

Lead in the Environment Advisory Group



© Cornatzer and Fogarty 2008 – CT scan of 20 packages of ground venison made from a rifle-shot deer. Glittering pieces are lead fragments.



Action Plan 2009

Background

Iowa wildlife rehabilitators documented an unusual increase in the number of sick, dead, and dying Bald Eagles being brought in for treatment in the winter and early spring of 2005. Since then, every effort has been made to lead test every eagle admitted. An eagle database was established that now contains information on 120 eagles. The over five year's worth of data show the overwhelming cause for eagle admissions to rehabilitators is lead poisoning and exposure, resulting from the birds ingesting lead. Approximately 60% of the eagles coming in to rehabilitators have abnormal lead levels in blood, liver, or bone. This is too high of a percentage to be a random event. Gunshot wounds account for only 12% of eagle admissions in the same database (Neumann 2009). The data do not indicate that the increasing number of eagles being admitted by Iowa wildlife rehabilitators is simply a function of the increasing number of eagles in wild populations. If this were the case, it would be expected that a variety of causes would be seen for admittance (miscellaneous trauma, fractures, starvations, disease, etc.), at percentages relative to that seen for gunshot wounds. This has been the case for other species. As Coopers Hawk numbers have increased in recent years, rehabilitators have admitted an increasing number of them, with a wide variety of problems (Cancilla pers. communication). This has not been the case with Bald Eagles. As the numbers of Bald Eagles has increased, Iowa wildlife rehabilitators have admitted more of them but not with a variety of injuries, instead with one overwhelming cause; lead ingestion (Neumann 2009). This high percentage of cases due to lead poisoning is the reason for concern.

If 60% of the people being admitted to an emergency room had some sort of poison in their system, doctors would be sounding the alarm that there was some sort of problem, the cause needed to be found, and further poisonings prevented. Wildlife rehabilitators are attempting to do the same for eagles and finding that eagles may be an indicator of human health issues as well. In the investigation to determine the source(s) of lead for eagles, the vast amount of research on the topic revealed the many other species negatively impacted by lead, including humans. Lead in ammunition and fishing tackle are cited as the source for wildlife poisonings and one avenue for human exposure. Please see Appendix 1: Wildlife and American Fisheries Societies draft position statement and Appendix 2: Link to The Peregrine Fund's Conference on "Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans", containing over 60 scientific papers on the topic.

To prevent further wildlife and human exposure to lead from ammunition and tackle sources, SOAR (Saving Our Avian Resources – a non-profit organization that does wildlife rehabilitation and education) secured a Resource Enhancement and Protection – Conservation Education Program (REAP-CEP) grant to form a *Lead in the Environment Advisory Group*. This Advisory Group would bring together the stakeholders involved in the issue of lead in ammunition and tackle. Through meetings, focus groups, and discussion a plan of action to address this issue would be formulated.

Group Meeting

One group meeting was held Monday, May 4, 2009 at the State Capitol Building in Des Moines. John Klein, M&M Divide RC & D Coordinator, agreed to act as the moderator for the meeting and facilitate action outcomes using the nominal group method. Mr. Klein and the listed guests did vote on the resulting suggestions as part of the group.

In attendance:

Advisory Group Members:

Kay Neumann, Executive Director SOAR
Marla Mertz, Naturalist Marion County Conservation Board
Laura Zaugg, Naturalist Dallas County Conservation Board
Bruce Ehresman, Wildlife Diversity, Iowa Department of Natural Resources (DNR)
Mike Delaney, Des Moines Izaak Walton League
Jane Clark, Sierra Club and Iowa Audubon
Rick Robinson, Farm Bureau
John Lindquist, Pheasants Forever
Megan Wisecup, Hunter Safety Coordinator, Iowa DNR
Mary Jo Berkgen, Turn In Poachers, Inc.

Guest Presenter:

Molly Tranel, Minnesota Department of Natural Resources

Guests:

Ben Berka, Shooting Sport Coordinator, Iowa DNR
Allen Crouse, Recreation Safety Officer, Iowa DNR
Jeff Barnes, Recreation Safety Officer, Iowa DNR

Advisory Group members that were unable to attend the meeting at the Capitol, but have reviewed and commented on the Action Plan via email:

Rita Gergely, Iowa Department of Public Health
Kenneth Sharp, Iowa Department of Public Health
Carrie Miller, Food Bank of Iowa
Larry Yost, Whitetails Unlimited
Julie Blanchong, Iowa State University – Wildlife Diseases
Justin Mays – US Fish and Wildlife Service – Law Enforcement
Jeremy Rosonke, Waterfowl Association of Iowa
David Nitzel, Sportsman's Warehouse
John Derner, American Legion
Beth Brown, Iowa Wildlife Rehabilitators Association

Prior to the meeting, the invited participants were provided with links to The Wildlife and American Fisheries Societies' Position Statement on Lead and to The Peregrine Fund's Spent Lead Conference Proceedings (Appendices 1 and 2).

Molly Tranel, Wildlife Research/Habitat Evaluation Biologist with Minnesota Department of Natural Resources's Farmland Wildlife Populations and Research Group, began the meeting with a presentation summarizing her research. Find the abstract below:

IMPACTS OF LEAD AMMUNITION ON WILDLIFE, THE ENVIRONMENT, AND HUMAN HEALTH – A LITERATURE REVIEW AND IMPLICATIONS FOR MINNESOTA

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ABSTRACT.—The Minnesota Department of Natural Resources (MDNR) has been investigating non-toxic shot regulations for upland small game hunting because there is considerable evidence that the use of lead ammunition impacts the health of wildlife, the environment, and humans. In 2006 MDNR established a Non-toxic Shot Advisory Committee (NSAC) to provide citizen input on restricting lead shot for small game hunting. To support the NSAC discussions, we summarized available literature regarding lead ammunition and its effects on wildlife, the environment, and human health. This literature review includes more than 500 citations on lead and non-toxic ammunition related issues worldwide and summarizes studies regarding ingestion of lead shot, bullets, and fragments by wildlife species and the impacts of lead poisoning on wildlife, the environment, and humans. We found over 130 species of animals (including upland birds, raptors, waterfowl, and reptiles) have been reported in the literature as being exposed or killed by ingesting lead shot, bullets, bullet fragments, or prey contaminated with lead ammunition. The impacts of ingested lead on wildlife included decreased survival, poor body condition, behavioral changes, and impaired reproduction. We found 15 recent studies that demonstrated the impacts of lead ammunition on human health. Studies in Canada, Greenland, and Russia linked lead shot found in game animals to higher levels of lead in people who eat those game animals, and recent evidence shows that meat far from entry wounds may contain lead fragments. Effective non-toxic alternatives to lead shot are available, and at costs comparable to lead. The results of our review demonstrate the effects of lead ammunition on wildlife, the environment, and human health and support the need for the use of non-toxic alternatives to lead ammunition.

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TRANEL, M. A., AND R. O. KIMMEL. 2009. Impacts of lead ammunition on wildlife, the environment, and human health—A literature review and implications for Minnesota. *In* R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans*. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa.2009.0307

Key words: Hunting, lead ammunition, lead poisoning, lead shot, non-toxic shot, Pb, Minnesota.

Her full paper can be found in the Peregrine Fund's Link to the Conference Proceedings (Appendix 2).

Focus Groups

Discussions were held with:

Iowa Ornithologists Union members at their Spring Meeting in Carroll, May 2nd, 2009,
Jefferson eighth grade students at Springbrook State Park, April 27th, 2009,
The general public at Lime Creek Nature Center, Cerro Gordo County, April 21st, 2009, and
Izaak Walton League members at their Lodge in Des Moines, IA, June 11th, 2009.

The comments from the Focus Groups were incorporated into this report and are noted as to the source.

POSITION STATEMENT

Lead has been known for centuries to be a broad-spectrum toxicant to humans and wildlife. The replacement of lead-based ammunition and fishing tackle with non-lead products, would remove a poisoning and exposure source for wildlife and humans. Long term elimination of lead from outdoor recreational activities will require collaboration among affected stakeholders. A first step would be to encourage enhanced educational efforts leading to greater public awareness and understanding of the consequences of lead exposure in wildlife species and humans, emphasizing the realized gains in wildlife and human health and in environmental quality from use of lead-free ammunition and fishing tackle.

ACTION PLAN

Action Items discussed were narrowed to the eight categories listed below, in order of Advisory Group support. Each participant, at the end of the meeting, had one full vote for their favorite of these eight ideas. They also had ½ vote for their second favorite alternative idea. In this manner, the success of an idea could be weighed by the larger group. Below is the breakdown of the voting for this group of 14 people (21 total votes) that attended the May 4th Advisory Group meeting in person.

Idea Choice	1 – Public Relations and Education	2 – Research	3 – Tax Lead	4 – Partial Bans on Lead	5 – Proper Lead Disposal	6 – Statewide Ban on Lead	7 – User Waiver	8 – Take No Action	Total
# of first choice votes = 1 vote	12	1	1	0	0	0	0	0	14
# of second choice votes = ½ vote	2	10	0	1	1	0	0	0	14
Total votes	13	6	1	1/2	1/2	0	0	0	21

1) Establish a public relations campaign to encourage non-lead ammunition and tackle use (13 votes)

This option was also suggested in all four focus groups. The following are the specific action steps discussed.

More education is needed on the toxic effects of lead in ammunition and tackle for wildlife and humans.

- Working with the County Conservation Boards (CCBs) and Iowa Association of Naturalists (IAN) to achieve statewide educational efforts on lead in ammunition issues
- Guest speakers at conferences, workshops, and meetings. This should include current conservation professional staff development for Iowa DNR, CCBs, veterinarians, wildlife rehabilitators, parks and wildlife managers. Additional workshops should be offered at outdoor/recreation conferences and sports shows. Special emphasis should be placed on newly added hunting lands for all public and private landowner groups in their regulatory process. It is important to bring ammunition manufacturers and retailers into the process early and maintain their continued support.
- Development of materials that could be used in Hunter Safety classes and other educational venues for students. Make lead information and education required at Hunter Safety Classes.
- Promote the use of non-toxic shot at shooting ranges. Springbrook Conservation Education Center and Mitchell CCB use non-toxic shot for their shooting classes. By setting an example, these locations give shooters a feel for how the non-toxics shoot and may help them decide to purchase non-toxics for hunting in the field.
- Continue and expand the Cooperative North American Shotgunning Education Program (CONCEP) in Iowa, which has made efforts to educate hunters on the best techniques for success in the field with non-toxic shot
- TV Commercials
- Public Service Announcements
- Billboards
- Podcasts
- Web site links
- News Releases
- Articles in periodicals, including regular outdoor news features
- Celebrity spokesperson

Work with manufacturers and retailers to increase the availability and promotion of non-lead alternatives to slugs, muzzleloader and rifle bullets, shot, and fishing tackle.

- Development of displays, posters, etc that would highlight the effectiveness and benefit to wildlife and human health. This has been done by the Arizona Fish and Game promoting copper rifle bullets and by the Minnesota Pollution Control Agency for non-lead fishing tackle. The displays are made available to retailers at very low cost.
- Hand outs available at point of purchase

- Have a buy back of lead ammunition or a trade-in lead for non-toxic ammunition and fishing tackle

Convene an Iowa Lead in the Environment Conference, modeled after the International Conference hosted by the Peregrine Fund.

- Invite experts in the field to present information and be available for discussion and question and answer sessions
- Include a session that would give an overview of all of the sources of lead that could impact human health; including lead paint, toys, industrial exposure, ammunition, tackle, and others.
- Invite a similar range of attendees to be included as in this Advisory Group, making sure all stakeholders in the issue would be represented
- Have large group participation with input and outcomes
- Secure commitments to action

2) Do more research in Iowa on the bio effects of lead in ammunition (6 votes)

Suggested research topics:

A pheasant wing study analyzing lead levels in bone (life time lead exposure measurement) or crop sampling to see how many Iowa pheasants are exposed to lead. These studies could use the work done on lead poisoning in mourning doves in Missouri as a model (Franson et al 2009 and Schulz et al 2009). Approximately 600,000 roosters were harvested in Iowa in 2008, that could be up to 80% of the available roosters (IDNR 2008 Iowa August Roadside Survey), and assuming a 50:50 sex ratio, there could conservatively be 1,500,000 pheasants in the state. Molly Tranel's presentation cited studies showing from 3 % (Bulter 2005) to 34 % (Kreager 2007) of the pheasants sampled having lead shot in their crops. These animals would be mortalities. When doing the math, lead could be impacting 45,000 to 510,000 pheasants in Iowa. If removing lead from the system could result in this many more pheasants surviving and adding their reproductive potential, use of non-toxic shot could have a significant positive impact. This information has lead Minnesota DNR to support more restrictions on lead shot (Tranel 2008). An argument could be made that eliminating lead could create more hunters, in that more people tend to hunt when there are more pheasants, increasing their odds of success. A switch to non-lead ammunition may actually generate more funds for conservation agencies. A research study to look at the impacts of lead on Iowa's pheasants and pheasant hunter participation would be very interesting.

More research could be done on the venison being eaten by hunters and food pantry clients. North Dakota, Minnesota, and Wisconsin have all done work in this area, sampling hundreds of packages of meat and analyzing them for lead content. After finding lead fragments in 53 of 95 packages of ground venison taken from food pantries in North Dakota, distribution of the meat was halted. North Dakota, now, only accepts bow shot deer into their donation program (North Dakota Department of Health 2008). Minnesota found lead in 76 of 299 samples, also prompting the disposal of the remaining donated venison (Minnesota Department of Agriculture 2008). Minnesota now only accepts whole cuts of venison into its donation program. Wisconsin found lead in 30 of 199 commercially processed venison samples. The amount of lead in each package was highly variable, with one package containing 265 mg/kg. The lethal dose of lead for an eagle is 200 mg (Pattee et al. 1981).

This resulted in the state urging food pantries to have their venison x-rayed for lead fragments (US Department of Health and Human Services 2008). Iowa sampled ten of 35,000 packages of donated venison, finding lead in two of the ten packages sampled (Iowa DNR 2008). This was a rate of 20 % of packages showing lead, resulting in 7000 suspect packages. Iowa has not altered its venison donation program, citing the low levels of lead found in the two positive samples (less than 1 mg/kg). A larger sampling of Iowa venison might be helpful, as other states were finding a very high variability in lead concentration from package to package and a sample size of 10 from 35,000 leaves a very wide confidence interval.

The people consuming the donated venison should be tested for lead to determine if this is impacting their health. The Center for Disease Control (CDC) found that of the over 700 North Dakotans tested, those that ate game meat had a statistically higher blood lead level than those that did not. None of the people tested had blood lead levels of 10 micrograms per deciliter or higher. However, this study was done in May. Most hunters consume their venison closer to the hunting seasons. A study in January and February may yield higher blood lead levels (Cornatzer pers communication). Ten micrograms per deciliter is the threshold the CDC set in 1991 for children that should prompt public health actions (retesting, home visits, etc.). Concurrently the CDC also recognizes that a blood lead level of 10 micrograms per deciliter does not define a threshold for the harmful effects of lead (Center for Disease Control 2008, 2007). Even at low levels (below 10 micrograms per deciliter); lead can cause children to exhibit lower IQs, impair cognitive development, and cause learning impairments (Center for Disease Control 2007). Obviously, children and pregnant women should avoid eating any amount of lead. Lead is mistaken by the body for calcium and is stored in bone and organ tissue, it can cross the placental boundary and be transferred to infants through breastfeeding. Studies on indigenous peoples dependent upon subsistence foods in the circumpolar north, continued to show elevated blood lead levels even with the phase out of lead in gasoline, paint, and solder. Lead in ammunition was shown to be the cause for these elevated blood lead levels and with education and community outreach a switch to non-lead ammunition was affected resulting in significantly lower blood lead levels (Verbrugge et al 2009). Elevated blood lead levels associated with consuming game meat harvested with lead have been well documented. Tranel et al (2009) cites 11 separate studies. Other studies demonstrate the difficulty in reducing or removing the lead from a carcass during the butchering process (Hunt 2006, Minnesota DNR 2008). With the demonstrated negative effects of lead, it would seem worthwhile to make sure that none of the people eating venison or other game meat in Iowa are exposing themselves to health problems.

Testing children could be especially important. This may work in with the mandatory testing for all children in Iowa. Children entering kindergarten must have proof of a blood lead test at some time in their life. It is recommended that children be tested for lead poisoning starting at the age of one year. Do children eating venison or other game meat shot with lead have higher lead levels than children who do not eat this type of meat? It would be helpful if a practical method could be devised to add this avenue of querying to regular lead test screening. It is being done this way in some parts of Alaska and North Dakota. Those who investigate cases of childhood lead poisoning should be made aware of the potential for game meat to contain lead, possibly helping them determine a source.

The Peregrine Fund recently completed a study feeding venison with and without lead from rifle shot deer to pigs (because their digestive system is similar to humans), finding elevated blood lead levels in the pigs eating venison with lead fragments (Hunt 2009). This life long exposure to lead in food, may have serious human health impacts, that we should attempt to measure. Do life long hunters have a higher incidence of high blood pressure, kidney failure, or Parkinson's Disease? As these are health problems found in older adults, when bone tissue begins to deteriorate and lead may be released back into their systems (Coon et al 2006). Analyzing lifetime exposure levels would be valuable information, involving specific x-ray techniques to determine the lead levels in bone tissue. However, x-ray fluorescence of bone is available in only a few research centers in the United States, it may be cost prohibitive to test lowans using this method. Perhaps support could be given, or the CDC urged, to test hunters in states closer to these x-ray facilities. Pennsylvania may be considering just such a study, the results could be helpful in evaluating lowans' health impacts from consuming game meat shot with lead.

3) Tax lead in ammunition (1 vote)

This idea was proposed in the student focus group also.

There was much discussion here with the thought that it just could not be approved by the legislature. There is a tax on cigarettes, a tax on gasoline, sales tax, income tax, property tax, a similar user tax on fishing and hunting items, etc., it seems that this is a possibility that could help to make non-toxic ammunition evenly marketable with lead, and if the price were the same, then lead would be the less attractive alternative.

The tax on cigarettes has helped many people to quit smoking, could a tax on lead make the switch to non-toxics easier?

The lead tax might then fund in part:

- More staff positions within the IDNR and/or Department of Health for lead abatement coordination
- The educational options discussed above – just as the cigarette tax has worked to fund the Just Eliminate Lies (JEL) initiative to educate people about the health effects of nicotine/tobacco
- The needed research discussed above
- Long term health care costs

4) Partial bans on lead in ammunition (1/2 a vote)

Private landowners concerned about lead could require the use of non-lead ammunition on their property. The Whiterock Conservancy, Land Trust in Guthrie County, Iowa, already does this, with good results.

All lead in ammunition could be banned, without state legislative action, on County Conservation Board hunting areas that are under citizen board control.

All lead in ammunition could be banned where the majority of eagles congregate in the winter. A simple way to implement this might be to ban all lead in ammunition where it is

already illegal to use lead shot. These are wetland and water areas and National Wildlife Refuges.

The National Park Service will be phasing out the use of all types of lead (all lead in ammunition and fishing tackle) on all of its land by the year 2011 (National Park Service 2009).

5) Work with landfills to educate the public on the proper disposal of lead in ammunition, lead tackle, and game animal processing byproducts (1/2 vote)

Landfills treat lead as a hazardous material and collect it separately from the rest of the waste. Is there a statewide process/protocol for this, followed by all landfills? Live ammunition cannot be taken to a landfill. Some police departments will dispose of live ammunition for people by using it in their practice ranges. More information is needed on the proper disposal of lead topic. The city of Ames does not want deer carcasses put out with people's trash. Where are people to dispose of the processing waste that may contain lead? Throwing it out in the ditch just makes it available to the wildlife we are trying to protect. If hunters are using non-lead ammunition, their processing byproducts would be safe to dispose of outdoors, on private property with the permission of the landowner. This option could be combined with number one, as it would involve researching proper lead disposal avenues and disseminating that information to the public.

6) Ban lead in all ammunition statewide (zero votes)

This was presented as a solution by the Iowa Ornithologists Union, the student, and the general public focus groups. These focus group discussions also favored a lead ban starting at the national (US Fish and Wildlife Service) level. Lead has been banned in gasoline, paint, and solder.

This item raised concerns in that forcing people to use non-toxic ammunition could increase the cost of their hunt and that they may quit hunting, and therefore quit buying hunting licenses. Scheuhammer and Norris (1995) found that, while non-toxic alternatives are slightly more expensive than lead, the non-toxic ammunition costs represented only a 1-2 % increase in the average hunter's yearly expenses. An increase in hunting license fees was requested this year by the Iowa DNR. Would that not also result in fewer hunters? Were waterfowl related jobs lost when non-toxic shot was required for waterfowl hunting? Did waterfowl hunters quit? More info is needed on job loss/hunter loss resulting from non lead ammunition use/legislation.

When looking through the hunters' regulation booklet, there is already a large number of hunting areas where lead shot is banned. Has this caused a drop in usage of these areas for small game hunting? This data might be a way to answer some of the questions above.

At one focus group, a hunter stated that he just didn't want to be told what he could and couldn't do as a reason for being against a lead ban. Again in looking through the hunters' regulations booklet, hunters are already being told what to do on just about every aspect of their hunt; hours, clothing color, number and types of animals harvested, how many shells

they can have in their guns, whether a dog is allowed, etc. All of these rules have been made with the hunters' safety and wildlife management goals in mind. The question was also brought up as to why the banning of lead would cause such a reaction. This may be a minority number of hunters – as the results from a survey done at the Iowa Deer Classic in 2008 shows that 83 % of the 151 hunters surveyed answered “yes” when asked: For wildlife and human health reasons, do you think that lead ammunition should be phased out in favor on non-lead/non-toxic alternatives (Neumann 2009). A more extensive hunter/angler survey should be conducted by an independent entity to determine attitudes toward non-toxic ammunition and fishing tackle, its impact on participation, and percentage of hunters/anglers that have already switched to non-toxics. This information would be essential before any statewide bans should be proposed.

7) Purchasers of lead ammunition are required to sign a waiver that states they have read a hand out provided and understand the potential health impacts of lead (zero votes)

This was proposed by the general public focus group. Ammunition containing lead already has a health warning label on it, similar to the requirement for cigarettes. Would a waiver have prevented the lawsuits the cigarette companies faced and are facing, from manufacturing/selling a product known to cause health problems? Who is liable for the health impacts of lead in ammunition on humans, on wildlife?

Mattel Corporation was sued by 39 states for 12 million dollars for lead in paint in some of its toys. No proof of harm was ever presented. Simply the potential for harm was all that was needed to have the suit be successful (Parker Waichman Alonso LLP 2008).

The Federal Government successfully sued PacifiCorp power company for 10.5 million dollars for failing to implement strategies to prevent the death of federally protected migratory birds (Golden Eagles and other species) (US Fish and Wildlife Service 2009).

8) Take no action (zero votes)

This item received no discussion at the meeting or in any of the focus groups.

Summary

The process of formulating an action plan to prevent further wildlife and human exposure to lead from ammunition and tackle sources has been a valuable exercise. Many stakeholder groups involved with the issue have been brought together to begin a dialogue to find solutions. These contacts will continue after the plan is submitted, as many of the Advisory Committee participants have committed to work on certain action items in the plan.

Education is the main emphasis of the plan, drawing the most positive response and consensus from participants. As listed, there are many avenues to follow within this option. This plan forms the beginning of the road to cooperation among stakeholders, leading to action to safeguard wildlife and human health.

Several Advisory Group Participants committed to take further action within the Educational/Public Relations option:
Bruce Ehresman, IDNR, and staff are working on producing a brochure on the issue.
Molly Tranel, Minnesota DNR, agreed to another trip to Iowa to present her data.
Megan Wisecup, IDNR, agreed that if acceptable materials were provided she would help with distribution to Hunter Safety Instructors.
Rick Robinson, Iowa Farm Bureau, said he would see if the Farm Bureau Spokesman could publish an article on the issue.
Jane Clark, Iowa Audubon and Sierra Club, is working to write a grant through the Sierra Club for some educational materials funding.
Marla Mertz, Marion CCB, is scheduling an event with the local sporting goods retailer.
Laura Zaugg, Dallas CCB, is willing to look into producing a PSA and a pod cast.
John Klein and M&M Divide R C & D will look into grant writing to fund a large conference.
Mary Jo Burkgren, Turn In Poachers, Inc., is looking into grant opportunities to produce materials for the Hunter Safety Classes.

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Appendix 1:

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Final Position Statement

Lead in Ammunition and Fishing Tackle

Lead has been used in ammunition and fishing tackle for centuries. It is an effective and inexpensive element for the manufacture of projectiles and weights. Although it is a naturally occurring element in the environment, lead has no functional or beneficial role in biological systems, and at very low levels of exposure it can be toxic, depending on the species and the health and age of an individual. At toxic levels lead damages the nervous system, causing paralysis and eventual death; at lower levels it is known to cause a variety of sublethal effects such as neurological damage, tissue and organ damage, and reproductive impairment.

Realization of the hazards of lead ammunition to waterfowl and some upland game birds can be traced to the late 1870s, while the hazards of lead fishing sinkers to waterfowl became apparent in the 1970s, when lead was found to poison swans in the United Kingdom (UK). In the 1970s and 1980s, the UK and some jurisdictions within the United States and Canada began placing restrictions on the use of lead ammunition and fishing tackle. Today lead from ammunition and fishing tackle provides a small fraction of total environmental releases, but it exists in a form that can be readily ingested by some species of wildlife.

Metallic lead can remain relatively stable and intact for decades, even centuries. However, under certain environmental conditions (e.g., acidic or basic water or soil) lead from shot or tackle can be readily released and taken up by plants or animals, causing a range of biochemical, physiological, and behavioral effects in some species of invertebrates, fish, amphibians, reptiles, birds, and mammals. Lead that is adsorbed or incorporated into food items through the soil, as well as lead fragments in carcasses or deposited at shooting sites, is known to be consumed by some birds and small mammals, resulting in elevated lead concentrations. Ingestion by reptiles, birds, and mammals of spent ammunition and lost fishing tackle has also been documented and can cause a range of negative effects in individuals, potentially leading to population-level consequences in some species (e.g., waterfowl, eagles, condors, mourning doves, and loons).

From a public health perspective, lead potentially can lead to a variety of human health problems, such as neurological effects and stunted growth, particularly in children. Although the extent is still unclear, recent research indicates that consumption of game taken with lead ammunition may increase blood-lead levels in humans. When lead that is imbedded in game meat becomes exposed to acid in the human stomach, lead may be absorbed into the system. Even if a lead pellet or bullet completely passes through an animal, a small amount of lead may be left in the tissue and may be absorbed by a person consuming the meat.

Lead poisoning related to spent ammunition and lost fishing tackle has been extensively studied in birds, and at least two studies indicate that the ban on the use of lead ammunition for hunting waterfowl and coots in North America has successfully reduced lead exposure in waterfowl. Nonetheless, other species such as upland game birds (e.g., doves and quail) and scavengers (e.g., vultures and eagles) have been documented to be exposed to lead, and the California condor population may be at risk. Despite the prohibition on lead shot for waterfowl hunting, current data for raptors and avian scavengers indicate increases in lead exposure in these species, especially during hunting season. Accordingly, 24 states (as of 2008) have instituted restrictions on the use of lead ammunition to minimize effects to upland game birds, eagles, and other species. The hazard of

ingested lead sinkers and fishing tackle is well-documented in swans and loons, and restrictions on the sale or use of lead weights have been instituted in parts of the UK, Canada, several other countries, and five states in the U.S. (as of 2008) in order to minimize effects on these and other potentially vulnerable species. There are only limited data on the adverse effects of lead ingestion at shooting ranges, and reproductive and mortality rates at these sites have not been adequately investigated.

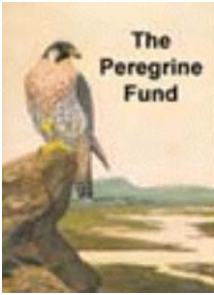
There has been an extensive effort in the development, efficacy testing, and regulation of alternatives to lead-based ammunition for hunting waterfowl and waterbirds. Several effective nontoxic alternatives have been approved and currently are available in North America and elsewhere. Several manufacturers have developed nontoxic ammunition that can be used safely in all gauges of modern shotguns, as well as nontoxic rifle bullets for hunting large game. However, the widespread manufacture of this shotgun and rifle ammunition depends on assured markets provided by regulation and enforcement. Nontoxic shot may be used in all clay target sports and currently is required by some shooting facilities. Dozens of substitutes for lead fishing tackle have entered the marketplace in recent years. A few, but not all, alternative metals in fishing tackle have been deemed safe if ingested by waterfowl and some other birds and mammals.

The policy of The Wildlife Society in regard to lead in ammunition and fishing tackle is to:

1. Recognize that lead has been known for centuries to be a broad-spectrum toxicant to humans and wildlife.
2. Advocate the replacement of lead-based ammunition and fishing tackle with nontoxic products, while recognizing that complete replacement may not be possible in specific circumstances.
3. Recognize that the removal of lead for hunting, fishing, and shooting will require collaboration among affected stakeholders (including wildlife professionals, ammunition and tackle manufacturers, sportsmen, policymakers, and the public). It may require a phased-in approach, and will require explicit and targeted educational strategies at both the national and international levels, thereby acknowledging and supporting the crucial role that hunters and anglers play in wildlife management and conservation.
4. Encourage studies on reducing barriers to the development of nontoxic ammunition and fishing tackle, additional research that generates toxicological and environmental chemistry data, monitoring and modeling of exposure effects, and studies predicting consequences of exposure and long-term population-level effects. The need for additional information, however, should not delay the educational efforts and the phasing-in of nontoxic ammunition and tackle where practicable.
5. Support educational efforts to promote greater public awareness and understanding of the consequences of lead exposure to wildlife populations, and emphasize the potential gains for wildlife and environmental quality from use of nontoxic ammunition and fishing tackle.

Approved by Council July 2009. Expires July 2014.

The Peregrine Fund



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NEWS RELEASE

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Now available online: Proceedings from conference, “Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans”

BOISE, Idaho – Research on the effects and risks of lead exposure from spent bullet fragments and shot is now available online.

The documents are proceedings from the conference, “Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans,” convened May 12-15, 2008, by The Peregrine Fund, Boise State University, Tufts Center for Conservation Medicine, and the US Geological Survey. The conference for the first time brought together professionals in wildlife and human health to share information on the toxic effects of this source of lead contamination.

Conference attendees offered a relatively easy solution: switch to non-lead bullets and shot. Such ammunition is available in most popular calibers and is considered by many hunters to be as good as or better than traditional lead ammunition. Experts said manufacturers will respond to demand, thus solving the problem.

Individual papers may be downloaded at:

http://www.peregrinefund.org/Lead_conference/2008PbConf_Proceedings.htm

An overwhelming weight of evidence presented at the conference shows that:

- Lead is toxic. It sickens and can kill at high levels of exposure, but even near the lowest detectable levels, lead has measurable health effects, including reduced IQ in children and increased risk of death from heart attack and stroke in adults.
- Lead from spent ammunition gets into people who eat game harvested with lead bullets or shot, with clinical effects among subsistence hunters. Effects among recreational hunters have not been adequately studied.
- Lead from spent ammunition gets into a wide variety of wildlife, including doves, swans, eagles, condors, and mammalian scavengers, regularly sickening and killing some.

- Non-lead bullets and shot are available as an alternative to lead for most uses.

The roughly 400 pages of the proceedings consist of more than 60 contributions from scientists and professionals in the fields of wildlife, health, and shooting sports. The conference documented evidence from around the world of:

- Effects of lead poisoning on wildlife that consume lead bullet fragments or lead shot when they forage.
- Lead exposure in people who eat game harvested with lead-based bullets or shot.
- Effects of lead on human health at minute levels that were formerly thought benign and currently are not recognized by many health agencies.
- Lead bullet fragmentation in game meat, extent of contamination of game meat from bullet fragments, and the potential for human exposure to lead from this source.
- Solutions to the problem of lead exposure from bullet fragments in both wildlife and people, with practical examples from Arizona and California where voluntary and legislative measures have been implemented on behalf of the California Condor, and from Germany and Japan on behalf of sea-eagles and human health concerns.
- Exposure to lead from other sources including fishing tackle, paints, and ceramics having significant negative health effects on wildlife and people.

The Peregrine Fund, a conservation group for birds of prey, convened the conference after a decade of research on wild California Condors in the Grand Canyon region of Arizona revealed that lead exposure from spent ammunition is the most important factor impeding the full recovery of the species in the area. The research also suggested that lead from spent ammunition could be a concern to people who eat game harvested with lead bullets or shot shells.

Efforts by the Arizona Game and Fish Department to encourage hunters to voluntarily reduce lead exposure of condors influenced 90% of hunters in the 2008 hunting season to use solid copper bullets as an alternative to lead-based ammunition or remove all remains of their harvest from the landscape. As a result, no condors died from lead poisoning this season.

“If this result can be achieved throughout the condor’s range, our data shows that condors could survive in the wild without the intensive and expensive management needed now to combat lead poisoning,” said Dr. Grainger Hunt, a scientist for The Peregrine Fund and contributor to the conference proceedings.

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