ingestion of spent lead shot by waterbirds such as ducks, geese, swans, waders, rails and flamingos causes toxicological effects. Lead exposure may result in mortality, or at lower exposure, in a range of adverse physiological and behavioural effects. Sub-lethal effects occur in waterbirds, as well as in species of birds that either predate or scavenge water birds contaminated with lead gunshot.

RAC concludes that lead is highly toxic and that a threshold for neurodevelopmental effects in children (as well as blood pressure and renal effects in adults) has not been established. RAC has given its opinion on lead toxicity in previous restrictions on lead in jewellery and in consumer articles (RAC, 2011; RAC, 2013), which is in line with the assessment by EFSA (2013). Any exposure to lead, including via the diet, constitutes a risk. This was questioned during public consultation⁴. However, in line with these assessments, the more recent assessment of lead by the Australian NHMRC concludes “Reducing the amount of lead in our environment (e.g. in soil, dust, air and products) as much as possible will reduce the risk of harm to future generations, especially for young children and unborn babies” (NHMRC 2015a and 2015b). During public consultation some comments highlighted the need for regulatory action to protect human health⁵.

RAC concludes that any emission of lead into the environment must be minimised. RAC also notes that the existence of some form of restriction on the use of lead shot in 23 out of 28 Member States confirms that the hazards related to the use of lead gunshot is already well-recognised in Europe.

Based on the methodology developed by Bellrose (1959), the Dossier Submitter estimated that between 400 000 and 1 500 000 waterbirds (across 19 species) die annually across the EU due to ingested lead shot. RAC examined the Bellrose calculations and questioned the appropriateness and reliability of the methods used. However, a reassessment of the Bellrose data using contemporary statistical methods reported by Green (2017, submitted)⁶ was considered to provide a more reliable estimate of annual mortality associated with the ingestion of various quantities of lead gunshot. Nevertheless, acknowledging the large confidence intervals in the Green estimates, and the relatively small differences between the estimates reported by Bellrose and Green, RAC can support with the approach of the Dossier Submitter to use estimates of annual mortality underpinned by the Bellrose mortality rates for further calculations of total bird mortality.

Key elements underpinning the RAC conclusion(s):

Lead is harmful to the environment. Extensive data on the effects of short and long-term lead exposure on a wide variety of aquatic and terrestrial organisms have been collated in REACH registration dossiers as well as covered in the EU voluntary risk assessment for lead and its compounds (LDAI, 2008). The literature describing the causes and consequences of lead poisoning in birds is extensive and comprehensive.

Lead also has a harmonised classification under the CLP Regulation as e.g., as toxic to reproduction (H360DF). Unlike many other trace metals it has no physiological function. It

⁴ comments #1583, #1705

⁵ comments #1560, #1607, #1703, #1802, #1841

⁶ Submitted in ECHA’s public consultation, #1612

acts as a neurotoxin, affecting multiple aspects of behaviour and causing brain damage at low levels of exposure in the absence of other symptoms (EFSA, 2013). Developing individuals (children) are particularly at risk. Lead has also effects on blood pressure and chronic kidney disease. EFSA concluded that there is no evidence for a threshold for neurological effects in children and for renal effects in adults (EFSA, 2013). This was the basis for the restriction on lead compounds in consumer articles that can be mouthed by children and on lead compounds in jewellery (RAC, 2011; RAC, 2013) and is in line with the assessment by EFSA (2013).

The fact that ingesting spent lead gunshot is lethal to waterfowl has been known for over a century, and many important studies are therefore rather old and not always well reported. Nevertheless, based on the experimental studies summarised in the restriction report it is possible to conclude that even the ingestion of a single lead gunshot may be fatal in mallards and small waterfowl, generally causing severe suffering for 2-3 weeks before death occurs (Rodriguez *et al.*, 2010). However, the sensitivity to lead toxicity appears to differ between species, for instance depending on the type of diet and body size, although it is clear that lead is more or less toxic to all species. The toxic effects of lead on organisms are further explained in the Background Document, and these are generally so well-known that it is not further discussed in this RAC opinion.

Whilst there are extensive laboratory data on the potential of lead poisoning to result in mortality, dead birds are not typically observed in the field. This is because carcasses are usually scavenged in a matter of days (USFWS, 1986). However, a few European case-studies have been reported. For example, mortality was observed in populations of flamingos in Spain, Italy and Cyprus (≤ 106 birds, containing 1 to 277 pellets/gizzard). Newth *et al.* (2012) have analysed 2 365 dead waterbirds (including 28 different species) found in the UK between 1971 and 2010, and attributed 10.6% of the deaths to lead poisoning. Mortality rates for some species were greater, such as for the Whooper swan where 27% of the deaths were attributed to lead poisoning. Taggart *et al.* (2009) collected dead or moribund birds and found that 21% of marbled teals (*Marmaronetta angustirostris*) and 71% of white-headed duck (*Oxyura leucocephala*) had shot in the gizzard.

Bellrose (1959) collected unpublished information from US state and federal conservation agencies on lead poisoning outbreaks among waterfowl and published a summary of die-offs in the US, showing numerous such die-offs involving hundreds of birds (often mallards). A few exceptional cases involving up to 16 000 birds were also reported. The use of lead gunshot to hunt waterfowl was subsequently banned in the USA.

Based on the methodology reported by Bellrose (1959), as used in other recent studies, the Dossier Submitter estimated that between 400 000 and 1 500 000 birds die annually due to ingested lead shot. The Bellrose method estimates the dose-dependent increase in annual mortality in mallard populations caused by the ingestion of different numbers of lead shot; for example, mortality is increased by 9% in birds having 1 shot in their gizzard and up to 75% in birds having > 6 lead shot in their gizzard.

The birds studied by Bellrose were wild-caught, dosed with lead shot, provided with leg bands, and released. Hunters were asked to report bands on birds that they had shot. Bellrose (1959) concluded that a considerable proportion of the recovered bands came from bagged (shot) mallards. Experiments were performed in three consecutive years with mallards dosed with 0, 1, 2, or 4 lead pellets.

RAC notes that the method described by Bellrose (1959) does not measure population mortality directly, but was designed to infer changes in relative mortality rates based on the

number of band recoveries in control and treatment groups over the period of the study (four years post banding). Bellrose also reported that lead-exposed birds are more frequently shot in the first year after dosing than control birds.

The more lead pellets that mallards were administered, the greater the percentage of birds were shot in the first season, within a few weeks of release. RAC agrees that this is evidence that sub-lethal effects in the mallards, after ingestion of lead shot, makes them more vulnerable to hunting.

The data also show that among the mallards surviving the first year, a lower percentage of treated mallards were shot in the three subsequent years compared to the controls. The difference was presumed by Bellrose to be caused by excess (unobserved) mortality among the treated mallards caused by lead poisoning. However, the mortality rate calculations performed by Bellrose do not appropriately reflect these assumptions, as they were simply the ratio of the number of banded birds recovered after the first year of banding to the total number of banded birds recovered in the four year period after banding. Also, Bellrose's calculations are not consistent with contemporary methodological approaches for estimating mortality rates from studies on the recovery of banded birds. Thus, in the view of RAC, the mortality rates reported by Bellrose associated with the ingestion of lead shot should be interpreted with caution, and more likely reflect sub-lethal effects rather than mortality.

Based on the excess mortality rates for mallards, Bellrose (1959) calculated that 3.98% of the US mallard population died each year because of lead poisoning. Bellrose also mentions "*The results of twice-weekly surveys of public shooting grounds in central Illinois during recent hunting seasons indicate that the waste, or unharvested loss, due to lead poisoning is about one-fourth less than the 3.98% calculated as the total loss, or approximately 3%.*". However, there is no further data or reference given to support this statement.

RAC also notes that the author has used the same data to estimate that mallards dosed with 1, 2, or 4 shot are 1.48, 1.89, and 2.12 times more likely than the controls to be shot the first year, respectively, which he defines as "relative hunting vulnerability". RAC can support these estimates and notes that an increase in hunting vulnerability (caused by sub-lethal effects) after ingestion of lead shot is supported by:

- the increased risk of being shot was most pronounced the 3 first weeks after the release (Bellrose, 1959), which coincides with when the lead pellets are dissolved, the concentrations in the birds peak (Rodriguez *et al.*, 2010), and the toxicological effects are likely to be worst,
- a larger proportion of the mallards dosed with lead pellets than control birds were shot close to the place of release (< 50 miles). Thus, 77% of mallards dosed with 2 pellets versus 58% of controls were shot within 50 miles of the release in the 1950 study, and 96% of mallards dosed with 4 pellets versus 69% of controls in the 1951 study (Bellrose, 1959),
- birds killed by hunters are three times more exposed to ingested lead pellets than birds randomly sampled from the same population (Heitmeyer *et al.*, 1993, cited in Tavecchia *et al.*, 2001),
- administration of one lead pellet (size 4) to farmed mallards caused 50% mortality in a

study by Rodriguez *et al.*(2010), a 90% mortality was observed in farmed mallards administered one lead pellet (size 4) by Brewer *et al.*(2003), and Rattner *et al.*(1989) showed 30 to 60% mortality in captured wild mallards dosed with 3 to 5 (size 4) pellets and then kept in captivity. Although there are studies showing no mortality after administration of 1 pellet to mallards, the weight of evidence indicates that already ingestion of 1 pellet can be fatal, and at least is likely to result in sub-lethal toxicity,

- a study by Mateo (2009) suggesting a relationship ($r=-0.63$, $p=0.012$) between prevalence of lead pellet ingestion and population trends in 15 species of wintering waterfowl,
- a study by Tavecchia *et al.* (2001) showing that the recovery of rings from 2 740 ringed mallards wintering in southern France was lower in birds that had lead pellets in the gizzard when ringed (as shown by X-ray) than in birds without pellets, which was interpreted as a 19% decreased survival of birds with lead in the gizzard.

Since the methods used by Bellrose to analyse his extensive dataset are rather dated and simplistic compared to current approaches, Green (2017, submitted) reanalysed the Bellrose dataset using contemporary methods and submitted this to ECHA and RAC through the Public Consultation⁷.

The new calculations use the same data as Bellrose to calculate the mortality associated with lead shot ingestion. Green first estimated total mortality (mortality from lead poisoning plus mortality associated with increased vulnerability to hunting) and then estimated the mortality associated with lead poisoning only, by subtracting the effect associated with the increased vulnerability to hunting. Based on a 50% reporting rate of recovered bands (from the finding that reporting doubled in an experiment where hunters were paid for reporting recovered bands), Green calculates the increased vulnerability to hunting as being 6, 23, and 21% in mallards dosed with 1, 2, or 4 lead pellets, respectively.

In contrast to Bellrose (1959), the methodology reported by Green estimated total mortality excluding the available data on the recovery of birds during first year of the study. The total mortality was estimated to be 11% (95% confidence limits; 1-20%), 47% (95% confidence limits; 33-59%) and 55% (95% confidence limits; 42-67%) in mallards dosed with 1, 2 or 4 lead pellets, respectively.

The difference between total mortality and increased vulnerability to hunting represents the mortality caused by lead poisoning, and is 4% (95% confidence limits; 0-25%), 24% (95% confidence limits; 9-38%), and 35% (95% confidence limits; 19-48%) in mallards dosed with 1, 2 or 4 lead pellets, respectively.

In the view of RAC, the new calculations are scientifically sound, and more appropriate than the original calculations reported by Bellrose. However, the new data analysis also indicates that combining data across all three years of the Bellrose study results in large confidence intervals.

⁷ Comment #1612

Table 1. Effects of administered lead pellets on Mallard survival; A re-analysis of Bellrose (1959) data by Green (comment #1612).

Number of administered lead pellets	Total mortality	Lead poisoning	Increased vulnerability to hunting
	% of birds affected; mean (95% confidence interval)		
1	11 (1-20)	4 (0-25)	6 (4-10)
2	47 (33-59)	24 (9-38)	23 (15-32)
4	55 (42-67)	35 (19-49)	21 (14-28)

The methodological basis for the mortality rates originally calculated by Bellrose are not considered to be reliable, thus the revised estimates of mortality calculated by Green should preferably be used. However, acknowledging the large confidence intervals and the small difference between the estimates reported by Bellrose and Green (which could be as a result of coincidence), RAC agrees with the approach of the Dossier Submitter to use estimates of annual mortality underpinned by the Bellrose mortality rates for further calculations of total bird mortality in the EU and subsequently for socio-economic calculations, since mortality incidences of 3.1%, 8.7%, and 6.1% calculated by Pain *et al.* (2015), Mateo *et al.* (2009), and Andreotti *et al.* (2018) respectively, are based on the application of the Bellrose methodology.

Although the Dossier Submitter's calculation involves many uncertainties, they indicate that in the order of 1 million birds per year (range 400 000 to 1 500 000) die annually from lead poisoning in the EU. Death of larger wetland birds, such as flamingos or swans has indeed been observed, but it is likely that small dying or dead birds are quickly caught by predatory or scavenging birds (or mammals) and they are therefore not easily observed or found, as reported by USFWS (1986).

All bird species that are hunted and bagged in wetlands are assumed to be for human consumption. Birds that have ingested lead shot have elevated concentrations of lead and are also more vulnerable to hunting. Thus, birds harvested for human consumption are likely to be contaminated with lead (possibly also via fragments of the shot used to kill the bird), even though exposure to humans has not been quantified.

It is noted that lead contains up to 1.5% arsenic, which is also a well-known toxicant. So if assuming 4 740 tonnes of lead (central estimate) released to wetlands from lead shot, up to 63 tonnes of arsenic is potentially also released. However, this is not further assessed by the Dossier Submitter or by RAC in this opinion.

Information on emissions and exposures

Summary of proposal:

According to the Association of European Manufacturers of Sporting Ammunition (AFEMS), the annual consumption of shot cartridges in Europe is estimated to be, at least, between 600 and 700 million units. This corresponds to a total of at least 18 000-21 000 tonnes of lead being dispersed annually into the environment from hunting. In terms of wetlands, releases of lead from hunting in wetlands in EU-27 was estimated by the Dossier Submitter to be in the range of 1 432 to 7 684 tonnes of lead per year.

Each lead shotgun cartridge may contain several hundred individual pellets that are dispersed into the environment during hunting or sports shooting. Only a small proportion of the pellets (e.g. in the order of 1% or fewer) are likely to hit and be retained in a killed bird (Cromie *et al.*, 2010), while $\geq 99\%$ of the shot are spread in the environment. The density of spent lead gunshot in the environment is an important factor influencing the likelihood of ingestion and developing adverse effects.

The available evidence from Europe suggests that lead shot is not evenly distributed within wetlands and that there are zones with higher densities, influenced predominantly by the hunting technique practiced. For example, hunting from fixed blinds or shooting posts tends to result in greater density of shot within a given area than more mobile hunting. In the Brescia district (in northern Italy) in an area with more than 5 100 hunting posts, Andreotti and Borghesi (2012) estimated a conservative mean of 5-6 kg of lead pellets are dispersed annually in the surroundings of each post. Based on 92 samples from across eight Member States, lead shot density within wetlands ranged from 0 to 399 shot/m² (Mateo, 2009). The average, median and 90th percentile densities were 52, 21 and 148 shot/m², respectively.

There is evidence reported in the Background Document that shooting ranges may result in even greater contamination of wetlands, with shot densities in the order of 2 000 shot/m² reported in wetlands from four Member States (Denmark, the Netherlands, Ireland, and Spain).

The time required for pellets to become unavailable (buried beyond the foraging depth of birds) after they have been dispersed in the environment varies in relation to several environmental variables (USFWS, 1986), including the amount of shooting over a particular wetland, the firmness/type of the bottom sediment, and the depth of water. Experimental field studies show that the risk of ingestion decreases over the years as the lead pellets settle in the sediment, but that it may take decades for pellets to become completely unavailable to water birds in some circumstances. Still, it is likely that the majority of gunshot ingested by wildfowl is that most recently deposited and that wildfowl searching for grit are more likely to ingest the readily available recently deposited shot. This is supported by a study by Anderson *et al.* (2000) (cited by Pain *et al.*, 2015), showing that 5-6 years after the US ban on lead gunshot in wetlands, 75% of the gunshot found in waterfowl gizzards were non-lead shot.

The prevalence of lead shot ingestion typically refers to the presence or absence of lead gunshot in the gizzard of a bird. However, of equal interest is the number of lead gunshot that have been ingested, i.e. the magnitude of the exposure. The prevalence of lead gunshot ingestion has been reported to vary between species and populations, most likely as a function

of diet and grit preference. Species that prefer larger grits are reported to be at greater risk of ingesting spent lead gunshot.

At least 33 European bird species have been reported to ingest spent lead shot. Mateo (2009) reported mean prevalence of lead gunshot ingestion in mallards from northern Europe to be 3.6% (n=8 683 shot or trapped individuals) and in central and southern Europe to be 17.3% (n=11 239). Higher prevalences have been reported for other European species. For instance, a prevalence of 32.1% in common goldeneye (*Bucephala clangula*) and 58.3% in tufted duck (*Aythya fuligula*) were found in Finland and a prevalence of 50 to 70% in the northern pintail (*Anas acuta*) and the common pochard (*Aythya ferina*) in Spain. Many wader species across the EU are likely to also ingest lead shot. In France, studies found that the waders jack snipe (*Lymnocyptes minimus*) and common snipe (*Gallinago gallinago*) had shot ingestion levels of 6.5% (of 178 birds) and 15.6% (of 269 birds), respectively.

Thus, there is extensive evidence describing the risks to waterbirds from the use of lead gunshot. This is supported by the fact that many jurisdictions throughout the world, including many EU Member States, have already enacted regulation of one type or another to prohibit or reduce the use of lead gunshot in wetlands (or for hunting waterbirds).

RAC conclusion(s):

RAC notes that up to 21 000 tonnes of lead are estimated to be released into the environment (all habitats) per year from hunting with lead gunshot. Within this, the Dossier Submitter estimates that the proposed restriction on wetlands could prevent the release of between 1 432 to 7 684 tonnes of lead per year, depending on the number of hunters affected (best case to worst-case range). RAC notes that the Dossier Submitter's central 'most-likely' estimate of 4 740 tonnes of lead used in wetlands corresponds to approximately 20% of total lead used in gunshot for hunting). In addition, there is an unquantified, but probably considerable (at least in some EU countries), additional contribution of lead from any shooting ranges located in wetlands⁸.

The occurrence of spent lead shot in wetland sediment is well documented, including in wetlands affected by shooting ranges. Direct exposure of water birds through the ingestion of spent lead shot has been shown in numerous bird species from across the EU, in some cases affecting a very large portion of populations. RAC thus agrees that the use of lead shot in or nearby wetlands results in exposure of water birds to lead, which poses a risk to these birds.

RAC also acknowledges the secondary exposure of scavenging or predatory birds. In addition, since it has been well established that waterbirds having ingested lead shot are more likely to be shot, there is also a potential exposure of humans consuming game (e.g. mallards). Humans may also be exposed via fragmented lead shot particles that is then present in the harvested bird.

RAC notes that some species of waterbirds like geese and swans to a large extent feed outside of wetlands e.g. in agricultural areas. Since especially geese also are hunted in these areas using lead shot, sometimes after attracting the birds by spreading feed in these areas, agricultural land may also be contaminated with lead pellets available for ingestion. Since this

⁸ To address this uncertainty, information on shooting ranges in wetlands was specifically requested in the public consultation on the Annex XV Dossier.

restriction only addresses the use of lead shot inside wetlands, RAC agrees with the Dossier Submitter that waterbird species that feed outside of wetlands will not be protected by this restriction or only partially protected. However, an assessment submitted by the AEWA Secretariat in the Public Consultation⁹ confirmed that the majority of species vulnerable to lead poisoning (85 out of 100 AEWA-listed species) feed primarily in wetlands.

Key elements underpinning the RAC conclusion(s):

For every lead gunshot cartridge fired, all (if missing the target bird) or nearly all pellets (if hitting the target bird) are spread to the environment. If the spent lead pellets land in a wetland, they may be ingested by waterfowl, either as a grit or mistaken as food (seed). The digestive system of many species of European wetland birds has been analysed for the presence of lead pellets. In most cases a few percent of the birds contain lead pellets, but in some species up to 70% of the birds contain lead pellets. In exceptional cases, the gizzard of a single bird may contain hundreds of lead pellets. The potential for high exposure of waterbirds to lead from spent lead shot is thus well documented.

Birds that have ingested lead pellets have been shown to be more likely to be shot by hunters, probably as a consequence of sub-lethal toxicity caused by exposure to lead. The Bellrose study (1959) showed that mallards dosed with one lead pellets were 1.5 times more likely to be shot in the season of the dosing, and two pellets almost doubled the risk. Heitmeyer *et al.* (1993) showed that birds killed by hunters were three times more exposed to ingested lead pellets than randomly sampled birds from the same population. This suggests that bagged game from wetlands may contain elevated concentrations of lead (also by lead fragments in the bagged game). The contribution to overall human exposure to lead via the consumption of game from wetlands was not quantified by the Dossier Submitter, but it is likely that consuming game from wetlands will contribute to individual lead exposure. Considering the non-threshold effects of lead on neurodevelopment, it seems prudent to minimise human exposure to lead via wetland game.

Waterbirds that have ingested lead pellets are likely to suffer from sub-lethal and lethal toxicity. Waterbirds frequently also contain 'embedded' shot as a consequence of being previously wounded but not killed by a hunter. Embedded shot are not typically considered to result in poisoning of the waterbird, but are available for secondary ingestion by predators/scavengers. Affected/wounded birds will be targets for predatory birds, resulting in exposure of the predatory birds to lead via their prey. Although this specific exposure pathway has not been quantified, it is known that birds of prey often have elevated concentrations of lead (by different reasons). Considering that lead toxicity is likely to target neurodevelopment also in birds, and that the hunting technique of many birds of prey require a well-functioning neuronal system, it is likely that a restriction will have beneficial effects also on birds of prey. A recent study in Golden Eagles (*Aquila chrysaetos*) has indeed suggested a correlation between lead blood levels and behaviour (flight height and movement rate) and that eagles found dead due to rail or road collisions usually have higher liver lead levels than eagles dying from other reasons (Ecke *et al.*, 2017).

Characterisation of risk(s)

Summary of proposal:

⁹ (#1873)

It is estimated that, based on an assessment of 22 species of waterfowl and 11 species of waders and rails, between 400 000 and 1 500 000 waterbirds currently die every year from ingesting lead shot in EU wetlands. These estimates should be considered as minimum impacts as they do not account for sub-lethal poisoning within these species, or for lethal effects on other waterbird species that could also ingest spent lead gunshot. These estimates also do not take into account lethal or sub-lethal effects on predatory or scavenging birds via secondary poisoning.

There is extensive evidence describing the risks to waterbirds from the use of lead gunshot. As compared to background lead levels in blood of < 20 µg/dL, subclinical poisoning is reported at blood levels of 20-50 µg/dL, clinical poisoning at 50-100 µg/dL, and severe effects or death at > 100 µg/dL blood. This is supported by the fact that many jurisdictions throughout the world, including many EU Member States, have already enacted regulation of one type or another to prohibit or reduce the use of lead gunshot in wetlands (or for hunting waterbirds).

In addition to environmental risks, there may also be risks to human health from the consumption of wildfowl shot with lead shot. Exposure to lead in humans is associated with a wide range of adverse effects, including various neurodevelopmental effects, mortality (mainly due to cardiovascular diseases), impaired renal function, hypertension, impaired fertility and adverse pregnancy outcomes. For children, the weight of evidence is greatest for an association between blood lead concentration and impaired neurodevelopment, specifically reduction of intelligence quotient (IQ).

Use of lead gunshot (especially in shooting ranges) may also endanger water (including ground water) resources at a local level.

RAC conclusion(s):

The large-scale contamination of wetlands with thousands of tonnes of lead annually from the use of lead gunshot for hunting in wetland is clear and well supported. Likewise, the large-scale exposure to lead of numerous wetland bird species by ingestion of spent lead pellets is well documented. Secondary exposure of predatory or scavenging birds (documented for e.g. marsh harrier), as well of humans consuming wetland game, is very likely, but the overall extent of this exposure is not quantified.

Using the Bellrose (1959) methodology, and reported incidences of lead pellets in gizzards, Mateo *et al.* (2009) calculated the annual mortality in European populations across 17 wetland bird species to be 8.7%. A similar estimation for 16 water bird species in UK (Pain *et al.*, 2015) resulted in an incidence of 3.1%. Andreotti *et al.* (2017) estimated that 6.1% of the wintering population of 16 species in the EU die annually, and that 3-fold more birds suffer sub-lethal effects. Based on these incidences, and the European population size of 22 species known to ingest lead pellets (excluding the populations in the four Member States that have banned the use of lead shot), the Dossier Submitter estimated an annual mortality of between 400 000 and 1 500 000 birds (central estimate 900 000). RAC acknowledges that these calculations have been performed using a methodology accepted in the scientific community and despite some uncertainties, they provide a clear indication of mortality and may indeed be minimum impacts. The new assessment of the Bellrose data by Green is in the view of RAC more correct, but results in a similar estimate of the mortality. Thus, RAC supports using the Bellrose numbers and calculations by the DS of an annual mortality of, in the order, of 1

million birds.

The use of lead shot in wetlands is also likely to result in lethal and sub-lethal effects on predatory or scavenging birds via secondary poisoning from eating lead-poisoned wetland bird species. However, it is not possible to quantitatively estimate to what extent this may occur.

Likewise, although not quantified, it is possible that humans eating game from wetlands will be exposed to lead through such food.

The presence of various restrictions on the use of lead shot in wetlands in 24 out of 28 Member States indicates that a concern with this use in wetlands is already recognised in most Member States.

Key elements underpinning the RAC conclusion(s):

Comments in the PC from AFEMS¹⁰ have stated that only population effects should be of concern in environmental risk assessment, and thus the death of individual birds is not a concern. However, against this, there is a common understanding, supported by RAC that an environmental risk assessment should not only protect against the risk for extinction of bird populations and species, and that the issue is more how large a percentage of a population should be affected before this becomes a problem.

A modelling approach by Meyer *et al.* (2016) on the population effects of lead gunshot on three mainly terrestrial bird species showed a 10% decrease in the size of a grey partridge population, no effects on the size of a common buzzard population, and a reduced growth rate of 1.5% in a red kite population. For waterbirds, the situation is likely to be worse. Bellrose (1959) suggested a yearly mortality of 4% of the US mallard population caused by ingestion of lead gunshot, and Mateo *et al.* (2009) suggested a relationship ($r=-0.63$, $p=0.012$) between the prevalence of lead pellet ingestion and population trends in 15 species of wintering waterfowl. Thus, effects have been indicated on the population level.

How large the percentage of the population that would need to be affected for it to be regarded as a problem in conservation terms is not discussed in any guidance, perhaps because the concern caused by mortality is greater in a small population, especially if threatened with extinction, than in larger populations. In fact, lead poisoning (through primary or secondary exposure) concerns several European wetland bird species that are considered to have vulnerable or endangered conservation status in the EU, notably the white-headed duck *Oxyura leucocephala*, marbled teal *Marmaronetta angustirostris*, and greater spotted eagle *Clanga clanga*. Thus, the idea that 'acceptable risks', in the form of population-level mortality, among species with such diverse population biology, migration patterns, feeding habits and vulnerability to lead poisoning can in some way be estimated and managed is not supported by RAC.

In the opinion of RAC, the annual mortality estimate of ca. 1 million birds via lead gunshot ingestion, even if this estimate covers 33 species gives sufficient concern in its own right. In addition, a PEC/PNEC comparison indicates similar concern as 25 to 100% of some studied species have had tissue concentrations of lead above the threshold for subclinical toxicity (i.e.

¹⁰ Association of European Manufacturers of Sporting Ammunitions, comment #1581

Whooper swans, Bewick's swans, pintail and pochard in the UK; flamingos in Italy and Spain; and Northern pintail in Spain).

RAC concludes that the widespread effects of lead on many waterbird species is sufficient to warrant the restriction, and notes that some waterbird species, for which lead pellet ingestion data were used to estimate the yearly mortality of 1 million waterbirds, are categorised as vulnerable/endangered. For already threatened species, additional mortality caused by lead pellet ingestion can be of concern also for the survival of that species.

Uncertainties in the risk characterisation

Lead pellet ingestion is common among bird species living in wetlands, but the quantification of the extent of lethal and sub-lethal effects in these birds is uncertain. The available quantification of mortality (in the order of 1 million dead birds annually in Europe) seems plausible, but involves many uncertainties that could affect this estimate and the risk characterisation regarding waterbirds. There are also other uncertainties affecting the overall concern caused by the use of lead shot in wetlands, and they are discussed below.

Uncertainties	Effect on concern
The data analysis reported by Bellrose is not consistent with contemporary methodological approaches introducing some uncertainty. However, a recent reanalysis of the extensive Bellrose dataset using contemporary approaches by Green supports the mortality rates reported by Bellrose.	↓ ↑
The re-assessment of the Bellrose study by Green estimates the mortality caused by lead poisoning for mallards, and the large confidence intervals indicates that the resulting numbers are uncertain.	↑ ↓
The Bellrose methodology is based upon mallard data, and Bellrose (1959) suggested that perhaps other species are less sensitive based on most documented die-offs concerning mallards.	↓
Other (smaller/less common/threatened) species could be more vulnerable than mallards to ingesting lead pellets, as indicated by either having much higher prevalence of ingested lead pellets (e.g. 50 to 70% in northern pintails) or finding individuals with extreme numbers of lead pellets in the gizzard (e.g. < 277 pellets/gizzard in flamingos).	↑
The calculation does not include all species that may ingest lead pellets in wetlands.	↑
For some waterbirds (e.g. geese), it is not clear if the ingestion of lead pellets has occurred inside or outside wetlands.	↓
Secondary effects in predatory or scavenging birds via secondary poisoning are not considered quantitatively.	↑

The extent of lead exposure of humans eating wildfowl has not been considered quantitatively.	↑
Effects caused by lead on threatened/endangered species have not been specifically assessed, and seem particularly important.	↑

Evidence if the risk management measures and operational conditions implemented and recommended by the manufactures and/or importers are not sufficient to control the risk

Summary of proposal:

The use of lead in or over wetlands is not adequately controlled, since four Member States lack any legislation and the legislation implemented in other Member States are inconsistent in terms of their scope. Thus, harmonisation across Member States should be undertaken to ensure a sufficient control of risks.

RAC conclusion(s):

The frequent findings of water birds with lead pellets in their gizzard indicate that lead shot are still used on a large scale in wetlands, and that further risk management measures are needed.

As regards the availability of alternatives to lead gunshot, facilitating voluntary substitution of lead gunshot to alternative (e.g. steel) gunshot, such alternatives have not been provided (by manufactures/importers) on the market in all Member States.

Evidence if the existing regulatory risk management instruments are not sufficient

Summary of proposal:

Union-wide action is needed to address the environmental risk associated with the use of lead gunshot in EU wetlands since the flyways of migratory birds typically cross several Member States. Regulating the risk to them at Union level is likely to ensure an appropriate level of protection throughout the EU.

In addition, this restriction would ensure an effective implementation of the Agreement on the conservation of African-Eurasian Migratory Waterbirds (AEWA) as managing the risk on a Member State level has resulted in inconsistent national regulations, including four Member States that have not implemented any controls on the use of lead gunshot in wetlands.

RAC conclusion(s):

Lead pellets have been found in the gizzard of many bird species in many Member States, perhaps indicating that the present national restrictions are not sufficiently protective.

However, the latest study is from 2014 (Mateo *et al.* 2014), and lead pellets ingested in 2014 could have been shot years previously. Thus, the present situation is unclear. An EU wide restriction, including in those countries presently lacking any restriction, is likely to protect the wetland birds more efficiently, throughout their migratory routes. The public consultation resulted in many supporting comments for the proposed restriction.

JUSTIFICATION IF ACTION IS REQUIRED ON AN UNION WIDE BASIS

Justification for the opinion of RAC

Summary of proposal:

Union-wide action to address the environmental risk associated with lead gunshot spent in EU wetlands is needed to ensure a high harmonised level of protection of waterfowl and other wetland-inhabiting birds across the Union. Since the flyways of these migratory birds cross several Member States, regulating the risk at Union level is likely to ensure the strongest possible protection all over the EU. As the EU has signed the AEWA and the UN Convention on Migratory Species (CMS), Union-wide action to guarantee an effective implementation of these measures is justified, especially in light of varying national regulations that differ with regard to their effectiveness.

A further reason to act on a Union-wide basis is related to the health risk posed by lead — a well known non-threshold substance — to humans via the consumption of wildfowl.

RAC conclusion(s):

Based on the key principles of ensuring a consistent level of protection across the Union (particularly noting that the flyways of migratory birds typically pass through several Member States), RAC support the view that any necessary action to address risks associated with the use of lead shot in wetlands should be implemented in all Member States.

JUSTIFICATION WHETHER THE SUGGESTED RESTRICTION IS THE MOST APPROPRIATE EU WIDE MEASURE

Justification for the opinion RAC

Considering practicality and enforcement possibilities (see below), a restriction covering all use of lead gunshot (i.e. a total ban) would be the most appropriate measure. However, the mandate given to ECHA by the Commission is acknowledged, and the assessment of RAC is accordingly focused on the proposed scope.

As to an EU wide measure, RAC is of the view that the suggested restriction is appropriate.

Scope including derogations

Justification for the opinion of RAC

Summary of proposal:

Add summary of Dossier Submitter proposal and suggested derogations from the Impact Assessment section of the Annex XV restriction report.

Lead and lead compounds	<ol style="list-style-type: none"> 1. Shall not be used in gunshot for shooting with a shotgun within a wetland or where spent gunshot would land within a wetland. 2. Lead gunshot shall not be in the possession of persons in wetlands; 3. For the purposes of paragraphs 1 and 2: <ul style="list-style-type: none"> • “shotgun” means a smooth-bore gun, • “gunshot” means pellets used in quantity in a single charge or cartridge in a shotgun; • “lead gunshot” means any gunshot made of lead, or any alloy or compound of lead with lead comprising more than 1% of that alloy or compound; • “wetlands” are defined according to Article 1(1) of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). 4. Paragraphs 1 and 2 shall apply 36 months from entry into force of the restriction; 5. Member States may, on grounds of human health protection and environmental protection, impose more stringent measures than those set out in paragraphs 1 and 2. Member States shall inform the Commission of such measures.
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RAC conclusion(s):

The scope of the proposal is clear if the definition of wetland is made clear in the restriction. Accordingly, the FORUM advises to add the definition of wetlands as a footnote to the restriction.

The justification for including peatland in the restriction have been challenged during the public consultation. However, RAC considers that the inclusion of ‘wet’ peatland within the restriction to be well justified and necessary. This is also supported by many comments during the public consultation. RAC acknowledges that fewer AEWA-listed waterbird species occur in ‘dry’ peatland habitats but after considering the risks posed by the use of lead gunshot in these habitats, as well as the practical difficulties in differentiating between ‘wet’ and ‘dry’ peatland, RAC supports including all peatlands in the scope of the restriction.

The proposal covers use of lead gunshot “where spent gunshot would land within a wetland”, without defining this quantitatively. RAC is of the view that the understanding and risk

reduction of the restriction would be increased if “where spent gunshot would land within a wetland” is explained further in the entry or expressed as a fixed ‘buffer zone’. The buffer zone could be a quantified area in the immediate vicinity of a wetland where restrictions on the use of lead gunshot would apply in order to prevent spent lead gunshot from landing in a wetland.

RAC notes that REACH restrictions may apply to the manufacture, placing on the market or use of substances, mixtures or articles. The definition of ‘use’, in REACH (Article 3[24]) includes ‘keeping’ and ‘any other utilisation’ which implies that a restriction on ‘use’, without further qualification, implies a restriction on any of the uses defined under REACH, including ‘possession’.

The proposed restriction is intended to prohibit any use of lead gunshot within a wetland (including possession) and the shooting of lead gunshot into a wetland from outside of a wetland (*‘use [...] where spent gunshot would land within a wetland’*). Other uses, e.g. possession, outside of a wetland are not intended to be restricted on the basis that this would increase the scope of the restriction beyond wetlands; this understanding is supported by the fact that the socio-economic analysis was also made based on the above rationale. However, RAC notes that the proposed wording of paragraphs 1 and 2 may introduce ambiguity as it could be interpreted that the restriction on ‘use’ outside of a wetland is wider than intended. Thus, the meaning of use and possession are not equivalent or interchangeable in the proposal. RAC considers that it is very important that the wording of the restriction should unambiguously indicate what precise uses (e.g. shooting/possession) of lead shot are restricted and where (inside or outside of a wetland).

A restriction on possession is considered to enhance the enforceability (and therefore risk reduction potential) of the proposed restriction. However, comments in the public consultation have argued that a restriction on the ‘possession’ of lead gunshot in wetlands (or where spent lead gunshot would land in a wetland), in general, is too broad to be practical. The comments argue that it could also prevent keeping at home or whilst driving or walking through wetlands to hunting/shooting areas, and that refinement of the term ‘use’ should be considered to be more specific to the shooting/hunting context (e.g. use could be refined to mean one of more of the following: shall not be discharged..., shall not be loaded into a shotgun..., shall not be possessed whilst shooting). There are examples of national legislation in the EU that prohibit *‘possession whilst hunting’* to prevent lead poisoning in wetlands.

The RAC evaluation of this proposal is based on the assumption that possession can be regulated under Reach, but it is outside the expertise of RAC to assess this assumption. RAC supports a clarification of the scope of the restriction as long as it is clear that all types of shooting would be included, and notes that some concern expressed in the public consultation will be addressed by this clarification. Thus, possession should be interpreted as **‘possession while hunting/sport shooting’**. RAC has not discussed if paragraphs 1 and 2 could be merged and if use in gunshot for shooting and possession while hunting/sport shooting could be restricted in the same manner and within the same area (e.g. fixed buffer zone).

RAC also notes the need to introduce an obligatory labelling requirement to the restriction for shotgun cartridges containing lead to ensure that it is clear to consumers (or enforcement authorities) that they contain lead. They could also be labelled to ensure that it is clear that the use of lead gunshot in wetlands is not permitted within the EU and communicate the risks that they are associated with (e.g. poisoning of waterbirds).

Considering the risk, there are good reasons to shorten the time period until entry into force (see further below).

Key elements underpinning the RAC conclusion(s):

The suggested scope of the restriction is, in principle, clear.

Article 1(1) of the Ramsar convention (as cited in paragraph 3 the restriction proposal) defines wetlands as:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".

RAC notes that, although comprehensive and internationally recognised, the Ramsar definition of a wetland might result in misunderstandings as other wetland definitions have previously been implemented as part of controls on the use of lead gunshot in some Member States, which according to comments submitted in the public consultation are well-known and accepted. Thus, RAC considers that the scope of the restriction is clear if read in conjunction with the Ramsar definition of a wetland. The public consultation indicates that certain types of peatland¹¹, notably 'inactive' (typically dry) or peatlands 'without visible water' may not commonly be understood as wetlands by hunters, despite being considered as a wetland habitat under the Ramsar definition. The comments have also argued that hunting in peatlands is not associated with risks to waterfowl, and that the inclusion of peatland is not proportionate to the risk. Hunter organisations have therefore requested derogations for (dry) peatland, ostensibly on the basis that such a derogation would make the restriction more understandable and proportionate to risk.

The Background Document estimates that relatively more lead is released during peatland hunting than in other wetland habitats. Active (typically 'wet') peatlands are used by numerous waterbirds known to have ingested lead gunshot, including various species of geese, swans, as well as the common snipe, Jack snipe, common moorhen, common coot, black-tailed godwit and western water rail. Considering that numerous species of wetland birds living in active peatland are known to consume lead gunshot, and the large amounts of spent lead gunshot released into peatland habitats, from a risk point of view RAC is of the opinion that active peatland should clearly be included in the scope of the restriction.

Comments in the public consultation by AEWA indicate that seven waterbird species and marsh harrier (via secondary poisoning) are potentially also at risk of ingesting lead gunshot in dry peatland, especially during the breeding season. In addition, Thomas *et al.* (2009) have reported that 'terrestrial' red grouse (*Lagopus lagopus scoticus*) on UK moors (peatlands) ingest lead pellets. They reported that 4-5% of 196 birds shot on moors had highly elevated bone lead levels, and lead isotope measurements showed that the lead came from lead gunshot.

¹¹ Ramsar guidance on peatlands outlines that peat is dead and partially decomposed plant remains that have accumulated *in situ* under waterlogged conditions. Peatlands are landscapes with a peat deposit that may currently support a vegetation that is peat-forming, may not, or may lack vegetation entirely. The presence of peat, or vegetation capable of forming peat, is the key characteristic of peatlands. Peatlands can be differentiated in terms of whether they are 'active' (typically wet) or 'inactive' (typically dry). An active peatland ("mire") is a peatland on which peat is currently forming and accumulating.

Risks to humans from consumption of lead-contaminated birds is the same irrespective if the birds are shot in wet or dry peatlands, being an argument for also including dry peatland within the scope.

Furthermore, it may be difficult to differentiate between 'wet' and 'dry' types of peatland in practice, which is another reason for including all peatland within the scope. Still, it is acknowledged that the inclusion of 'dry' peatland may cause misunderstanding, at least initially, and that hunters and that hunter organisations oppose this inclusion.

The intention of the Dossier Submitter, when developing the wording of paragraph 1 and 2 of the proposed restriction, was to prevent the deposition and accumulation of lead gunshot in wetlands. This is in line with the request to develop a restriction from the Commission and the results of the risk assessment. The reasoning for the wording of paragraph 1 and 2 is described in section 5.3.1. in the background document, as well as the buffer zones analysed (and dismissed in favour for a dynamic/flexible approach).

RAC notes that the wording of the proposal by the dossier submitter differs between possession (§2) and use (§1). While possession is only restricted in wetlands, the use is restricted in wetlands and also nearby wetlands where shooting could result in spent gunshot would land within a wetland. The analysis of the Dossier Submitter is also focused on 'use'.

The intention of the Dossier submitter is clear as regards 'use', The Background Document (5.3.1) explains that this formulation relies "*on the experience, skill and local knowledge of those undertaking the shooting (e.g. in terms of the likely distance that lead gunshot will travel once fired, noting that 'fall-out' distances of 300 metres may not be uncommon)*" and further that "*this was considered as the most appropriate means of describing the scope of the restriction in relation to the risks and the request from the Commission.*" The Dossier submitter states that the proposed wording "where spent gunshot would land within a wetland" "*is considered to be a flexible, dynamic and 'fit-for-purpose', approach to address the risk posed from lead gunshot in wetlands in a proportionate way.*" and that "*this was in recognition that flexibility and discretion is likely to be required to account for the specific local circumstances (e.g. site specific topology, wind conditions, shotgun, ammunition) that will combine to determine the likelihood that spent lead shot would land within a wetland.*"

On the other hand, RAC notes that this flexible approach without a fixed buffer zone around a wetland would mean that on one day under specific conditions and for a specific hunter with specific gear a point in space would be inside the restriction and on another day with different conditions, different hunter and different equipment would maybe not be inside the restriction. Also, enforcement will be difficult if compliance depends on the direction the hunter aims at.

Question 2 (b) in the public consultation ask for comments on "how wetlands definition have been implemented in practice and if e.g. buffer zones around wetlands have been used". This resulted in various comments, including some in favour of a large fixed buffer zone of up to 300 metres. One comment highlighted that the safety requirement to avoid the risk from falling shot on clay target ranges is 300 meters and that - to be meaningful - any buffer zone to prevent lead shot falling into wetlands should be of that order¹². Another comment points out, that in practice much of the hunting at wetlands takes place while the hunters are not

¹² Comment #1607

inside the wetland, but rather just outside of it (e.g. lake shore, river bank, etc.). Thus, spent lead shot can be still deposited in the wetland while shooting birds over or nearby the wetland¹³. In the federal state Mecklenburg-Vorpommern in Germany¹⁴, there is legislation that prevents the use of lead gunshot in a buffer zone of 400 m enclosing every type of wetland.

There is some variability as to how far gunshot can travel once fired, and thus how far away from a wetland the restriction would need to apply in order to prevent lead shot from landing within a wetland. Comments received in the public consultation indicate that gunshot missing the target may travel up to 400 metres¹⁵. The Dossier submitter notes that "*fall-out distances of 300 metres may not be uncommon*" (section 5.3.1). The distance strongly depends on the current weather conditions the trajectory of the shot and the combination of shotgun, propellant, shot load and size of lead shot used. It is also noted that lead shot may spread in an angle of up to 140 degree in front of the hunter (Krebs 2004, p. 552, via comment #1785). However, gunshot is only lethal to birds within a distance of perhaps 30 metres. The intention of the Dossier Submitter is that shooting towards a wetland, where the lead gunshot would land within the wetland, should not be permitted. RAC assumes that the consequence is that there should be no shooting towards a wetland at distances of less than perhaps 300-400 metres from a wetland. When discussing a potential usefulness of a fixed buffer zone versus the flexible approach proposed by the Dossier Submitter, the arguments can broadly be divided into being related to enforcement, to legal aspects or to risk aspects.

Enforcement-related aspects

The inclusion of possession in the restriction proposal is important. If the proposed restriction will be enforced, it is important that the restriction is enforceable, and comments in the PC have expressed a concern that only hunters 'caught in the act of shooting' outside of a wetland can be enforced in spite of restricting 'possession' of lead gunshot within wetlands.

The scope of the proposed restriction covers use outside wetlands (if spent gunshot can land within a wetland) but not possession outside wetlands. This could hamper enforcement possibilities just outside a wetland (e.g. at a shore).

Below follows some arguments in relation to defining a quantitative buffer zone for possession:

- A fixed quantitative buffer zone around a wetland where possession of lead gunshot is not allowed (independent on in what direction the rifle is pointed) would assist and simplify enforcement no matter to which extent this buffer zone is defined (e.g. 30 metres or 300 metres). However, the scope might be considered to have been increased in relation to the original proposal as any shooting with lead gunshot (irrespective of purpose and direction) will be restricted in this zone (as shooting requires possession). The magnitude of the increase of the scope would depend on the distance from the wetland the buffer zone extends to.
- A fixed wide quantitative buffer zone (e.g. 300 metres) will be more difficult to estimate than a smaller one (e.g. 30 metres). Thus, a large buffer zone may be difficult to enforce if the wetland is not visible (behind trees, hills) from this distance. On the other hand, a

¹³ Comment #1599

¹⁴ Comment #1685

¹⁵ Comments #1685, #1785

large buffer zone around a wetland with a defined border (e.g. a Ramsar site or a wetland Natura 2000 site) could be displayed in maps and on signs close to the wetlands.

- A fixed wide quantitative buffer zone where the possession of lead gunshot is not allowed (e.g. 300 metres) has clear advantages to the enforcement since smaller wetlands patched in the landscape are aggregated to a larger protected area. This supports enforcement and the understanding of the restriction at the local level. This also increases the chance to visualise the protected areas in maps.
- A fixed wide quantitative buffer zone (e.g. 300 metres) might increase the risk of a hunter being illegal when moving inside the buffer zone between non-wetland areas when hunting non-wetland species. This risk is lower when only a fixed small quantitative buffer zone (e.g. 30 metres) is defined.
- Hunters and hunter organisations have argued strongly against the use of any fixed buffer zone. As enforcement is limited in most Member States, risk-reduction is dependent on compliance with the proposed restriction.
- If including any possession of lead gunshot in a fixed wide quantitative buffer zone (e.g. 300 metres), it might cause problems for people living close to wetlands as they may not be able to possess lead gunshot in their house or car.
- For wetlands where the border is uncertain, such as for seasonally flooded land and marshy areas, the definition of where a buffer zone starts and ends (irrespective of how it is defined in size) will also be uncertain. However, this will be a problem with or without a buffer zone and will depend on the interpretation of the Ramsar definition. In contrast, around a lake or river where the shoreline will constitute a clear border any buffer zone could also be clear.

FORUM in their advice has requested that this *“proposed territorial extension of the ban of using lead gunshot to neighborhood areas in order to protect wetland from landing of spent gunshot pellets would make it necessary to define a border line and to determine these neighborhood areas by decree. Otherwise identification and prosecution of offences would pose nearly unresolvable situations for enforcement. It can be assumed that additional 300 m is a reasonable distance for defining neighborhood areas.”* (See final version of advice by FORUM from August 2017).

Enforcement is generally helped by conditions that are as clear as possible. There are many different aspects to consider when it comes to the use of a fixed quantified buffer zones. As regards enforcement, arguments in favour for a buffer zone are mainly related to having a small buffer zone (e.g. 30 metres) around objects with clear borders where possession of lead gunshot could be enforced without having to catch the shooter in the act of shooting. Whether this would increase or decrease to scope is a matter of interpretation, but it would decrease the difference in the proposal between restricting use outside wetlands “where spent gunshot would land within a wetland” but not possession outside wetlands. There is some support for a limited buffer zone for possession in RAC.

Risk-related aspects

RAC notes that the risk reduction capacity of the proposed restriction would clearly benefit from a fixed and wide as possible quantitative buffer zone (e.g. 300 metres) around each

wetland. This is because it is known that many waterbirds may also feed and pick up lead shots outside a wetland. It is acknowledged that the scope of the present proposal does not cover species feeding outside wetlands, and that the scope as such cannot be increased by the committees. However, limiting shooting with lead gunshot in buffer zones in order to prevent spent gun shot to land in wetlands (or to help enforcement) will as a side effect probably also lead to less gunshot being spent in feeding areas very close to wetlands that may also be used by waterbirds.

When discussing risk-related aspects of a fixed quantitative buffer zone, there are two options: a quantitative buffer zone where shooting in any direction is banned or a quantitative buffer zone where only shooting towards a wetland is banned. Obviously, any ban on possession inside a fixed quantitative buffer zone only complies with the first option (i.e. that shooting in any direction is banned) as there cannot be any shooting if possession is prohibited. A possible exception is to ban possession (and thus all hunting with lead gunshot) within a limited buffer zone and have a fixed larger buffer zone where shooting towards a wetland is restricted.

Arguments in relation to the two options and the size of a fixed buffer zone on the risk-related aspects and on the scope are given below.

- A fixed wide quantitative buffer zone (e.g. 300 metres) will increase the risk reduction capacity if all shooting (in any direction) is banned. This will lead to less lead being deposited both in the wetland and close to the wetland in potential feeding areas, but will extend the scope.
- A fixed wide quantitative buffer zone (e.g. 300 metres) is viewed by the DS as outside the scope if the buffer zone would concern shooting in any direction. It could also be deemed to increase the scope of the proposed restriction if concerning shooting towards a wetland as spent shot will not in all specific situations and under all specific conditions travel this distance. On the other hand, if it is true, that spent shot reach even further than 300 metres it might be viewed as decreasing the scope. If only including shooting towards a wetland, any deviation from the scope seems rather marginal.
- A fixed small quantitative buffer zone (e.g. 30 metres) would prevent the deliberate hunting of waterfowl (or any shooting) that is in or very nearby the wetland. However, this shooting is also restricted by the original proposed scope of the Dossier Submitter even in the absence of a fixed buffer zone. In contrast, a fixed small quantitative buffer zone (e.g. 30 metres) would not restrict shooting towards wetlands at distances 30 to 300 metres away from the wetland, which is implicitly covered by the original proposed scope of the Dossier Submitter. In other words, a fixed small quantitative buffer zone (e.g. 30 metres) would reduce the scope of the proposed restriction.

In a review of national legislations on the use of lead gunshot in wetlands, the DS has noted that;

- Wording similar to 'shooting on or over' wetlands (without fixed buffer zones) are used in the following Member States or regions within a Member State: France, Scotland, Northern Ireland, England and Wales. The restrictions place responsibility on those shooting to ensure that the spent lead gunshot does not land in wetlands.

- Whilst there is a buffer zone in the French legislation, it is better understood as a 'transition zone' where lead gunshot can be used, but only under specific circumstances e.g. when they are shooting away from a wetland. The transition zone in France only applies to features with a fixed, definitive boundary. For bogs and swamps hunters are required to ensure that no lead gunshot is deposited when shooting, i.e. the wording 'shooting in or over' takes effect.
- It appears that buffer zones in the sense of total exclusion zones are only used in member states where narrow bans are implemented in well-defined wetland sites with clear (mapped) boundaries. Examples of these are found in Italy (150 m, only SPA), Bulgaria (Ramsar sites 200 m), and Hungary Ramsar sites (100 m).
- In general, generic bans are not put in place with an accompanying buffer zone, but rather alongside a flexible (on or over) approach.

There are clearly different approaches in different Member States, and a harmonisation is needed. The compliance can probably become better, but it is not known how the different approaches affect compliance.

If quantitatively defining what is meant with "where spent gunshot would land within a wetland", RAC is of the view that the travelling distance of lead shot should be an important factor when deciding the size of a fixed quantitative buffer zone. RAC notes that a large buffer zone will increase the risk reduction capacity of the proposed restriction. There is some support in RAC for quantitatively defining the buffer zone, and that it should be in the order of 300 metres.

As mentioned previously, there are also good enforcement-related reasons for a fixed buffer zone for 'possession whilst hunting/shooting'.

There is also a possibility to propose two different fixed quantitative buffer zones, one for possession (§2) and one for shooting (§1), or just one of them.

Irrespective of the role of any buffer zone within the restriction, awareness campaigns will be needed to explain the restriction to stakeholders. As indicated by paragraph 5 in the proposed restriction, Member States will be allowed to impose more stringent measures than proposed by the DS. RAC assumes that this will also apply to potential buffer zones.

As mentioned above, the scope also includes possession of lead gunshot within a wetland. RAC notes that FORUM has questioned if 'possession' legally corresponds to the term 'keeping', which is used in REACH, and thus whether possession can be restricted under REACH. However, the definition of 'use' in Article 3(24) of the REACH Regulation includes 'keeping' and 'any other utilisation'. This suggests that a restriction under REACH on 'use' would also implicitly allow Member States to restrict 'possession'. Therefore, the Dossier Submitter has proposed to add this specific paragraph on possession in the restriction proposal only to explicitly identify that restricting possession within a wetland is within the scope of the proposal.

If possession is included in the restriction, RAC is of the view that this strengthens the need (see further below) to introduce and require specific labelling of cartridges containing lead gunshot (as opposed to e.g. steel gunshot), as possession of lead gunshot can be more easily demonstrated without dismantling the cartridges (and perhaps analysing the pellets). RAC notes that steel gunshot need to be labelled already, and RAC proposes introducing a similar

requirement for cartridges containing lead gunshot. The labelling of lead gunshot could be complemented with information that the use of lead gunshot in wetlands is regulated in the EU.

There have not been any comments regarding the definitions of shotgun, gunshot, and lead gunshot, so RAC concludes that these definitions are clear.

Regarding the 'entry into force', there are many comments in different directions in the PC. Hunter organisations request a much longer time period (5-10 years) for hunters to adapt to the restriction, whereas other NGOs note there have been restrictions, of one kind or another, for many years in most Member States, and that the proposed 3 years therefore is too long. The Dossier Submitter proposed 3 years to give producers of cartridges time to adapt. RAC notes that producers already produce non-lead cartridges, and that adjusting to a growing demand of non-lead gunshot might not need to take 3 years. Additionally, a ban in the US of the use of lead gunshot in wetlands since 1991 might indicate a global production capacity that rather quickly should be able to adjust.

From a risk point of view, for each additional year until entry into force, 4 740 tonnes of lead (central estimate) will be released to wetlands with numerous dead and affected birds as a result. Considering that 24 out of 28 Member States already have some type of restrictions on the use of lead gunshot in wetlands, RAC strongly support a shorter time of entry into force than three years. Various comments were received during the public consultation concerning the proposed transitional period, requesting a longer transitional period¹⁶ or a shorter transitional period¹⁷.

RAC notes the possibility for Member States to impose more stringent measures than the proposed restriction, which RAC supports.

Effectiveness in reducing the identified risks

Justification for the opinion of RAC

Summary of proposal:

The proposed restriction entails a ban on the use of lead gunshot within all wetland habitats within Member States and includes prohibiting the use of lead gunshot where spent lead gunshot would land within a wetland even if the use (i.e. the shooting) takes place outside of a wetland. The proposed restriction applies irrespective of whether the use of lead gunshot relates to hunting live quarry or shooting at targets (e.g. clay pigeons). The Dossier Submitter concludes that the proposed restriction would address the risks to birds from the ingestion of lead gunshot where this occurs within a wetland and harmonise existing Member State approaches to address the risk.

¹⁶ Comments #1562, #1563, #1581, #1584, #1587, #1588, #1589, #1590, #1593, #1595, #1600, #1601, #1602, #1604, #1731, #1743, #1744, #1745, #1746, #1747, #1749, #1750, #1751, #1752, #1753, #1754, #1756, #1757, #1759, #1760, #1762, #1764, #1766, #1767, #1771, #1775, #1782, #1783, #1784, #1814, #1866, #1870, #1880, #1881

¹⁷ Comments #1564, #1571, #1578, #1579, #1582, #1592, #1599, #1639, #1682, #1684, #1685, #1688, #1689, #1690, #1691, #1692, #1693, #1694, #1695, #1696, #1697, #1698, #1699, #1700, #1701, #1704, #1722, #1733, #1735, #1742, #1748, #1797, #1799, #1800, #1801, #1812, #1821, #1824, #1826, #1835, #1840, #1857, #1862, #1872, #1877

The scope of the restriction was determined based on the recognition that waterbirds range across large areas during their annual cycle (often travelling between numerous Member States) and that basing the scope of a restriction on the geographical extent of existing networks of protected areas, such as Ramsar sites or the Nature 2000 network, whilst they are acknowledged to offer an important refuge for migratory species, would not be appropriate to limit the risks posed by the ingestion of lead gunshot. Primarily as these risks can occur when lead gunshot is used within any wetland, designated or not. Designated sites only partially cover the wetland habitats used by waterbirds, including AEWA species, at risk of ingesting lead gunshot.

Therefore, to ensure that the scope of the proposed restriction was commensurate to the risks posed by the use of lead gunshot in wetlands, the Dossier Submitter proposed that the scope is underpinned with a generic definition of a wetland (Ramsar definition).

This scope was considered by the Dossier Submitter to be consistent with (i) the mandate for this restriction provided by the Commission (to develop a restriction on the use of lead gunshot in wetlands), (ii) the fact that the Ramsar convention has been ratified by all EU Member States, (iii) the existing obligations of the EU under the AEWA and CMS and (iv) the fact that waterbirds are known to use all of the habitat types included in the Ramsar definition of a wetland.

However, certain species of wetland birds (including AEWA listed waterbirds and predatory or scavenging raptors) also feed outside of wetlands and may therefore still be exposed to spent lead gunshot where this is used outside of a wetland. For example, grazing species of waterbirds that primarily feed away from wetlands include migratory swans (whooper swans and Bewick's swans), species of geese (including the endangered Greenland white-fronted goose *Anser albifrons flavirostris*) and other threatened species that are listed as priorities under AEWA and CMS. As such, the proposed restriction on use within wetlands (even with a comprehensive generic definition of wetland environments) cannot completely address the risks associated with the use of lead gunshot to waterbirds. An assessment submitted by the AEWA Secretariat in the Public Consultation¹⁸ noted that the majority of EU AEWA-listed species vulnerable to lead poisoning (85 out of 100) feed primarily within wetlands clarifying the risk reduction potential of the proposed restriction.

In addition, as compliance problems have been widely reported in certain Member States, the factors affecting compliance (e.g. attitudes of hunters to the identified risks and the suitability of alternatives to the role of enforcement) are clearly relevant to effectiveness of the proposed restriction. Feedback from stakeholders¹⁹ was that the enforceability of any restriction proposal would be simplified by prohibiting the possession of lead shot within a wetland. Education and outreach to hunters, in relation to understanding any restriction and the risks it was intended to address, could also improve effectiveness.

The definition of 'use' in Article 3(24) of the REACH Regulation, includes 'keeping' and 'any other utilisation', suggests that a restriction under REACH on use would also implicitly allow Member States to restrict 'possession'. However, national legislation on the use of lead gunshot does not tend to cover extend to bans on 'possession'. Therefore including a specific paragraph within the restriction proposal that explicitly outlines that possession within a

¹⁸ (#1873)

¹⁹ Meeting of the Expert Group on the Birds and Habitats Directives (NADEG), in November 2016.

wetland is within the scope of the proposal ensures that the intention is clear during opinion and decision making (and public consultation).

RAC conclusion(s):

There are many uncertain factors making it impossible to estimate quantitatively the effectiveness. With full compliance by hunters, which seems based on experience with existing restrictions in Member States to be optimistic, the restriction will prevent the release of 1 432 to 7 684 tonnes of lead to wetlands each year.

However, even assuming full compliance, the restriction will not completely prevent the poisoning of certain species of waterbirds that also feed outside of wetlands.

Considering the uncertainties, it would be reasonable to review the effectiveness of the proposed restriction some years after entry into force.

Key elements underpinning the RAC conclusion(s):

There are currently no restrictions in four Member States, some form of restrictions in 21 Member States, and total bans in three Member States. Thus, for most Member States the proposed restriction will increase the protection level of waterbirds. The actual effectiveness could depend on both compliance and enforcement (although the two are recognised to be linked). In terms of enforcement, this restriction will not be enforced by REACH enforcement authorities (FORUM) and the actual extent of enforcement in different Member States is largely unknown. In light of the potential for limited enforcement, compliance is important to achieve the potential risk reduction. The analysis by the Dossier Submitter indicates that some wetlands are existing official Natura 2000 sites, where high compliance and effectiveness may be expected. The effectiveness in (dry) peatland might be lower, but may increase with time as awareness is increased and those shooting get used to using alternative shot materials. As compliance is difficult to predict, it is not possible to estimate quantitatively the effectiveness. Ideally, the restriction will prevent the release of 1 432 to 7 684 tonnes of lead to wetlands each year.

A factor that could support greater effectiveness, is that an EU wide restriction leading to the protection of European flyways could increase the awareness of the risks posed by lead gunshot to waterbirds and, as a consequence, increase the likelihood of compliance irrespective of the potential for enforcement.

On the other hand, whereas hunter organisations generally support the need to protect waterbirds against lead gunshot poisoning by ingestion of lead pellets, individual hunters and hunter organisations highlight several issues in the public consultation that, in their view, will adversely affect compliance and, therefore, the effectiveness of the proposed restriction:

- Many Member States already have well-known definitions of wetland and a new (broader) one will create problems,
- The inclusion of dry peatland within the scope is not proportionate to the risks,
- The inclusion of possession within the scope will affect the possibilities for hunters to move in between 'legal' hunting areas,
- The potential inclusion of a quantitative buffer zone will increase the scope even further.

Practicality, incl. enforceability

Justification for the opinion of RAC

Summary of proposal:

Steel shot cartridges are produced by most European manufacturers (in this study sample all companies). It is by far the most common alternative to lead gunshot, particularly in the context of waterbird hunting. However, many European manufacturers produce other lead-free ammunition as well, e.g. bismuth and tungsten-based shot. In addition, North American manufacturers distribute via their European representations, a variety of lead-free ammunition types in Europe. If a restriction on the use of lead shots in wetlands is introduced, manufacturers that produce lead shots might face a problem due to the fact that the technology used for manufacturing their product cannot be adapted to alternative metals. None of the products different from lead can be produced using the skills, technologies and facilities used to produce lead shots.

Concerns were raised that steel shot might damage standing timber when lead was to be prohibited in the 1990s in Denmark, and the forestry authorities had recommended against the use of steel. However, the LAG report (2015) found no documented evidence of any problem with the use of steel ammunition in forestry in the Nordic countries (Denmark in particular).

RAC conclusion(s):

RAC is of the view that the proposed restriction is practical, as also indicated by already having similar restrictions in many Member States. Alternative gunshot is already on the market, and sufficiently increased amounts for a larger scale substitution should be available within a few years. Awareness campaigns, training of hunters, and labelling of lead gunshot cartridges are additional factors that can increase the practicality.

Key elements underpinning the RAC conclusion(s):

The restriction proposal expresses concern for the manufacturers of cartridges. However, RAC notes that there have already been restrictions on the use of lead gunshot in wetlands in 24 out of 28 Member States (some for many years), so the substitution of lead gunshot (and shotguns in some instances) should already be well underway in most Member States. It is unclear how much the proposal will broaden the need to substitute lead gunshot with steel (1 432 to 7 684 tonnes of lead/year is the estimate), and to what extent compliance will result in actual substitution. The producers may need some time to adjust, but there should be no practical problems.

As to forestry and the use of steel gunshot, comments have only been received from stakeholders in Finland, where it seems that logs containing steel shot are discarded by the forest industry. This is in contrast to the information from Denmark discussed above. Forestry is not relevant in most types of wetland, but may be relevant in peatland.

Many comments in the PC highlight the lack of enforcement in most Member States, and that a successful restriction would require that those shooting comply with the restriction and understand the reasons for it. The restriction proposal identified that education/training of individuals undertaking shooting would be helpful, and comments in the PC support that

theoretical training (e.g., with respect to wetland definition and the risks posed by lead gunshot) would increase compliance whilst practical shooting training with non-lead gunshot would improve hunting success and decrease the potential for crippling quarry. This training could, for instance, be part of routine licencing within Member States. RAC supports the need for awareness campaigns and educational programmes, and that hunters could benefit from training (or at least practising) with new ammunition prior to hunting, e.g. steel shoot with clay pigeons.

Regarding enforceability, see above in the section of scope regarding enforcement aspects on buffer zones and possession of lead gunshot. In the view of RAC, and supported by FORUM, obligatory labelling of cartridges containing lead gunshot is needed to help enforcement as dismantling of cartridges and subsequent chemical analysis will be avoided. FORUM also notes that a restriction covering all uses of lead gunshot would rather enable enforcement to focus on the 'placing on the market' of lead gunshot in contrast to field inspections of hunters.

Monitorability

Justification for the opinion of RAC

Summary of proposal:

The most conclusive method of monitoring compliance with the restriction is to measure the prevalence of ingested or embedded shot in birds over time. Many of the current studies highlighting the problem of lead poisoning in waterfowl use this method, or varieties of it, to establish the scale of the problem. The method can readily be adapted to monitor the effectiveness of the proposed restriction.²⁰

It could be beneficial to require mandatory training on the need and scope of the proposed restriction before hunting would be permitted in Member States, i.e. the training and examination needed to receive a hunting permit should be amended to that effect.

RAC conclusion(s):

RAC supports that the most conclusive method of monitoring compliance with the restriction is to measure the prevalence of ingested or embedded shot in birds over time.

UNCERTAINTIES IN THE EVALUATION OF RAC

Summary of proposal:

The amount of lead released to the environment, and specifically to wetlands, could be significantly greater than estimated.

The number of waterbirds dying annually is based on a study from the US concerning mallards. The applicability of this method to other species than mallards could result in either an underestimation or overestimation of impacts.

Various sub-lethal effects could also be occurring that have not been quantified e.g. on reproduction.

²⁰ WWT (2010) describe a protocol for the determination of lead pellets in various species.

RAC conclusion(s):

RAC agrees that the estimate of number of waterbirds dying per year is subject to uncertainties. Also, the effectiveness is difficult to estimate as it depends on both enforcement and compliance of those affected by restriction (see above under effectiveness).

Key elements underpinning the RAC conclusion(s):

The amount of lead estimated to be released to wetland, to be restricted by this proposal, is uncertain as indicated by the large interval (1 432 to 7 684 tonnes per year). However, as the estimate is based on the assumption that present restrictions in 19 Member States are fully complied with, which is not likely the case, the amount of lead prevented from being released could therefore be larger (assuming full compliance with the proposed restriction).

The recalculation of the Bellrose mallard data by Green has on the one hand increased the confidence in the estimates, but on the other hand indicated large confidence intervals. The order of magnitude seems reliable, but it assumes that other species are equally sensitive as mallards to lead poisoning. Other species could be more or less sensitive than mallards, and the sensitivity may also vary over time within a species (e.g. depending on choice of feed). Overall, it is certain that a huge number of waterbirds die annually after ingesting lead pellets, although the actual number is uncertain. It is of particular concern when the mortality affects threatened or endangered species, and although this is known to occur, this has not been specifically analysed.

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