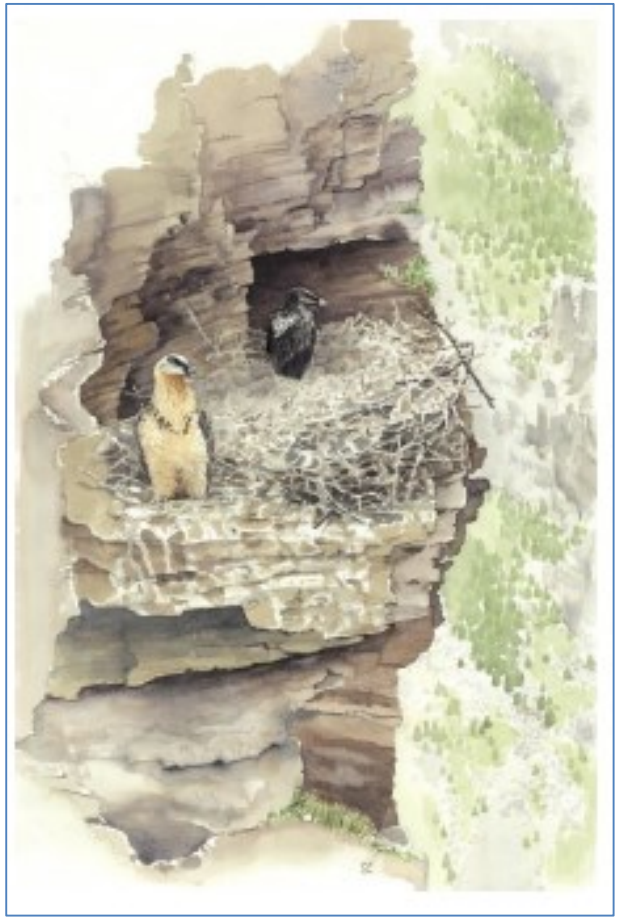


Symposium “Twenty years of Bearded Vulture in Italy”
18 March 2018 - Bormio

CONTRASTING THE USE OF LEAD IN HUNTING AMMUNITION TO PROTECT WILDLIFE AND HUMAN HEALTH

R D

MAN ECTS

Alessandro Andreotti

The use of hunting lead ammunition poses concrete risks to

WILDLIFE

ENVIRONMENT

HUMAN HEALTH

A huge amount of scientific literature is now available

http://www.escholarship.org/uc/item/6dq3h64x

eScholarship
University of California

Health Risks from Lead-Based Ammunition in the Environment
A Consensus Statement of Scientists, March 22, 2013
With a particular focus on impacts in the USA
signed by 30 scientists

Based on overwhelming evidence for the toxic effects of lead in humans and wildlife, even at very low exposure levels, convincing data that the discharge of lead-based ammunition into the environment poses significant risks of lead exposure to humans and wildlife, and the availability of non-lead alternative products for hunting (Thomas, 2013), we support reducing and eventually eliminating the introduction of lead into the environment from lead-based ammunition.

There is a general consensus among scientists on the need to phase out the use of lead ammunition

A huge amount of scientific literature is now available

2014 - http://www.zoo.cam.ac.uk/leadammuntionstatement/

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

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

There is a general consensus among scientists on the need to phase out the use of lead ammunition

African-Eurasian Waterbird Agreement

CMS

UNEP
United Nations
Environment Programme

4.1.4 - Parties shall endeavour to phase out the use of lead shot for hunting in wetlands by the year 2000

original text

4.1.4 -Parties shall endeavour to phase out the use of lead shot for hunting in wetlands as soon as possible in accordance with self-imposed and published timetables

amended text

entered into force on 1st November 1999

CMS

Passons à l'action!

COP11

4-9 nov 2014
Quito, Equateur




CMS Resolution 11.15 approved on 9th November 2014 by CMSCoP11 to prevent the poisoning of migratory birds

http://www.cms.int/en/cop11

The CMS Resolution includes **guidelines** to minimise the risk of poisoning by:

insecticides - *rodenticides* - *poison-baits* - *veterinary pharmaceuticals* (diclofenac) - *lead ammunition and fishing weights*

The guidelines contain some recommendations

Non-legislative recommendation

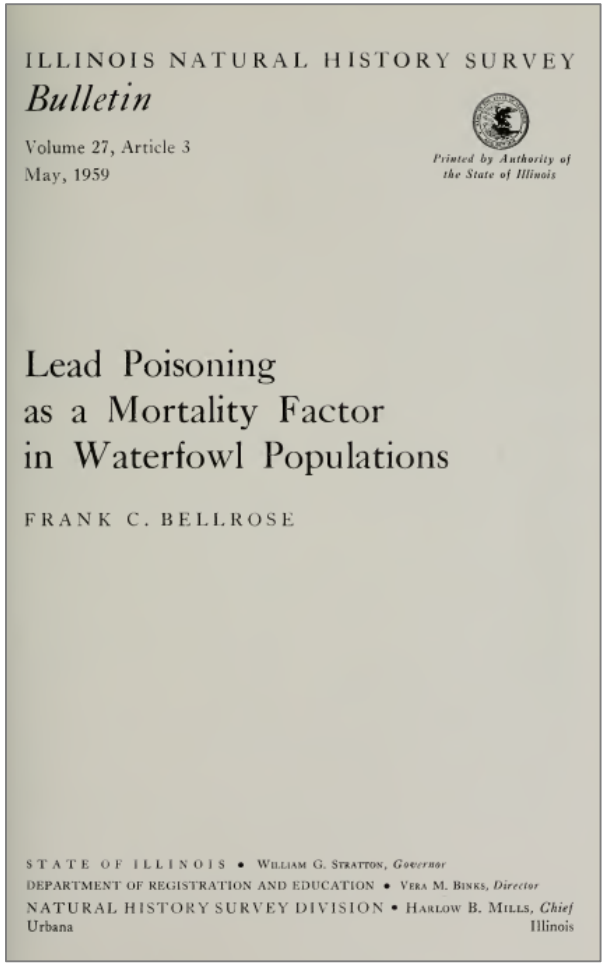
Raise awareness of lead poisoning, particularly at key sites for migratory waterbirds; promote leadership from ammunition users, including wildlife managers, on non-toxic alternatives and best practice

Legislative recommendations

Phase-out the use of lead ammunition across all habitats (wetland and terrestrial) with non-toxic alternatives within the next three years with Parties reporting to CMS Conference of the Parties (COP12) in 2017, working with stakeholders on implementation

Create legislative processes to facilitate remediation of lead ammunition-contaminated environments

Despite this, adequate measures have not yet been taken in most countries, even in the case of wetlands



ILLINOIS NATURAL HISTORY SURVEY

Bulletin

Volume 27, Article 3
May, 1959

Printed by Authority of the State of Illinois

Lead Poisoning as a Mortality Factor in Waterfowl Populations

FRANK C. BELLROSE

STATE OF ILLINOIS • WILLIAM G. STRATTON, *Governor*
DEPARTMENT OF REGISTRATION AND EDUCATION • VERA M. BINKS, *Director*
NATURAL HISTORY SURVEY DIVISION • HARLOW B. MILLS, *Chief*
Urbana Illinois

Phillips & Lincoln (1930:166), over two decades ago, stated: "From this account it will be seen that lead poisoning due to eating shot is of common occurrence, and it seems reasonable to presume that the disease will continue and even increase in the great ducking marshes of the country. The ultimate conclusions as to its effect upon the supply of waterfowl are hazardous to imagine." A few years later Dr. E. C. O'Roke of the University of Michigan was quoted in *Michigan Waterfowl Management* (Pirnie 1935: 75–6) as follows: "Considering the enormous quantity of lead that there must be in the vicinity of blinds that have been shot over for decades, it is reasonable to conclude that the potential danger from lead poisoning is great and should be considered in any waterfowl management program. In the writer's opinion lead poisoning is the disease which takes the greatest toll of adult ducks in this section of the country."

DECRETO MINISTERIALE 17 OTTOBRE 2007 - CRITERI MINIMI UNIFORMI PER LA DEFINIZIONE DI MISURE DI CONSERVAZIONE RELATIVE A ZONE SPECIALI DI CONSERVAZIONE (ZSC) E A ZONE DI PROTEZIONE SPECIALE (ZPS) (G.U. 6 NOVEMBRE 2007, N. 258)

National Decree 17 October 2007, issued by the Italian Ministry for the Environment

Art. 2. Conservation measures in the Special Areas of Conservations (SACs)
Art. 5. Conservation measures in the Special Protection Areas (SPAs)

"It is forbidden the use of lead shot in wetlands, such as lakes, pounds, swamps, marshes, oxbows and lagoons with fresh, salt or brackish waters, and in a 150 m buffer zone from the external shores."

Less than 50% of Italian wetlands are inside SACs or SPAs

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Restriction proposal on lead in shot used in wetlands, on the basis of Article 69(1) of the REACH Regulation .

3 December 2015: the European Commission requested ECHA to prepare an Annex XV restriction dossier

1 April- 21 July 2016: call for evidence

29 September 2016: technical workshop

7 April 2017: dossier report

21 June - 21 December 2017: public consultation

Annuitised one-off costs		**Use value**	
Replacement of guns	€6.3m	Avoided opportunity cost associated with the annual mortality of approximately 700 000 waterfowl from 16 wetland bird species known to ingest lead shot.	non-quantified
Testing of guns	€1.3m	Avoided opportunity cost associated with the annual mortality of other waterbirds, predators and scavengers.	non-quantified
Annual operational costs		Beneficial impacts on leisure activities including bird watching	non-quantified
Switching to alternative cartridges	€68.6m	Avoided human health impacts through consumption of contaminated game meat and/or potential consumption of contaminated (ground) water.	non-quantified
Total annual cost to hunters	**€76.2m**	**Non-use values**	
Distributional cost in terms of generated tax revenues assuming an average VAT rate of 20%	€15.2m	Protection of wildlife and ecosystem services	non-quantified
Distributional cost in terms of producer surplus gains (after VAT deduction)	Up to €25m	**Existence value**	
		Protection of rare bird species	non-quantified
		Cascading effects on birds of prey and predators feeding on waterfowl	non-quantified
Total societal cost	**€35-61m**	**Total societal benefit**	non-quantified

Methods to quantify the economic value of bird populations

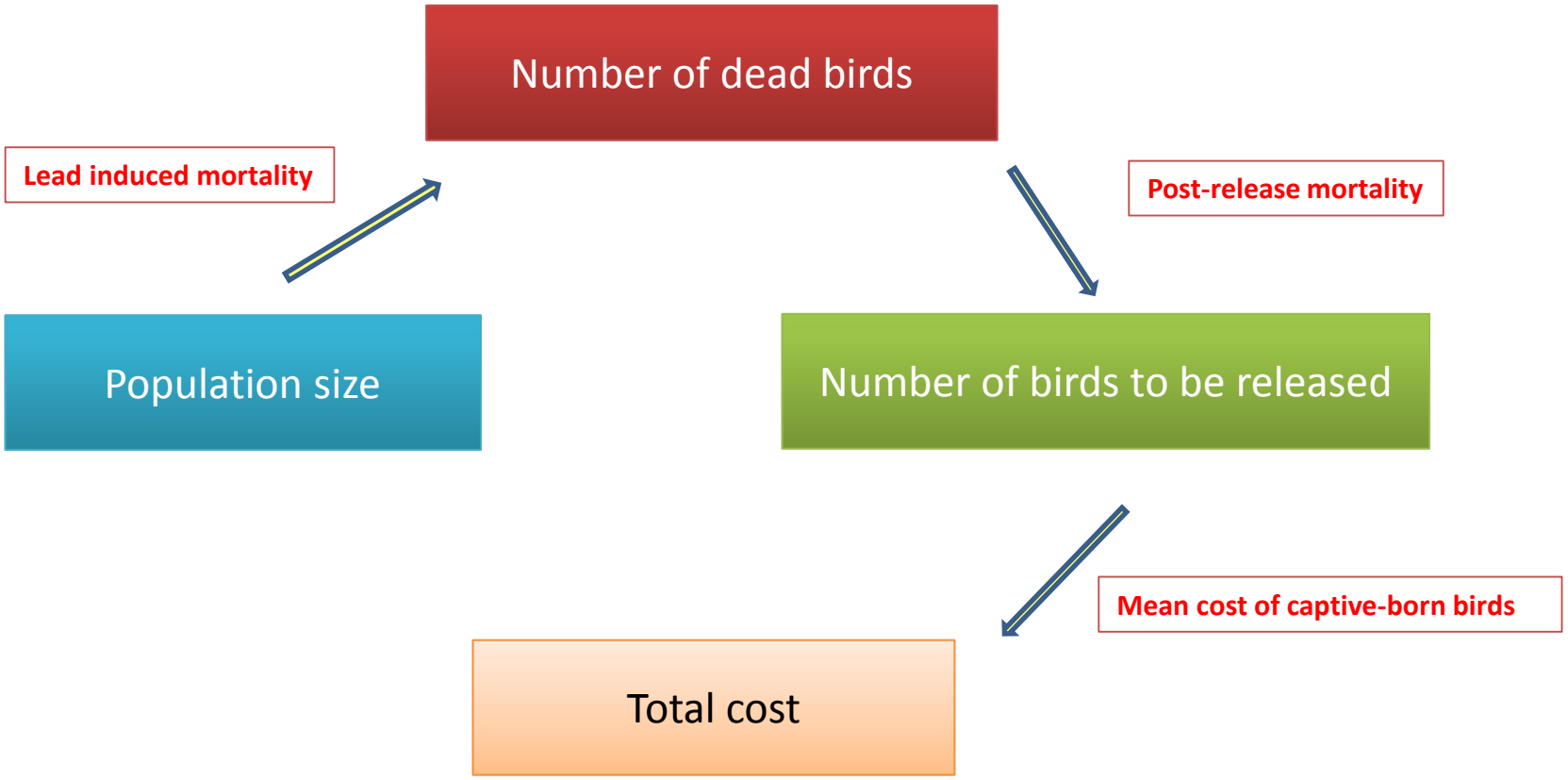
- Willingness to pay: how many euros people are ready to pay to conserve or use a bird population (subjective value)

- Habitat restoration costs, i.e. costs to increase the productivity of natural populations through the increase of nesting habitats

- Costs to reduce bird mortality, i.e. costs to remove a mortality factor, as to compensate a limiting factor that can not be removed

- Replacement costs, i.e. costs to replace dead wild birds with captive bred ones (reintroduction/restocking programs)

REPLACEMENT COSTS



English name	Scientific name	Conservation status[a]	Countries[b]	References[c]
Ruddy duck	*Oxyura jamaicensis*[d]	NE	ES, US	Mateo et al., 2001; Perry and Artmann, 1979.
White-headed duck	*Oxyura leucocephala*	EN - VU	ES	
Mute swan	*Cygnus olor*	LC – LC	CA, GB, IE, IT	Bowen and Petrie, 2007.
Whooper swan	*Cygnus cygnus*	LC – LC	GB, IE, JP	Ochiai et al., 1992.
Tundra swan	*Cygnus columbianus*	EN[W] - EN[W]	CA, GB	Bowen and Petrie, 2007.
Barnacle goose	*Branta leucopsis*	LC – LC	GB	Pain et al., 2015.
Canada goose	*Branta canadensis*[d]	LC – NE	GB, US	Newth et al., 2017
Greylag goose	*Anser anser*	LC – LC	ES, GB	De Francisco
Pink-footed goose	*Anser brachyrhynchus*	LC – LC[W]	GB	
Greater white-fronted goose	*Anser albifrons*	LC – LC[W]	JP	Och
Common eider	*Somateria mollissima*	VU - EN	US	
Common scoter	*Melanitta nigra*	LC – LC	CA	own et al., 2006.
Common goldeneye	*Bucephala clangula*	LC – LC	FI, FR, GB, NL, SE	
Common shelduck	*Tadorna tadorna*	LC – LC	GB	
Marbled teal	*Marmaronetta angustirostris*	VU - CR	ES	
Red-crested pochard	*Netta rufina*	LC -LC	ES	
Common pochard	*Aythya ferina*	VU -VU	CH, ES	
Ferruginous duck	*Aythya nyroca*	LC – LC	ES	Mateo et al., 2001.
Tufted duck	*Aythya fuligula*	LC – LC		
Greater scaup	*Aythya marila*	VU[W] - VU		Bellrose, 1959.
Garganey	*Spatula querquedula*	LC - VU		
Northern shoveler	*Spatula clypeata*	LC – LC		Bellrose, 1959.
Gadwall	*Mareca strepera*	LC -	B, NL	
Eurasian wigeon	*Mareca penelope*		., ES, FR, IT, SE	
Mallard	*Anas platyrhynchos*		CH, DK, ES, FI, FR, GB, GR, HU, NL, NO, PL, PT, SE, US	Bellrose, 1959, Binkowski and Sawicka-Kapusta, 2015.
Northern pintail	*Anas acuta*		CH, DK, ES, FI, FR, GB, GR, SE, US	Bellrose, 1959.
Common teal	*Anas crecca*		CH, ES, FR, GB, GR, IT[e]	
Greater flamingo	*Phoeni*	LC	ES, FR, IT	
Western water rail	*Ra*	LC – LC	FR	
Purple swamphen		LC – LC	ES	
Common moorhen		LC – LC	FR, GB, US	Jones, 1939.
Common coot		NT – LC	CH, ES, FR, PL	Binkowski and Sawicka-Kapusta, 2015
Pied avocet	avosetta	LC – LC	ES	Guitart et al., 1994b.
Black-tailed	amosa	VU – EN	ES, FR, IT	
Ruff	aris pugnax	LC – EN	FR, IT[e]	
Dunlin	*Calidris alpina*	LC – LC	CA	Kaiser et al., 1980.
Common	*Gallinago gallinago*	LC – LC	FR, GB	
Jack snipe	*Lymnocryptes minimus*	LC – LC	FR	
Western m	arrier	*Circus aeruginosus*	LC - LC	ES, FR
White-tailed sea-eagle	*Haliaeetus albicilla*	LC - LC	DE, GL, SE	Helander et al., 2009.

[a] IUCN Red List Categories assessed at a pan-European (left) and EU (right) level. LC = least concern; NT = Near Threatened; VU = vulnerable; EN = endangered; CR = critically endangered; NE = not evaluated; [W] = assessment based on wintering populations (BirdLife International, 2015).

[b] CA = Canada; CH = Switzerland; DE = Germany; DK = Denmark; ES = Spain; FI = Finland; FR = France; GB = United Kingdom; GL = Greenland; GR = Greece; HU = Hungary; JP = Japan; IE = Ireland; IT = Italy; NL = the Netherlands; NO = Norway; PT = Portugal; SE = Sweden; US = United States of America.

[c] Due to the large amount of literature for some species, only selected references are listed; when references are non indicated, see Mateo (2009).

[d] Introduced in Europe.

[e] Unpublished data.

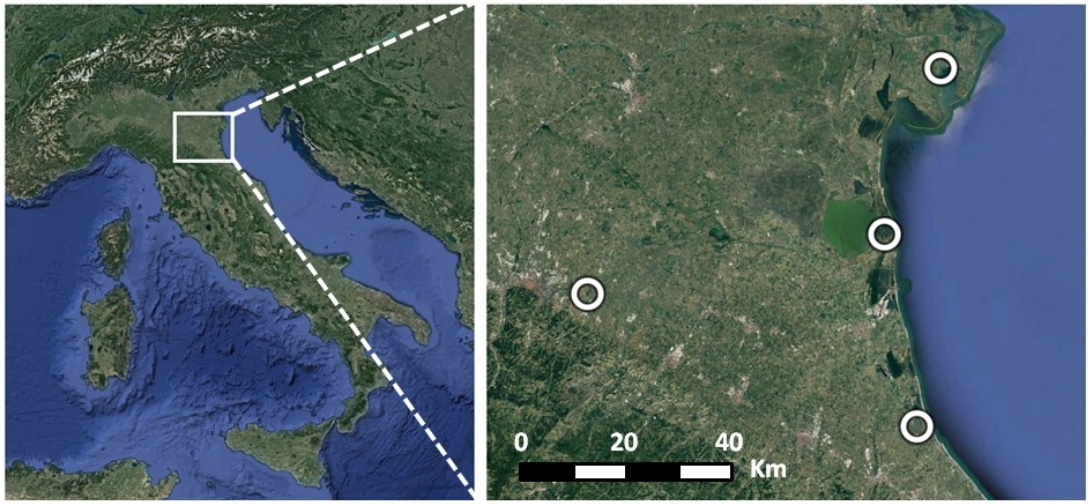
$$\text{Mortality}\ (\%) = \sum_{i=1}^{7} d_i = \frac{p_i}{h_i} \cdot t \frac{m_i}{100}$$

d = % dead birds for lead poisoning
h = hunting bias correction factor
t = turnover correction factor
m = mortality

Species	Lead shot ingestion prevalence % (n[a])	Estimated mortality %	Estimated individuals suffering sub-lethal effects %	Wintering population in Europe n	Wintering population in the EU n	Estimated mortality in Europe n	Estimated mortality in the EU	Estimated individuals suffering sub-lethal effects in Europe n	Estimated individuals suffering sub-lethal effects in the EU n
Tundra swan	0.2 (516)	0.2	0.8	22,400	22,000			179	176
Barnacle goose	0.0 (61)	0.0	0.0	718,500	718,500			0	0
Greylag goose	4.4 (203)	4.5	13.5	1,002,500	956		3,052	135,338	129,155
Pink-footed goose	2.7 (73)	2.8	8.2	422,500			11,830	34,645	34,645
G. white-fronted goose	0.0 (30)	0.0	0.0	1,960,000		0	0	0	0
Common goldeneye	16.0 (156)	16.2	48.8	44		71,280	60,953	214,720	183,610
Red-crested pochard	12.4 (97)	12.5	37.5			46,750	5838	140,250	17,514
Common pochard	23.1 (2333)	23.4	70		200	56,511	26,255	170,499	79,213
Tufted duck	10.5 (4208)	10.6			1,222,500	163,770	129,585	500,580	396,090
Greater scaup	0.0 (11)	0.0		0	213,514	0	0	0	0
Northern shoveler	10.4 (1515)	10.5		4,000	260,160	34,020	27,317	102,060	81,950
Gadwall	3.8 (816)	3.8		209,000	169,175	7942	6429	23,408	18,948
Eurasian wigeon	2.1 (1518)			2,295,000	2,087,000	48,195	43,827	158,355	144,003
Mallard	11.9 (20,927)	12.	36.9	3,730,000	2,355,000	451,330	284,955	1,376,370	868,995
Northern pintail	31.5 (977)	31.9	96.1	160,000	130,610	51,040	41,665	153,760	125,516
Common teal	4.7 (43,069)	4.7	14.3	1,115,000	939,000	52,405	44,133	159,445	134,277
Total				14,777,900	11,898,564				

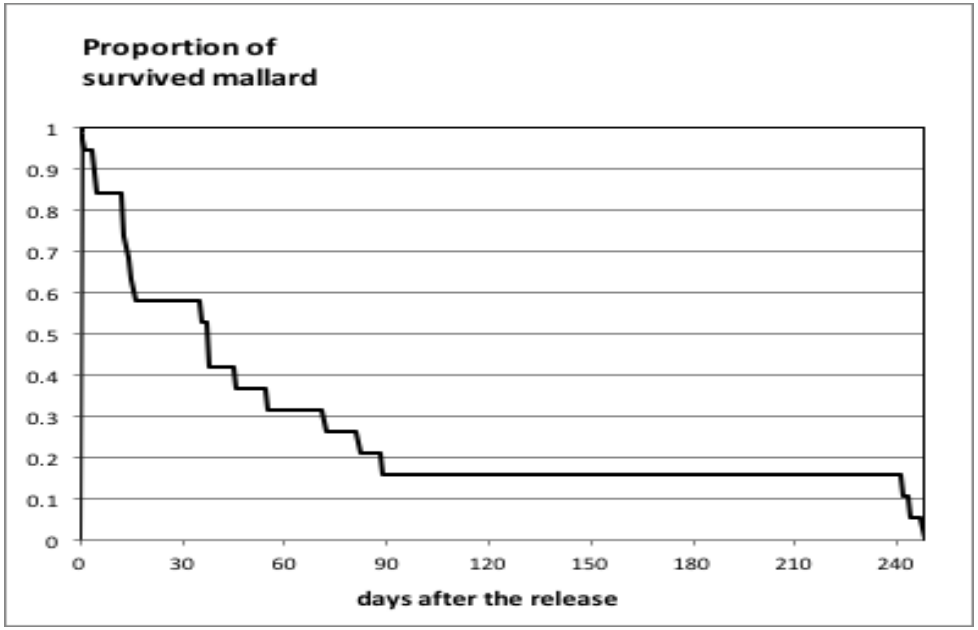
[a] n represents the number of examined specimens.

16 species of Anatidae



Releasing sites of 19 Mallards tracked by means of GPS-GMS Ecotone devices (from 2.2.2016 to 8.3.2016)

84% of the Mallards died before the opening of the hunting season



Cumulative survival

MORTALITY OF RELEASED CAPTIVE-BRED DUCKS BIBLIOGRAPHIC REVIEW

we found 5 values + 1 from the original research carried out by ISPRA

2 outliner (40-84%)

4 very close values (70-75%)

Mean value: **72.7%**

ECONOMIC SURVEY

Species	ES		FR		GB		IT		RO		Mean
Tundra swan	n.a.	0	n.a.	0	452	2	450	1	n.a.	0	451
Pink-footed goose	n.a.	0	n.a.	0	47	1	100	1	n.a.	0	73
G. white-fronted goose	n.a.	0	138	2	n.a.	0	90	1	n.a.	0	114
Greylag goose	n.a.	0	58	2	23	1	45	1	n.a.	0	42
Barnacle goose	65	1	n.a.	0	38	2	45	1	n.a.	0	49
Eurasian wigeon	65	1	59	2	32	2	30	1	n.a.	0	46
Gadwall	65	1	53	2	32	1	30	1	n.a.	0	45
Common teal	65	1	61	2	32	2	30	1	n.a.	0	47
Mallard	30	1	17	2	n.a.	0	8	1	18	2	18
Northern pintail	65	1	47	2	30	3	35	1	111	1	58
Northern shoveler	70	1	66	2	45	3	35	1	n.a.	0	54
Red-crested pochard	55	1	41	2	31	3	30	1	n.a.	0	39
Common pochard	65	1	58	2	29	2	35	1	n.a.	0	47
Tufted duck	65	1	55	2	32	2	30	1	n.a.	0	45
Greater scaup	n.a.	0	n.a.	0	n.a.	0	50	1	n.a.	0	50
Common goldeneye	115	1	110	2	76	3	50	1	n.a.	0	88
n of species priced/dealers	11	1	12	2	13	3	17	1	2	2	

BIRDS TO BE RELEASED AND THEIR COST

Species	Captive-bred birds to release annually (n)		Estimated costs (euros)	
	In Europe	In the EU	In Europe	In the EU
Tundra swan	164	161	74,010	72,689
Pink-footed goose	43,333	43,333	3,163,333	3,163,333
G. white-fronted goose	0	0	0	0
Greylag goose	165,247	157,698	6,940,385	6,623,308
Barnacle goose	0	0	0	0
Eurasian wigeon	176,538	160,538	8,120,769	7,384,769
Gadwall	29,092	23,548	1,309,121	1,059,668
Common teal	191,960	161,659	9,022,106	7,597,989
Mallard	1,653,223	1,043,791	29,758,022	18,788,242
Northern pintail	186,960	152,618	10,843,663	8,851,818
Northern shoveler	124,615	100,062	6,729,231	5,403,323
Red-crested pochard	171,245	21,385	6,678,571	834,018
Common pochard	207,000	96,171	9,729,000	4,520,057
Tufted duck	599,890	474,670	26,995,055	21,360,165
Greater scaup	0	0	0	0
Common goldeneye	261,099	223,269	22,976,703	19,647,692
Totals				

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journal homepage: www.elsevier.com/locate/scitotenv

Economic assessment of wild bird mortality induced by the use of lead gunshot in European wetlands

Alessandro Andreotti [a,*], Vittorio Guberti [a], Riccardo Nardelli [a], Simone Pirrello [a], Lorenzo Serra [a], Stefano Volponi [a], Rhys E. Green [b,c]

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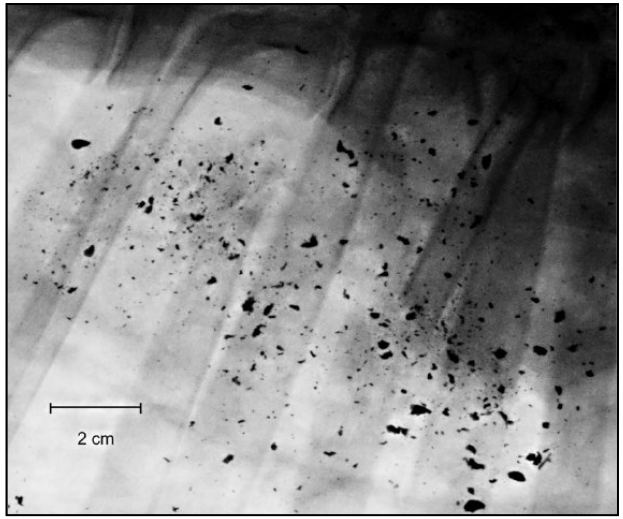
[c] RSPB Centre for Conservation Science, Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK

Annuitised one-off costs		**Use value**	
Replacement of guns	€6.3m	Avoided opportunity cost associated with the annual mortality of approximately 700 000 waterfowl from 16 wetland bird species known to ingest lead shot.	
Testing of guns	€1.3m	Avoided opportunity cost associated with the annual mortality of other waterbirds, predators and scavengers.	non-quantified
Annual operational costs		Beneficial impacts on leisure activities including bird watching	non-quantified
Switching to alternative cartridges	€68.6m	Avoided human health impacts through consumption of contaminated game meat and/or potential consumption of contaminated (ground) water.	non-quantified
Total annual cost to hunters	**€76.2m**	**Non-use values**	
Distributional cost in terms of generated tax revenues assuming an average VAT rate of 20%	€15.2m	Protection of wildlife and ecosystem services	non-quantified
Distributional cost in terms of producer surplus gains (after VAT deduction)	Up to €25m	**Existence value**	
		Protection of rare bird species	non-quantified
		Cascading effects on birds of prey and predators feeding on waterfowl	non-quantified
Total societal cost	**€35-61m**	**Total societal benefit**	

WHAT IS HAPPENING IN TERRESTRIAL HABITATS?



IN ITALY THERE IS NO NATIONAL RESTRICTION ON THE USE OF LEAD AMMUNITION IN TERRESTRIAL HABITATS

Local bans of lead bullets [illegible] cts

Lead ammunition not al [illegible] control wild ungulates (especially in protected areas)

Lead ammunition not all[illegible] marketed (Emilia-Romagna)

About 10% of the hunting bullets sold in Italy are lead-free (source: AFEMS)

ECHA
EUROPEAN CHEMICALS AGENCY

Towards a new restriction proposal on lead in hunting ammunition extended to terrestrial habitats?

Reliable assessments of the economic benefits of the restriction are needed

Can the reintroduction programme of the Bearded Vulture on the Alps allow us to estimate the economic value of eagles and vultures poisoned by lead ammunition?

We should try to do an economic assessment…!