

# LEGISLATIVE HEARING ON S. 659, THE BIPARTISAN SPORTSMEN'S ACT OF 2015

---

## HEARING

BEFORE THE

SUBCOMMITTEE ON FISHERIES,  
WATER AND WILDLIFE

OF THE

COMMITTEE ON  
ENVIRONMENT AND PUBLIC WORKS  
UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

---

MARCH 17, 2015

---

Printed for the use of the Committee on Environment and Public Works



Available via the World Wide Web: <http://www.fdsys.gov>

---

U.S. GOVERNMENT PUBLISHING OFFICE

94-984 PDF

WASHINGTON : 2015

---

For sale by the Superintendent of Documents, U.S. Government Publishing Office  
Internet: [bookstore.gpo.gov](http://bookstore.gpo.gov) Phone: toll free (866) 512-1800; DC area (202) 512-1800  
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED FOURTEENTH CONGRESS  
FIRST SESSION

JAMES M. INHOFE, Oklahoma, *Chairman*

DAVID VITTER, Louisiana	BARBARA BOXER, California
JOHN BARRASSO, Wyoming	THOMAS R. CARPER, Delaware
SHELLEY MOORE CAPITO, West Virginia	BENJAMIN L. CARDIN, Maryland
MIKE CRAPO, Idaho	BERNARD SANDERS, Vermont
JOHN BOOZMAN, Arkansas	SHELDON WHITEHOUSE, Rhode Island
JEFF SESSIONS, Alabama	JEFF MERKLEY, Oregon
ROGER WICKER, Mississippi	KIRSTEN GILLIBRAND, New York
DEB FISCHER, Nebraska	CORY A. BOOKER, New Jersey
MIKE ROUNDS, South Dakota	EDWARD J. MARKEY, Massachusetts
DAN SULLIVAN, Alaska	

RYAN JACKSON, *Majority Staff Director*  
BETTINA POIRIER, *Democratic Staff Director*

---

SUBCOMMITTEE ON FISHERIES, WATER AND WILDLIFE

DAN SULLIVAN, Alaska, *Chairman*

JOHN BASSASSO, Wyoming	SHELDON WHITEHOUSE, Rhode Island
SHELLEY MOORE CAPITO, West Virginia	THOMAS R. CARPER, Delaware
JOHN BOOZMAN, Arkansas	BENJAMIN L. CARDIN, Maryland
JEFF SESSIONS, Alabama	BERNARD SANDERS, Vermont
ROGER WICKER, Mississippi	KIRSTEN GILLIBRAND, New York
DEB FISCHER, Nebraska	CORY A. BOOKER, New Jersey
MIKE ROUNDS, South Dakota	EDWARD J. MARKEY, Massachusetts
JAMES M. INHOFE, Oklahoma ( <i>ex officio</i> )	BARBARA BOXER, California ( <i>ex officio</i> )

# C O N T E N T S

---

	Page
MARCH 17, 2015	
OPENING STATEMENTS	
Sullivan, Hon. Dan , U.S. Senator from the State of Alaska .....	1
Whitehouse, Hon. Sheldon, U.S. Senator from the State of Rhode Island .....	3
WITNESSES	
Crane, Jeff, President, Congressional Sportsmen’s Foundation .....	5
Prepared statement .....	7
Hall, Dale, CEO, Ducks Unlimited .....	18
Prepared statement .....	20
Pacelle, Wayne, President and CEO, The Humane Society of the United States .....	26
Prepared statement .....	28
Responses to additional questions from:	
Senator Booker .....	32
Senator Sullivan .....	39
ADDITIONAL MATERIAL	
Statement of David Sollman, Executive Director, Fur Industries of North America .....	154
Letter from more than 100 national, regional, and local organizations regarding the Bipartisan Sportmen’s Act of 2015 .....	154



# **LEGISLATIVE HEARING ON S. 659, THE BIPARTISAN SPORTSMEN'S ACT OF 2015**

**TUESDAY, MARCH 17, 2015**

U.S. SENATE,  
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,  
SUBCOMMITTEE ON FISHERIES, WATER AND WILDLIFE  
*Washington, DC*

The subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Building, Hon. Dan Sullivan (chairman of the subcommittee) presiding.

Present: Senators Sullivan, Inhofe, Boozman, Fischer, Whitehouse, Booker, Cardin. Also present: Senator Crapo.

## **OPENING STATEMENT OF HON. DAN SULLIVAN, U.S. SENATOR FROM THE STATE OF ALASKA**

Senator SULLIVAN. Good morning and welcome to our hearing on S. 659, the Bipartisan Sportsmen's Act of 2015. I see a number of the members of the audience wearing the green of St. Patrick's Day. I think it is altogether fitting that we are discussing this bill on St. Patrick's Day. I am sure most of you know that St. Patrick was a sportsman, an outdoorsman, chased all the snakes out of Ireland.

[Laughter.]

Senator SULLIVAN. He obviously was outside doing a lot of work with animals.

So it is great that we are starting this important bill on an important day.

This legislation represents years of hard work by the sporting community. I am appreciative of the efforts that have gone into crafting what is a collection of bills that have demonstrated broad bipartisan support over the years, including measures that enjoy the support of the Obama administration.

I am hopeful that in this Congress, we will be able to take these long efforts across the finish line. Because doing so means more opportunities for America's sporting community and importantly, more dollars for wildlife conservation.

Specifically, S. 659 would codify an existing exemption that would exclude the EPA from regulating lead fishing tackle and ammunition, provide the States greater ability to use Pittman Robertson funding for shooting ranges on public lands, allow the Secretary of Interior to issue permits to 41 hunters, including two Alaskans, so that they can import their legally taken polar bear trophies from Canada, ensure farmers are not cited for illegally baiting when hunting birds from their farm fields, allow the posses-

sion of firearms at water resource development projects, reauthorize the North American Wetlands Conservation Act, reauthorize five multi-national species conservation funds and extend Pittman Robertson Wildlife Restoration Act interest payments.

This morning, I know we are going to hear many positive things about the bill. We will also probably hear a few criticisms regarding the polar bear and lead ammunition provisions. Here are the facts, the straightforward facts on those provisions. This legislation simply codifies an existing exemption regarding the regulation of lead tackle and ammunition, and in no way restricts the ability of fish and wildlife agencies, both at the State and Federal levels, from restricting their usage if there is compelling scientific reason to do so.

Further, there are those who may be opposed to amending the Marine Mammal Protection Act to allow for the importation of 41 polar bear trophies from Canada and refer to the language as a loophole. But the intent of Section 4 couldn't be clearer: to allow only those hunters with a legally taken polar bear trophy prior to the 2008 ESA listing to bring those trophies into the U.S. This section reflects drafting changes requested by the Fish and Wildlife Service and has the support of the Obama administration.

I hope we won't let these few differences detract from the bipartisan nature of this legislation, which represents the furtherance of the American system of conservation funding, which has funded fish and wildlife conservation for the past 76 years. Hunting and fishing licenses purchased, along with the excise taxes on the equipment sportsmen buy pay for State fish and wildlife management efforts that benefit both game and non-game species and continue to enhance our Nation's sporting heritage. But there is no denying that the greatest source of conservation funding comes from the sporting community itself.

Finally, this bill includes important conservation reauthorizations, like the North American Wetlands Conservation Act, Multi-national Species Conservation Act, which provide matching grants to organizations, governments and land owners for projects. Both projects leverage non-Federal dollars at a ratio that far exceeds a one to one match.

With our Federal deficit now over \$18 trillion, our Federal debt, it is important that we adequately justify why Congress should continue to appropriate a small but symbolically important amount of taxpayer money to these programs. I hope our witnesses today will help us tell that story.

Thank you again for being here. I look forward to hearing the testimony of our witnesses.

I now recognize Ranking Member Whitehouse for 5 minutes to deliver any opening statement he may have.

[The prepared statement of Senator Sullivan follows:]

STATEMENT OF HON. DAN SULLIVAN, U.S. SENATOR  
FROM THE STATE OF ALASKA

Good morning and thank you for being here to discuss legislation I sponsored, S. 659, the Bipartisan Sportsmen's Act of 2015.

This legislation represents years of hard work by the sporting community, and I am appreciative of the efforts that have gone into crafting what is a collection of

bills that have demonstrated broad-based bipartisan support, including some that enjoy the support of the Obama administration.

I am hopeful that in this Congress, we will be able to take this effort across the finish line, because doing so means more opportunities for America's sporting community and more dollars for wildlife conservation.

Specifically, S. 659, would:

- Codify an existing exemption that would exclude the EPA from regulating lead fishing tackle and ammunition;
- Provide the states greater ability to use Pittman Robertson funding for shooting ranges on public lands;
- Allow the Secretary of the Interior to issue permits to 41 hunters, including two Alaskans, so that they can import their legally taken polar bear trophies from Canada;
- Ensure farmers are not cited for illegal baiting when hunting birds from their farm fields;
- Allow the lawful possession of firearms at water resource development projects;
- Reauthorize the North American Wetlands Conservation Act;
- Reauthorize the five Multinational Species Conservation Funds; and
- Extend Pittman-Robertson Wildlife Restoration Act Interest Payments

This morning, I know we're going to hear criticisms regarding the polar bear and lead ammunition provisions. However, the facts are simple.

This legislation simply codifies an existing exemption regarding the regulation of lead tackle and ammunition, and in no way restricts the ability fish and wildlife agencies, both on the State and Federal level, from restricting their usage if there is compelling scientific reasons to do so.

Further, there are detractors here today who are opposed to allowing for the importation of 41 polar bear trophies from Canada and refer to the language as a "loophole." But, the intent of Section 4 couldn't be clearer—to allow only those 41 hunters with a legally taken polar bear trophy, taken prior to the 2008 ESA listing, to bring those trophies into the U.S. This section reflects drafting changes requested by the Fish and Wildlife Service, and the Administration now supports this portion of the bill.

Those who legally hunted and harvested these polar bears fully complied with all U.S. and Canadian laws in place at the time. In many instances, these hunts were planned for years as savings were set-aside to book a once in a lifetime experience.

Most importantly, I want to stress that the prohibition on bringing these trophies into the U.S. is not providing any conservation value to polar bear populations. In fact, if we allow these trophies to be imported, we can raise much needed funds for conservation activities for the polar bear population.

I hope we won't let these few differences detract from the bipartisan nature of this legislation, which represents the furtherance of the American System of Conservation Funding, which has funded fish and wildlife conservation for the past 76 years. The hunting and fishing licenses purchased by sportsmen, coupled with excise taxes on the equipment sportsmen buy, fund State efforts to manage fish and wildlife that benefit an array of species, and continue to enhance our nation's sporting heritage. There are always going to be those who don't think we should kill animals. But, there is no denying that the greatest source of conservation funding comes from the sporting community themselves.

Finally, this bill includes important conservation reauthorizations like the North American Wetlands Conservation Act and Multinational Species Conservation Funds, which provide matching grants to organizations, governments, and land-owners for projects. Both programs leverage non-Federal dollars at a ratio that far exceeds a 1-1 match. With our Federal deficit now over \$18 trillion, it's important that we adequately justify why Congress should continue to appropriate a small, but symbolically important, amount of taxpayer money to these programs. I hope our witnesses today will help us tell that story.

Thank you again for being here this morning and I look forward to hearing the testimony of our witnesses.

#### **OPENING STATEMENT OF HON. SHELDON WHITEHOUSE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND**

Senator WHITEHOUSE. Thank you, Chairman Sullivan.

I think what I would like to do is ask that my opening statement be entered into the record, without objection, because I want to make a rather different point. This has always been a strongly bi-

partisan bill. There has been a lot of support for it. I voted for it, I think every time it has come up.

I am even OK with the polar bear business, even though I think it is probably the largest amount of congressional intention ever devoted to the smallest issue in the history of Congress. But never mind, if it is important enough to a few polar bear owners to bring them in and all of Congress wants to respond to that, that is, I guess, our business to do.

But what I see over and over again is bills that come to the floor or bills that come to the committee that should be bipartisan, that could be non-controversial that have a stowaway loaded into them that causes partisan problems that are unnecessary. We are dealing right now on the floor with a human trafficking bill which has been jammed up because an abortion-related stowaway provision was stuffed into it at the committee level without notice to the other side.

OK, now we are where we are. This bill has a new section that wasn't in, I don't think I have ever seen it before in the earlier versions of the Sportsmen's Act, which is this Section 6, giving people the right to run around water resources development projects with loaded firearms. Well, this isn't like being out in a park with a firearm. This is dams. This is hydroelectric power houses. This is navigation locks. This is river systems and levees, flood risk management infrastructure. These are things that are within our national security infrastructure.

And at the moment, Army Corps Rangers have responsibility for many of these areas, and they are not trained or equipped to be law enforcement officers. They don't have authority to carry firearms themselves, they can't make arrests, they can't execute search warrants. And now they are going to have to make decisions about whether somebody running around in national security infrastructure with a loaded weapon is doing so as a demonstration of their Second Amendment rights or has a worse intention.

I don't think that makes any sense. You may want that in Alaska, but in places like Rhode Island, that kind of behavior would be intensely alarming and frightening to other people and would be very, very unwelcome. I think this is a completely unnecessary addition to the bill. I would like to support it but I think that the best way to go forward is to let the bill go forward in the way that it has customarily gone forward, with bipartisan support, rather than put a stowaway provision that puts at risk national security infrastructure and puts in peril the folks who have security authority over these areas, and is completely inconsistent with at least the way a lot of Americans live. We simply don't expect to see armed people running around what could very well be national security facilities when they have a security component there. To put enforcement people at the risk of figuring out who is there with a good or bad motive when they are running around with a loaded firearm I think is a mistake.

So I hope that the majority will reconsider putting such a contentious, unnecessary, potentially unsafe provision in this bill, when they enjoy a bill that is already very strongly supported by both sides. It doesn't seem necessary to put that stick in the public's eye.

With that, I will yield to the hearing.



Senator SULLIVAN. Thank you.

I want to welcome our witnesses, Jeff Crane, President of the congressional Sportsmen's Foundation. Mr. Dale Hall, the CEO of Ducks Unlimited, and Mr. Wayne Pacelle, President and CEO of The Humane Society of the United States.

The witnesses have 5 minutes to deliver an oral statement, and a longer written statement, of course, will be included in the record.

I also want to, before we begin with the witnesses, ask unanimous consent that Senator Crapo will be allowed to sit on the dais and participate in this subcommittee hearing. Hearing no objection, so ordered.

Senator WHITEHOUSE. With absolutely no objection.

Senator SULLIVAN. Mr. Crane, sir, you have 5 minutes for your opening statement.

**STATEMENT OF JEFF CRANE, PRESIDENT, CONGRESSIONAL  
SPORTSMEN'S FOUNDATION**

Mr. CRANE. Thank you, Mr. Chairman, Senator Whitehouse, members of the committee. My name is Jeff Crane. I have had the privilege for the past decade of serving as the President of the congressional Sportsmen's Foundation. Established in 1989, CSF works with the largest, most active bipartisan caucus on Capitol Hill, the congressional Sportsmen's Caucus. With nearly 300 members in the House and the Senate, a number of you are here today, our past chairman in the caucus, Senator Crapo, is with us here today, I think that we work in the most bipartisan manner possible here in Washington.

I am here in support of S. 405, which is the expanded Bipartisan Sportsmen's Act that includes provisions contained in S. 659, which we also support.

I would like to point out, as you did, that this bill, S. 405, has 18 bipartisan co-sponsors, evenly divided between Republicans and Democrats, which again is a rarity these days in this town. A very similar bill had 46 bipartisan co-sponsors in the Senate last year, but failed to pass. So in borrowing some of my lexicon from the sportsman's world, where patience and persistence yields to success in the field, I am hoping this will be our year.

As you pointed out, Mr. Chairman, the Obama administration specifically supported three of the provisions that are in S. 659. In their Statement of the Administration Position dated February 3d, 2014, it stated "The Administration supports Title 2, which is Section 3 of S. 659, which amends funding requirements under the current law for target range construction and maintenance, thus reducing the financial burden on State and local governments for public target ranges."

Continuing on, "The Administration also supports Title 4, which is Section 4 of S. 659, which allows the importation of certain polar bear trophies taken in sport hunts in Canada." Finally, the Administration staff says "The Administration has no objection to Title 1, which is Section 2 of S. 659, which includes certain sport fishing equipment, from the classification of toxic substances."

With all of this broad support, Mr. Chairman, I believe is time to pass the Bipartisan Sportsmen's Act of 2015. As a life-long con-

servant and outdoorsman, I learned to hunt and fish from my father and grandfather, and I am passing these traditions on to my three daughters. In my home, we eat doves, deer, waterfowl, wild turkey and small game taken from the iconic eastern shore of Maryland. In the summer time, we catch crabs and fish for rockfish, which the rest of you might know as striped bass, from the Chesapeake Bay.

So the pursuit of game and fish is a way of life for me. This bill is very important to me personally. But I think more importantly, it is important to the nearly 40 million Americans who hunt and fish and spend \$90 million in support of this economy, oftentimes in rural parts of this Country.

Conservation started with hunters and anglers. I draw a very great quote from Gifford Pinchot, who was the first chief of the Forest Service, who defined conservation as the wise use of the earth and its resources for the lasting good of mankind. With this comes a responsibility for stewardship. I think again that the sportsmen's community has always taken a leadership role in that.

As part of this, I would like to submit, which is part of my written testimony, a letter from nearly 50 of the leading hunting conservation and fishing conservation groups in America, asking for support and passage of S. 405.

Senator SULLIVAN. Without objection.

Mr. CRANE. Thank you.

SO quite simply, in my final minutes, the overarching purpose behind this bill is to provide clarity where it doesn't exist and ensure access and opportunity for hunters, shooters and anglers. With an ever-increasing population, urbanization and suburban sprawl into areas that we traditionally hunt and fish, it is ever more important. With young people that spend more time on the couch and behind computers, we need to get them outside. Hunting and fishing are great opportunities to do just this.

So where this does exist, we are looking for guarantees that it will continue to exist in the future. Where it doesn't, we are looking for your help to try and rectify that. That is all this bill does today.

I thank you for providing me the opportunity and I will be happy to answer any questions. Thank you.

[The prepared statement of Mr. Crane follows:]

Testimony of

**Jeff Crane**  
**President**  
**Congressional Sportsmen's Foundation**

Before the

**Subcommittee on Fisheries, Water and Wildlife**  
**Committee on Environment & Public Works**  
**United States Senate**

Regarding

*S.659, the Bipartisan Sportsmen's Act of 2015*

**March 17, 2015**

Good morning Chairman Sullivan, Senator Whitehouse and members of the Committee. My name is Jeff Crane, and for the past decade I have served as the President of the Congressional Sportsmen's Foundation (CSF). Established in 1989, CSF works with the bipartisan Congressional Sportsmen's Caucus (CSC), the largest, most active caucus on Capitol Hill. With nearly 300 Members of Congress from both the House and Senate, current Senate CSC Co-Chairs are Senator Jim Risch (R-ID) and Senator Joe Manchin (D-WV), and Vice-Chairs are Senator Deb Fischer (R-NE) and Senator Heidi Heitkamp (D-ND).

Ten years ago, CSF extended the legislative network from Washington, DC to states across the country, establishing the bipartisan National Assembly of Sportsmen's Caucuses, which today is made up of 45 state legislative caucuses, and includes over 2,000 legislators. Five years ago, CSF established a bipartisan Governors Sportsmen's Caucus, which today includes 28 Governors and one Lieutenant Governor. Together, this collective force of bipartisan elected officials work to protect and advance hunting, angling, recreational shooting and trapping for the 37 million sportsmen and women who spend \$90 billion annually on our outdoor pursuits.

As a lifelong conservationist and outdoorsman, who was taught to hunt and fish by my father and grandfather, I am passing this heritage along to my three daughters. From my early days of boy scouting, where I achieved the rank of Eagle Scout, to leading safaris in Southern Africa as a professional hunting guide, my love of nature and respect for the great outdoors defines who I am as a person. When I had the opportunity to join CSF in 2002, and thereby combine this passion with my professional background in the policy arena, I knew I found my life's calling.

In my professional life in the conservation policy arena, I am the only person to sit on both the sport fishing and hunting federal advisory committees (FACA); the Sport Fishing and Boating Partnership Council and the Wildlife and Hunting Heritage Conservation Council, respectively. Originally appointed to these FACA councils during the Bush Administration, I have been subsequently reappointed to each during the Obama Administration. I am a past Chairman of the American Wildlife Conservation Partners, a board member of the Council to Advance Hunting and the Shooting Sports, a panelist on the Blue Ribbon Panel on Sustaining America's Diverse Fish & Wildlife Resources, am involved in numerous national hunting and fishing conservation groups, and am a professional member of the Boone & Crockett Club, the oldest conservation club in America, founded by Theodore Roosevelt in 1887.

Taking a moment to put things into historical perspective, the idea of conservation in America began with members of the sportsmen's community, who introduced game laws and programs to protect natural resources - leading to the creation of state and federal fish and wildlife agencies. Nearly 80 years ago, the hunting community led the charge for the passage of the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act) which redirected excise taxes on firearms and ammunition to a dedicated fund to be used specifically for conservation purposes. Further, revenue from sportsmen's licenses was also permanently linked to conservation, laying the foundation for what is now the uniquely American System of Conservation Funding, a "user pays - public benefits" program that is the financial backbone of the most successful conservation model in the world. Through time, this System has expanded and now includes the fishing and boating communities - with the passage of the Federal Aid in Sportfish Restoration Act (also known as the Dingell-Johnson Act, and the subsequent Wallop-Breaux Amendment) as well as the archery

community. The funds collected through these programs, totaling over \$16 billion, plus millions of dollars annually in license and permit fees, are the lifeblood of state fish and wildlife agencies – the primary managers of our nation’s fish and wildlife resources. These critical conservation dollars fund a variety of efforts including: enhanced fish and wildlife habitat and populations, recreational access to public and private lands, shooting ranges and boat access facilities, wetlands protection and its associated water filtration and flood retention functions, and improved soil and water conservation - all which benefit the American public.

Conservation is critically important to hunters, anglers, boaters, and shooters alike. The term ‘conservation,’ as understood by the sportsmen’s community, can be traced back to Gifford Pinchot of the U.S. Forest Service. Pinchot defined conservation as the “wise use of the Earth and its resources for the lasting good of [mankind].” The idea of “the lasting good,” is that with the use of a resource comes the responsibility of careful resource management. America’s sportsmen and women are the original conservationists, who exemplify the laudable definition of conservation advanced by Pinchot, and remain dedicated to the stewardship of our natural resources. As part of my statement, I would like to include a February 26, 2015 letter from virtually every national hunting and fishing conservation organization supporting S. 405, the expanded Bipartisan Sportsmen’s Act, containing provisions that fall under both the jurisdiction of the Energy and Natural Resources Committee and this Committee.

The title, “Bipartisan Sportsmen’s Act,” is in itself indicative of the fact that conservation, hunting, recreational fishing and shooting, and our outdoor traditions are not defined by or constrained to any partisan label. We are sportsmen and women because we love and care for America’s great outdoors, regardless of political affiliation, race, religion, gender, or socio-economic standing. In a city all too often characterized by partisan rancor, S. 405 already has 18 cosponsors, equally divided between Republicans and Democrats. In the 113th Congress, a nearly identical Senate bill had 46 bipartisan cosponsors. In the House of Representatives, similar sportsmen’s packages were passed with strong bipartisan support in both the 112th and 113th Congresses.

The Obama Administration in its Statement of Administration Policy regarding the aforementioned House sportsmen’s act (H.R. 3590), dated February 3, 2014, was also in favor of three of the provisions contained in S. 659. “The Administration supports [Title II – Sec. 3 of S. 659], which amends funding requirements under current law for target range construction and maintenance, thus reducing the financial burden on State and local governments for public target ranges. The Administration also supports [Title IV – Sec. 4 of S. 659], which allows the importation of certain polar bear trophies taken in sport hunts in Canada. ....The Administration has no objection to [Title I – Sec. 2 of S. 659], which excludes certain sport fishing equipment from the classification of toxic substances.”

With all of this support, it is now time to pass the Bipartisan Sportsmen’s Act of 2015.

The overarching purpose behind S. 405 is quite simply to ensure access and opportunity for hunters, shooters and anglers. According to polling, the number one reason that we lose hunters and anglers is, ‘not enough access to quality places to hunt or fish.’ With an ever increasing population and urban/suburban sprawl, it is imperative that access and opportunity are protected and even enhanced for future generations. In an effort to get our younger generations off the couch

and out from behind the computer, recreational access to our national treasures of public lands and waters is imperative. Where this access does currently exist, let's guarantee it and provide certainty that it will always be there. Where it doesn't, let's ask why, and if reasonable and feasible, let's look at solutions to make it more accessible. After all, these are public assets owned by the American people that were established for multiple use, including low impact recreational uses like hunting and fishing.

It is also worth noting that unlike some other outdoor recreational activities, hunting and shooting, in particular, are under constant siege by well-funded, politically and legally active, extremists groups that are intent on using whatever means to put an end to the traditions we cherish. Through the use of frivolous lawsuits and judicial action, the anti-use and animal rights extremists are using the courts instead of relying on science-based wildlife management to achieve their intolerant anti-hunting/fishing agenda. Legal challenges to the application of the statutory and administrative policies that guide federal land management and conservation are effectively tying the hands of the public land managers and state wildlife officials, which in turn, degrade habitat quality and deny access and opportunity.

The provisions in this legislation attempt to address many of these issues and should provide certainty that our sportsmen's heritage will be protected into the future. CSF supports both the comprehensive Bipartisan Sportsmen's Act, S. 405 and the legislation before this Committee today, and would like to draw particular attention to the following provisions in S. 659:

**Sec. 2 – Modification of Definition of Sport Fishing Equipment Under the Toxic Substance Control Act**

Section 2 amounts to little more than two technical corrections to the U.S Code that are of vital importance to protect the firearms, ammunition and sport fishing tackle industries and the conservation programs they fund. Section 2 would amend the Toxic Substance Control Act (TSCA) to clarify that an existing exemption to TSCA's jurisdiction, for products subject to Pittman-Robertson excise taxes, applies not only to assembled cartridges but also to their component parts, while also creating a similar exemption for articles of fishing tackle subject to Wallop-Breaux excise taxes.

Anti-hunting and fishing interests are currently litigating against the Environmental Protection Agency (EPA) to force the Agency to expand its TSCA authority in order to regulate traditional ammunition and recreational fishing tackle. These organizations assert that this is necessary to address significant impacts to wildlife populations that are resulting nationwide from the use of traditional tackle and ammunition. These exaggerations are little more than misleading scare tactics with no credible supporting science.

Moreover, EPA's exercise of TSCA authority over ammunition and tackle would likely result in massive increases in the price of ammunition and tackle for sportsmen due to the exponentially higher raw materials and manufacturing costs of using alternative metals. Not only would this result in the loss of hunters, recreational shooters and anglers, it would also have untold detrimental impacts on countless manufacturing facilities resulting in the loss of thousands of jobs.

In addition, organizations involved in this anti-hunting and fishing campaign fail to acknowledge that these detrimental economic impacts to the ammunition and tackle industries would result in considerable reductions to the excise taxes the firearms, ammunition and sport fishing tackle industries pay on their products as a means of funding habitat conservation throughout the country. In fact, much of our country's wildlife and habitat exist solely as the result of these contributions.

Section 2 would amend TSCA in a manner that serves to protect and enhance our hunting, recreational shooting and fishing heritage while concurrently facilitating the important benefits that the hunting, shooting and recreational fishing industries contribute to the betterment of our nation's economy and treasured natural resources. Finally, it is important to note that the importance of enacting this legislation will remain regardless of the outcome of litigation recently decided, currently pending or upcoming absent a ruling by the U.S Supreme Court which clearly precludes the EPA from extending its TSCA jurisdiction over traditional ammunition and tackle.

### **Sec. 3 - Target Practice and Marksmanship**

Section 3 would allow states to use the excise taxes already collected on sporting equipment and ammunition to develop and maintain much-needed public shooting ranges while also resulting in increased wildlife conservation funding. Hunters, recreational shooters and firearms, archery, and ammunition manufacturers are the largest financial supporters of wildlife conservation throughout the United States having contributed more than \$7 billion to habitat conservation, recreational shooting and wildlife management through Pittman-Robertson excise tax payments since the program's inception. A significant portion of this amount is directly attributable to recreational shooters who, per-capita, spend even more than hunters on firearms and ammunition subject to these important excise taxes.

Despite the unqualified success of this historic "user pays – public benefits" system, Pittman-Robertson funds have not always been administered in a manner that encourages the creation of recreational shooting opportunities. As a result, opportunities for both recreational and competitive shooting have declined significantly in recent years. Section 3 would help address this loss of access and opportunity by providing states with more flexibility in their use of Pittman-Robertson funds to develop and improve public shooting ranges.

Specifically, it would amend an existing requirement that Pittman-Robertson funding used for shooting ranges be obligated within two years by allowing the funds to accrue over five years. This extension would allow individual projects to be funded over multiple budget cycles and significantly enhance the ability of states to build and maintain shooting ranges. In addition, the legislation would limit the unnecessary exposure to liability that land management agencies may face when providing recreational shooting opportunities on public lands.

Finally, Section 3 would reduce existing local and state Pittman-Robertson matching requirements for shooting ranges from 25% to 10%. Pittman-Robertson funds are allocated to states on a formula basis. Therefore, while this change would provide additional flexibility and capability to states, the reimbursement rate would not result in increased federal spending.

### **Sec. 4 – Permits for the Importation of Polar Bear Trophies Taken in Sport Hunts in Canada**

This section is about allowing a small number of hunters to import their legally harvested polar bears from Canada. Each harvested their polar bear before the U.S. Fish and Wildlife Service

(FWS) prohibited the importation of polar bear parts into the United States on May 15, 2008. Canada is home to over 50% of the world's polar bears, numbering more than 16,000. Based on scientifically-established and sustainable quotas, unrelated to international trade, only about 600 bears are harvested annually in Canada. Canada has extensive monitoring and conservation programs that protect the species, including through sustainable use by Inuit communities. Canada's First Nations coexist with polar bears, harvest the bears for subsistence purposes, and value the bear's conservation even more because of limited sport hunting by non-Inuits that brings much needed cash to the remote communities. This sustainable use has given them intimate knowledge of polar bear population dynamics and ecological needs. According to the scientific evidence, confirmed by local members of the communities, the polar bear has enjoyed a significant increase in its overall population over the past 40 years, not a decline as portrayed by some.

The key points in support of Section 4 are:

- 1) Polar bears harvested in Canada are taken under a legal and scientific framework established by governments in Canada. Based on scientific knowledge, including Inuit's traditional ecological knowledge, Canada sets quotas for polar bear harvests that are sustainable.
- 2) Prior to May 15, 2008, the date the FWS listed the polar bear as threatened worldwide and imposed an import ban, US hunters could import polar bear trophies from six populations in Canada approved by the FWS as having a sustainable and well-managed conservation and hunting program. All imports would be from these approved populations.
- 3) By bringing much needed cash to these remote communities (U.S. hunters generally spent between \$30,000-50,000 per hunt), U.S. hunters help encourage the local indigenous communities to support science-based polar bear management efforts in Canada.
- 4) The U.S. sport hunters did not increase polar bear mortality from hunting. These hunters used one of the "tags" assigned to local indigenous communities based on the scientifically-determined quotas (about 15% of the total allotted per year are assigned to sport hunters). If the U.S. hunters did not use these tags, the local community would have used them for subsistence hunting.
- 5) Under U.S. law, import permits provide important conservation program funding of \$1000 per permit, paid by the importer. In the 12 years prior to the 2008 import ban, the U.S. Fish and Wildlife Service collected almost \$1 million dollars under this program for polar bear research in Alaska and Russia. The permits authorized by Section 4 would add over \$40,000 to these research efforts.

This section is not about whether the United States should allow the importation of polar bears hunted in the future. Instead, the bill will move polar bear trophies out of cold storage in Canada into the homes of U.S. citizens who undertook this once-in-a-lifetime hunt.

In addition, passage of this bill will generate over \$40,000 for polar bear research, further supporting the extensive efforts to conserve and manage the polar bear. Multinational agencies and committed governments are already dedicating significant resources to manage the polar bear and to ensure its long-term sustainability. These efforts have resulted in positive impacts to the polar



bear, including rebounding from possible population numbers as low as 5,000 bears 30-40 years ago to today's population of 20,000-25,000.

**Sec. 6 - Protecting the Right of Individuals to Bear Arms at Water Resources Development Projects**

Section 6 would remove unnecessary federal regulations that prohibit U.S. citizens from possessing or transporting firearms on or across lands administered by the U.S Army Corp of Engineers ("USACE"). The USACE administers 404 lakes and river projects in 43 states, with approximately 12 million acres under its control. Allowing law abiding citizens to possess and transport firearms for self-defense or sporting purposes on and across these lands is common sense and sound policy.

Section 327.13 of title 36, Code of Federal Regulations, provides that possession of loaded firearms, ammunition, loaded projectile firing devices, bows and arrows, crossbows, or other weapons is prohibited at water resources development projects administered by the USACE. The regulations provide exceptions for law enforcement officers, unloaded firearms being transported for sporting purposes and firearms possessed with the written permission of the District Commander.

Section 6 would remove these unnecessary restrictions by preventing the promulgation of regulations that prohibit the possession of firearms in areas open to the public at water resources development projects provided that the possession complies with the law of the State in which the water resources development project is located and that the individuals in possession are not otherwise prohibited by law from possessing or transporting the firearms.

In 2009, Congress enacted legislation which allowed for individuals meeting the criteria set forth in Section 6 to possess and transport firearms in and across National Park Service lands. To my knowledge, in the more than half a decade since enactment of that legislation, there have not been increases in firearm related crimes, poaching, or any other detrimental impacts to land management agency employees or Park visitors. If there has been any impact, I would venture that it has likely been a reduction of confusion and inconvenience for law abiding citizens and an extension of common sense state laws which promote self-defense and the lawful transportation of firearms.

**Sec. 8 – Multinational Species Conservation Funds Reauthorization**

The Multinational Species Conservation Funds (MSCF) are modest federal programs administered by the FWS that make targeted investments in conservation of several global priority species. The first Fund, for African elephants, was authorized by Congress in 1989 to address rampant ivory poaching. Since that time, four more Funds have been authorized to help protect Asian elephants, great apes, marine turtles, tigers and rhinos. Since 1989, these programs have awarded over 2,300 grants, targeting key regions to ensure the protection of some of the world's most endangered and treasured animals.

The five MSCF programs have played a critical role in saving wild populations of these species by controlling poaching, reducing human-wildlife conflict, and protecting essential habitat. They have consistently enjoyed strong bipartisan support in Congress, which has funded the MSCF through the Interior, Environment and Related Agencies Appropriations since 1990. Section 8 merely reauthorizes the MSCF through 2020.

**Summary**

In summary, this is common sense legislation with strong bipartisan support that is good for conservation and preserves our outdoor heritage. It is also good for the American economy, especially for rural communities that surround our treasure of public lands and waters. With an ever increasing population, perhaps most importantly, it provides clarity and certainty that access to our federal lands and waters will remain available for hunting, recreational shooting and fishing, and other outdoor recreational pursuits for generations to come.

We thank the sponsors of this important bill for their leadership, and pledge to work with them to get the Bipartisan Sportsmen's Act of 2015 passed by the US Senate and enacted into public law. Thank you.

American Fly Fishing Trade Association \* American Sportfishing Association \* Archery Trade Association \* Association of Fish and Wildlife Agencies \* B.A.S.S. \* Bear Trust International Berkley Conservation Institute \* Boone and Crockett Club \* Bowhunting Preservation Alliance Camp Fire Club of America \* Catch-A-Dream Foundation \* Coastal Conservation Association Congressional Sportsmen's Foundation \* Council to Advance Hunting and the Shooting Sports Dallas Safari Club \* Delta Waterfowl Foundation \* Ducks Unlimited \* Houston Safari Club International Game Fish Association \* Izaak Walton League of America \* Masters of Foxhounds Association \* Mule Deer Foundation \* National Marine Manufacturers Association \* National Shooting Sports Foundation \* National Trappers Association \* National Wild Turkey Federation North American Bear Foundation \* North American Grouse Partnership \* Orion – The Hunter's Institute \* Pheasants Forever \* Pope and Young Club \* Quail Forever \* Quality Deer Management Association \* Rocky Mountain Elk Foundation \* Ruffed Grouse Society \* Safari Club International \* Texas Wildlife Association \* Theodore Roosevelt Conservation Partnership Tread Lightly! \* Trout Unlimited \* U.S. Sportsmen's Alliance \* Wild Sheep Foundation Wildlife Forever \* Wildlife Management Institute Wildlife Mississippi

February 26, 2015

Dear Senator:

On behalf of our organizations, which represent millions of hunters, anglers and wildlife enthusiasts, we are writing to express our strong support for the *Bipartisan Sportsmen's Act of 2015* (S.405) and to seek your formal support for this historic legislation.

Recently introduced by Congressional Sportsmen's Caucus (CSC) members Senators Lisa Murkowski and Martin Heinrich along with CSC Co-Chairs Senators Jim Risch and Joe Manchin III and Vice Chairs Deb Fischer and Heidi Heitkamp, S.405 is a bipartisan package of pro-sportsmen's legislation that will expand, enhance and protect America's hunting, fishing and conservation heritage.

In order to avoid the timing challenges that stalled passage of the widely supported *Bipartisan Sportsmen's Act* last year, we are urging the Senate to pass S.405 in the first half of the 114<sup>th</sup> Congress. A strong demonstration of the far-reaching, bipartisan support for this legislation will be helpful to expeditiously securing committee and floor consideration of S.405 in a manner consistent with this timeline.

To that end, we respectfully request that you join the growing coalition of Senators, already bound by a shared commitment to enacting this historic legislation, by cosponsoring the *Bipartisan Sportsmen's Act of 2015*. To be added as a cosponsor of S. 405, please contact Chris Kearney in Senator Murkowski's Office at: [christopher\\_ Kearney@energy.senate.gov](mailto:christopher_ Kearney@energy.senate.gov) or Maya Hermann in Senator Heinrich's office at: [Maya\\_Hermann@heinrich.senate.gov](mailto:Maya_Hermann@heinrich.senate.gov).

Thank you for your consideration of this request and for your service on behalf of America's hunting, angling, shooting and conservation community.

Sincerely:

American Fly Fishing Trade Association  
 American Sportfishing Association  
 Archery Trade Association  
 Association of Fish and Wildlife Agencies  
 B.A.S.S.  
 Bear Trust International Berkley  
 Conservation Institute Boone and  
 Crockett Club Bowhunting  
 Preservation Alliance Camp Fire  
 Club of America  
 Catch-A-Dream Foundation Coastal  
 Conservation Association  
 Congressional Sportsmen's Foundation  
 Council to Advance Hunting and the  
 Shooting Sports  
 Dallas Safari Club  
 Delta Waterfowl Foundation  
 Ducks Unlimited  
 Houston Safari Club  
 International Game Fish Association  
 Izaak Walton League of America  
 Masters of Foxhounds Association  
 Mule Deer Foundation

National Marine Manufacturers Association  
 National Shooting Sports Foundation  
 National Trappers Association  
 National Wild Turkey Federation  
 North American Bear Foundation  
 North American Grouse Partnership  
 Orion – The Hunter's Institute  
 Pheasants Forever  
 Pope and Young Club  
 Quail Forever  
 Quality Deer Management Association  
 Rocky Mountain Elk Foundation  
 Ruffed Grouse Society  
 Safari Club International Texas  
 Wildlife Association Theodore  
 Roosevelt Conservation  
 Partnership  
 Tread Lightly!  
 Trout Unlimited  
 U.S. Sportsmen's Alliance  
 Wild Sheep Foundation  
 Wildlife Forever  
 Wildlife Management Institute  
 Wildlife Mississippi

**Jeffrey S. Crane**

**President – Congressional Sportsmen’s Foundation (CSF)**

Jeff Crane joined CSF in 2002 and brings over thirty years of experience in on-the-ground natural resource management and policy expertise at the federal, state and international levels. A life-long outdoorsman, Jeff spent five years working in the US Congress and was instrumental in establishing the Maryland legislative sportsmen's caucus prior to joining CSF. In addition he has experience developing wildlife habitat management plans in the United States and South Africa. During his eight years in Africa, Jeff obtained his professional hunter's license and guided hunts for big game animals. Jeff holds a BA in political science from Vanderbilt University and an MBA.

At CSF, Jeff ensures a steadfast and successful relationship between the bipartisan National Assembly of Sportsmen’s Caucuses, the Congressional Sportsmen’s Caucus and the Governors Sportsmen’s Caucus. He develops and manages the organization’s strategic business strategy and policy priorities, and serves as the primary liaison between CSF and leaders within the governmental and non-governmental conservation community. Jeff also supervises all program areas to achieve overall organization goals, including, but not limited to directing and supervising development, administration, fundraising, strategic planning and the day-to-day operations of the organization.

Jeff Crane is the only person to sit on both the Wildlife and Hunting Heritage Conservation Council (WHHCC) and on the Sport Fishing & Boating Partnership Council (SFBPC). Both Councils are appointed by the Secretaries of Interior and Agriculture, and advise these federal agencies on sportsmen's issues vital to the future of fishing and hunting. In addition, Jeff is a member of the American Wildlife Conservation Partners (AWCP) serving as its Chairman in 2005. He is a board member of the Council to Advance Hunting and the Shooting Sports, a panelist on the Blue Ribbon Panel on Sustaining America’s Diverse Fish & Wildlife Resources, is involved in numerous national hunting and fishing conservation groups, and is a professional member of the Boone & Crockett Club, the oldest conservation club in America, founded by Theodore Roosevelt in 1887.

Senator SULLIVAN. Great. Thank you, Mr. Crane, for your outstanding statement.

Mr. Hall, you are recognized now for 5 minutes. Thank you for being here.

**STATEMENT OF DALE HALL, CEO, DUCKS UNLIMITED**

Mr. HALL. Good morning, Mr. Chairman, members of the committee. It is a pleasure to be here with you.

My name is Dale Hall. I am the CEO of Ducks Unlimited. I spent 31 years with the U.S. Fish and Wildlife Service. With the grace of this committee, headed by my good friend, Senator Inhofe, I was able to be the Director of the Fish and Wildlife Service from 2005 to 2009. So it is a pleasure to be back here in front of you.

I appreciate the opportunity to testify in behalf of Ducks Unlimited, fully supporting the Sportsmen's Act, including the reauthorization of the North American Wetlands Conservation Act, known as NAWCA, and the reauthorization of the interest from the Pittman-Robertson to fund NAWCA, as well. As has been stated, Pittman-Robertson was passed in 1937 at the request of hunters and shooters to be taxed so that money would go into the treasury and support the State game and fish agencies in their management of the resources within the State. Interest gained from that fund has been agreed to by all of the States to go into the NAWCA fund to be used as part of the grant program. It has been very successful and we fully support that. We are here also to talk about other provisions, such as the baiting issue and different aspects of this bill that we fully support clarity on.

These programs are all the way government can and should work. The partnership with the public, partnership with our friends out there, these programs represent good governance and we support them.

With more than a million supporters at Ducks Unlimited, we have a significant conservation voice for migratory birds and other habitats that live in wetlands that we helped create across the continent with our friends. Our work is always, I repeat always, scientifically based. We like to say that the motion and passion brings us to do what we do, but science and facts drive our decisions. I believe this bill is based on science and fact, and I think that is the way we ought to be looking at things, and good governance comes from that.

Since enactment, NAWCA has accomplished measurable success in all 50 States. This program has conserved more than 27 and a half million acres across North America. Reauthorization of NAWCA is critical to build on this success and ensure the health of high quality wetlands in the United States.

Despite those successes, wetlands here in the U.S. are disappearing. The lower 48 States of the U.S. have lost approximately 53 percent of our original wetlands. The most recent nationwide study documented that wetland loss had dramatically accelerated to 140 percent since 2004.

Wildlife-related recreation generates, as has been said, nearly \$100 billion a year in economics for this Country. It is more than just the right thing to do; it is the right economic thing to do.

Another part of this is the use of those interest funds to help with NAWCA projects. At a maximum level, they have contributed between \$15 million and \$16 million in a given year to help go out and put wetlands and other habitat on the ground. And as I said earlier, all of the States have agreed that this is a good use for the interest on funds that were originally directed to go to them.

Finally, the migratory game birds baiting issue, as Director of the Fish and Wildlife Service in a past life, one of the things that always concerned me was if a regulation is so confusing that the public doesn't understand it, then we are missing the mark. And the ultimate objective of law enforcement is to have the public voluntarily comply and carry out the law. If they don't understand it, it is going to be very difficult to do.

Today, many landowners have to simply call the game warden and say, will you come by and tell me if we are legal. If it is that hard to understand, then there needs to be clarity. We believe that this last aspect here in helping to understand what normal agricultural practices are, and including the State agencies as well as the Fish and Wildlife Service in that, is simply the right thing to do.

Mr. Chairman, thank you again for allowing us to testify in full support of this bill. We look forward to answering any questions that you may have.

[The prepared statement of Mr. Hall follows:]

**STATEMENT OF DALE HALL, CHIEF EXECUTIVE OFFICER  
DUCKS UNLIMITED, INC.**

**BEFORE THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,  
SUBCOMMITTEE ON FISHERIES, WATER AND WILDLIFE**

**CONCERNING:  
S. 659 THE BIPARTISAN SPORTSMEN'S ACT OF 2015**

**March 17, 2015**

Mr. Chairman, members of the committee, my name is Dale Hall, and I am the chief executive officer for Ducks Unlimited. Before assuming that role in 2010, I worked for the U.S. Fish and Wildlife Service for 31 years, including serving as its director from 2005 to 2009.

I appreciate the opportunity to testify on behalf of Ducks Unlimited regarding the Sportsmen's Act, including reauthorization of the North American Wetlands Conservation Act (NAWCA), reauthorization of the interest from the Pittman-Robertson fund to NAWCA, and many other important provisions. NAWCA has been an important and highly effective program that has protected and conserved migratory bird populations for more than 25 years, and Ducks Unlimited fully supports the passage of these provisions within the bill. These programs are models of how government can and should work.

Ducks Unlimited has been a strong proponent of waterfowl conservation for 78 years. Our mission is to conserve, restore, and manage wetlands and associated habitats for North America's waterfowl, and for the benefits these resources provide to other wildlife and the people who enjoy and value them. We work in Canada, Mexico, and every state in the U.S. Since 1937 Ducks Unlimited has conserved more than 13.4 million acres of habitat important to waterfowl and other wildlife.

With more than 1 million supporters, Ducks Unlimited represents a significant conservation voice for birds and the landscapes that support them. Our work is science-based. We use reliable information from the disciplines of wetland ecology, waterfowl biology, hydrology, civil engineering, and landscape ecology to develop, implement, and adapt waterfowl-conservation actions. We collaborate with agencies, organizations, farmers, and ranchers in the most important landscapes used throughout migratory birds' lifecycles, including breeding, migration, and wintering habitats. These partnerships are essential for conservation, and we support legislation and policy that advances these efforts.

**To Reauthorize the North American Wetlands Conservation Act**

Ducks Unlimited is pleased to testify before the U.S. Senate Committee on Environment and Public Works Subcommittee on Water and Wildlife on the fifth reauthorization of NAWCA. Since enactment, NAWCA has played an invaluable role in North American wetlands conservation by stimulating local partnerships aimed at habitat conservation for wetland-



dependent species and the many people who enjoy them. NAWCA continues to be a popular and productive program for all the partners. We commend Congress for its foresight in creating NAWCA in 1989, and for repeatedly ensuring its long-term success.

Since enactment, NAWCA has accomplished measurable success in all 50 states, as well as Canada and Mexico. The creation of the program more than 25 years ago was a bipartisan effort, and NAWCA has consistently attracted strong support in Congress and from administrations of both parties. This program has conserved more than 27.5 million acres across North America. Reauthorization of NAWCA is critical to build on this success and ensure the health of high-quality wetlands in the United States.

Despite those successes, wetlands in the United States are disappearing. The lower 48 states of the United States have lost approximately 53 percent of their original wetlands. The state of Oklahoma, for example, has lost nearly two-thirds of its original wetlands. And while NAWCA has conserved some wetlands, the most recent nationwide study documented that wetland loss had dramatically accelerated by 140 percent since 2004.

NAWCA catalyzes efforts by resource managers and partners from many sectors to use a variety of strategies to restore and enhance degraded habitat as well as protect some of the remaining high-quality habitat. The habitat conservation completed on both public and private lands improves recreational opportunities and often provides economic benefits for landowners and communities. Wildlife-related recreation generates more than \$100 billion of economic output annually. In many cases, this economic activity is vital to rural communities and the incomes of rural Americans.

The restoration and protection of wetlands and associated habitats made possible by NAWCA has many benefits for both people and wildlife. Scientific studies clearly demonstrate that wetlands act as filters to clean water, and recharge groundwater supplies. Wetlands also trap and hold precipitation and runoff, and act as buffers in coastal regions, lessening the damage from floods and hurricanes. In Alaska, for example, 14 NAWCA projects have been completed or are underway. More than 65,000 acres of wetland and upland habitat has been conserved using these dollars, of which \$4.7 million came from the government while partners contributed \$14.5 million.

One successful NAWCA project was completed in Alaska's Goose Bay State Game Refuge in 2010. Approved in 2009 and awarded to The Conservation Fund, this \$75,000 NAWCA grant—which partners matched with an additional \$175,000—protected 286 acres of wetlands and associated uplands within the state refuge for an array of wildlife. The Goose Bay State Game Refuge, located in Upper Cook Inlet, supports a diverse coastal ecosystem that provides important waterfowl nesting and migration habitats, moose calving areas, spring and fall bear concentration areas, and salmon spawning. Protecting the land helps both humans and wildlife by providing a clean and healthy environment for recreational activities, while also offering important habitat for a critical ecosystem.

In Alaska, nearly 6,000 jobs involving more than \$439 million of retail sales were created in 2011 by more than 125,000 hunters, according to a Congressional Sportsmen's Foundation

report. Anglers created another nearly 10,000 jobs in Alaska, generating \$86 million in state and local taxes.

In Oklahoma, the economic benefits to the state were also significant: 240,000 hunters created more than 12,000 jobs, while 729,000 fishermen generated more than \$821 million in retail sales. Thirteen NAWCA projects have been completed there since the program's inception, and these projects have conserved 26,970 acres of wildlife habitat within the Sooner state. NAWCA funding of \$4.9 million in Oklahoma has stimulated partner contributions of \$11.3 million. An example of the benefits of these projects was the protection of Drummond Flats through a \$700,000 grant awarded to Ducks Unlimited to permanently protect 3,000 acres. The land protected in this Drummond Flats project is vital wintering habitat in the Central Flyway, essential for many migratory bird species travelling from the Prairie Pothole region in Canada to the Gulf Coast region and beyond.

NAWCA's success is not confined only to large states. For example, Rhode Island currently has 11 NAWCA projects completed or underway. These projects have conserved 5,137 acres of wildlife habitat. NAWCA funding of more than \$6.6 million there has leveraged partner contributions of more than \$31.3 million.

These results are not unique, and have been replicated all over the country with the help of more than 5,000 NAWCA partners. More than 2,421 voluntary, habitat conservation projects have been delivered in North America, benefiting wetlands, wildlife, and people. Partners include all 50 state fish and wildlife agencies, hundreds of private landowners, conservation organizations, small businesses, corporations, tribes, and local governments.

In addition to being one of the federal government's most effective conservation programs, NAWCA is a model of fiscal responsibility as it provides an excellent return on a relatively modest federal investment. The law requires every federal dollar put into the program to be matched by at least \$1 of non-federal money however, partner matches actually have more than tripled every \$1 of federal grant money. The partner investment in NAWCA totals more than \$3 billion during the life of the program. In 2014, a total of 116 projects were approved for the United States, Canada, and Mexico: 92 in the United States, 14 in Canada, and 10 in Mexico.

Undeniably, the benefits of NAWCA extend beyond waterfowl. Wetlands provide a home for more than 900 wildlife species at some time during the year. As Congress intended, the criteria for NAWCA projects include waterfowl as well as other wetland-associated migratory birds and threatened and endangered species. Under this guidance, NAWCA projects benefit an array of species, including fish.

NAWCA is vital for cooperative efforts to address landscape-level habitat challenges in key areas for waterfowl and other migratory birds, including inland wetland systems such as the Prairie Pothole Region of the Great Plains and the Lower Mississippi River Valley, as well as iconic coastal communities such as the Chesapeake Bay, Gulf Coast, and Great Lakes.

What began in 1989 as a way to implement the North American Waterfowl Management Plan, the agreement between the United States, Canada, and Mexico on managing waterfowl

populations has developed into a successful program with widespread support and success. NAWCA has stimulated hundreds of conservation partnerships that would not otherwise exist. The result is millions of acres of habitat conserved that benefit wetlands, wildlife, and the public.

NAWCA is the most effective wetland restoration program in the country. We strongly support the legislation, and we urge the Congress to reauthorize the act.

#### **Pittman-Robertson Interest Reauthorization of funding to NAWCA**

As part of permanent funding for NAWCA—that's not subject to annual appropriations—the interest from the investment of Pittman-Robertson Funds (P-R fund) is deposited into the North American Wetland Conservation Fund for use annually through the normal grant-making process. This interest has added millions of dollars a year to the program and is an important addition to the annually appropriated funds. It is critical that this provision of the Pittman-Robertson Wildlife Restoration Act (Pittman-Robertson Act) be reauthorized before it expires in September 2015 (the sunset of the ten-year authorization).

Under the Pittman-Robertson Act, excise taxes collected on certain hunting equipment are deposited into the P-R fund and are available without further appropriation to states. The Pittman-Robertson Act requires that interest earned on balances in that fund finance wetland conservation projects authorized under NAWCA. Because the interest earnings will be spent without further appropriation action, the Congressional Budget Office has historically determined that enacting this legislation would have no net effect on federal spending, and scores as revenue neutral. The amount of funding fluctuates, predicated on the prevailing interest rates of government bonds and sale of guns and ammunition, but it has totaled as much as \$17 million in past years. When matched by the growing list of partners, it represents at least \$34 million in on-the-ground wetlands conservation. Unlike the yearly NAWCA appropriation, the Pittman-Robertson portion of the funding cannot be allocated without a new authorization. Furthermore, in 2013 the Association of State Fish and Wildlife Agencies' directors passed a resolution supporting the continued flow of this interest into the NAWCA account rather than to their states through the apportionment process.

#### **Baiting of Migratory Game Birds**

Ducks Unlimited supports an approach that would, in effect, allow normal agricultural practices to be determined through the concurrence of the state cooperative extension service and the state fish and wildlife agency, then in consultation with the U.S. Department of the Interior. This approach ensures appropriate state-level conversations occur regarding their agricultural practices (based on the crop type and conditions) and also guarantees that U.S. Fish and Wildlife Service perspectives are considered. Ducks Unlimited supports this effort. The process will encourage producers to grow ratoon rice (second crop rice) in the Mississippi Alluvial Valley (MAV) and along the Gulf Coast to improve winter waterfowl foraging habitat. And it should provide clarity to producers, landowners, hunters, and law enforcement officials regarding hunting waterfowl over second-growth rice.

Gulf Coast Joint Venture (GCJV) conservation planning established population-based waterfowl habitat goals that depend upon the presence of rice agriculture—in particular ratoon rice—on the landscape. Within rice-growing areas of coastal Louisiana, GCJV conservation planning assumes that rice agricultural habitat will support 41 percent of its midwinter waterfowl population objective. Across the border in Texas, 63 percent of the total midwinter population objective is assumed to rely on rice agricultural habitats. Stated another way, GCJV plans call for approximately 4.45 million ducks and geese to depend primarily on rice agricultural habitats, of which ratoon (harvested or unharvested) provides the most energy because of the timing of seed production and harvest. Flooded rice fields, in fact, provide an estimated 44 percent of food energy available to wintering waterfowl along the Gulf Coast, with coastal marsh responsible for the remainder.

Hunters, farmers, landowners, and conservation law enforcement all would benefit from increased clarity regarding the definition of normal agricultural practices relative to ratoon rice. Presently, hunters that lease rice fields from producers can pay \$5,000 to \$10,000 per field or blind. As noted previously, in the MAV, ratoon crops are increasingly common, and with the increasing length of growing seasons, ratoon crops are expected to increase in this landscape. If the producer has performed any rolling, disking, mowing, or other treatment of a ratoon rice field, it currently remains unclear whether that field may be legally hunted under existing Migratory Bird Treaty Act (MBTA) language. Hunting leases often are executed in the summer or early fall while ratoon crops may be developing, leading to concerns and questions as to whether even a small area near a blind may be treated to facilitate waterfowl hunting.

Ducks Unlimited and conservation partners recognize that rice agriculture is an essential habitat type along the Gulf Coast and in the MAV to meet population-based habitat objectives. Prior to around 1990, rice in the MAV provided substantial habitat benefits through provision of waste grain to wintering waterfowl. Changes in rice culture post-1990 have made rice fields significantly less valuable (about 71 percent) as foraging habitat for waterfowl in the MAV. Developing ratoon crops, developing rice cultivars that readily ratoon, and accepting ratoon crops as part of producers' annual business plans would be a favorable development for producers and wintering waterfowl. Producers would have an additional source of income via ratoon harvest and premium lease prices for optimal waterfowl habitat. Waterfowl would find about 2.3 to 5.9 times more waste rice in fields with availability timed to their traditional arrival in the MAV in November and December, much like it was in decades past when rice harvest was later in the calendar year.

This language seeks to provide the clarity hunters, farmers, landowners, and conservation law enforcement desire with respect to MBTA baiting regulations. Furthermore, and our rice industry partners agree, this bill provides clarity that ultimately may encourage rice variety development favoring ratoon crop traits. This likely would increase profit margins from both rice production and waterfowl hunting leases, and enable producers to provide premium habitat for waterfowl that otherwise would not be on the landscape.

**Conclusion**

Once again I appreciate the opportunity to testify regarding this important legislation, including the reauthorization of the NAWCA, reauthorization of the interest from the Pittman-Robertson fund to the NAWCA, and the other important provisions I have discussed today. With your continued support of these programs, NAWCA will remain an essential tool to protect and conserve migratory bird populations, and a model of how government can and should work.

I look forward to working with your committee and our partners as the Sportsman's Bill moves forward, and to continue to support the benefits the bill would provide to wildlife and the millions of people who enjoy, or make their livings, in the outdoors.

Mr. Chairman, I again thank you for the opportunity to testify today and I will be pleased to answer any questions you may have.

Senator SULLIVAN. Great. Thank you, Mr. Hall. I couldn't agree more with your statement on the need for clarifying regulations.

Mr. Pacelle, you have 5 minutes for your opening statement. Thank you for being here.

**STATEMENT OF WAYNE PACELLE, PRESIDENT AND CEO, THE HUMANE SOCIETY OF THE UNITED STATES**

Mr. PACELLE. Thank you very much. Thanks for the invitation, I really appreciate it.

I am Wayne Pacelle, with The Humane Society of the United States. I hate to be a skunk at the party here. I do have a few concerns about this issue, and again, I really appreciate your allowing us to offer our perspective.

I want to say at the start that we are not opposed to hunting. We are not seeking to ban deer hunting or duck hunting or other very common forms of hunting. We have been critics of captive hunting. We have been critics of bear baiting, a practice that we think is reckless and unsporting.

So when we bring our concerns here today, we do so because we are zeroing in on particular concerns that are within this bill, not because of a general opposition to hunting.

We are glad, of course, that the lead ammunition provision applies more to EPA and not to Interior. Mr. Chairman, you mentioned that the Feds and the States would still have the authority to restrict that. We think that is appropriate and important.

We are just not quite sure why we are even discussing the EPA piece. We don't think the EPA is working on this issue. It is not moving on the issue. And I guess we are concerned about the precedent being established of the Congress telling a Federal agency that clearly does have some germane experience that it can't take action on an issue if the science compels an examination.

So again, we are critics of the use of lead ammunition. Just like we have seen in society, we don't have lead in gasoline, we don't have lead in paint. The world is moving away from lead ammunition. We are moving to non-toxic forms of shot that essentially don't see bullets and ammunition continuing to kill long after they have left the chamber.

So I say that just as a general concern. I am not quite sure why we are focused here on EPA on this issue.

On the polar bear piece, I know, Senator Crapo, you have been concerned about this. And we are glad this doesn't involve why are polar bears being shot, and then being brought in. These animals are dead. We recognize that. They cannot be brought back to life. If it were just that issue, I don't think I would be here expressing concern. I think again, our concern really relates to the precedent. What happened with the polar bear issue is that the Fish and Wildlife Service gave appropriate notice to the sport hunting community that a listing for polar bears was coming. Many hunting groups told hunters, listen, if you go up and do this and you don't bring the trophies back by a date certain, you are unlikely to get these animals' carcasses and the trophies back into the U.S.

These guys went up there anyway and shot the polar bears. Now we view it as a pleading to Congress to get these trophies back in.

Now, what happens when the Fish and Wildlife Service says, OK, we are going to list the African lion as threatened or endangered and we are going to restrict trophies? Are we going to see a mad runs of people going to kill these rare animals and then coming back to the Congress to override an executive agency decision to grant these import permits? If it were just polar bears and this class of 41 folks, while we don't like what they did, we think it is wrong what they did, we wouldn't be here objecting. I think we are deeply concerned about the precedent.

The larger issue of this bill, I think the biggest practical concern that we have is, you are talking about the Forest Service, principally, and you are talking about the BLM. The Federal Government cedes authority for wildlife management to the States in all of those jurisdictions on hunting seasons and the like. Ninety-nine percent of these lands are already open to hunting. We are not quite sure what is being accomplished by having this open and less closed provision. Except, and when we get a little bit paranoid on this is the issue of traffic.

There has been a lot of concern expressed by humane organizations about inhumane and indiscriminate forms of body-gripping traps, steel jaw leg hold traps, snares and the like. This language, not before your committee today, but the other portion of this larger bill that was before Energy and Natural Resources, essentially equates trapping with these other forms of wildlife taking, hunting and fishing. We think this could be also a very dangerous provision to enable trapping activities in wilderness areas and other areas where there is an appropriate reason for the restriction.

If you have a firearm and you are shooting an animal, you are zeroing on the target. If you leave a trap in the woods, any animal can be victimized by that trap. We have likened them to land mines for wildlife. And there may be very compelling and appropriate reasons to restrict them, what we are doing is we are eliminating the discretion of local land managers with the Federal Government when the history of these particular agencies' involvement in hunting and fishing and trapping issues is to be entirely permissive.

So again, I think our criticisms, just to wrap up, really are zeroing in on, why are we doing these things? The lands are already open to hunting. And for the polar bears, let's not send a signal to the trophy-hunting community that if there is an endangered species listing looming, you guys go ahead and then the Congress can bail you out and you can bring your trophies back into the United States.

Thank you again for giving me the opportunity to testify. Much appreciated.

[The prepared statement of Mr. Pacelle follows:]

Testimony of Wayne Pacelle

President & CEO

The Humane Society of the United States

before the

Senate Committee on Environment and Public Works

Subcommittee on Fisheries, Water, and Wildlife

S. 659: “the Bipartisan Sportsmen’s Act of 2015”

March 17, 2015

On behalf of The Humane Society of the United States, the nation’s largest animal protection organization, I submit this testimony in opposition to S. 659, the Bipartisan Sportsmen’s Act of 2015. I express my thanks to Chairman Dan Sullivan and Ranking Member Sheldon Whitehouse for granting me the opportunity to testify. I speak today not only on behalf of our millions of supporters, but also on behalf of the many animal protection and environmental groups who share our concerns about an innocuous-sounding bill that contains a number of provisions inimical to wildlife protection.

I want to be clear that the Humane Society of the United States is not opposed to hunting. We’ve never pushed legislation to restrict hunting deer, ducks, or small game. We have opposed hunting practices that are at odds with the ethic of true sportsmen, and sought to ban captive hunts, bear baiting, and the use of cruel and indiscriminate traps.

This bill, while cast as a measure for rank-and-file sportsmen, actually contains provisions that would benefit only a very small subset of trophy hunters and trappers. This year’s bill is even more troubling than last year’s version, which stalled in the Senate and did not find its way to the President. Our opposition is grounded on three provisions of S. 659 and three more provisions of S. 405, the larger package of which S. 659 is a part.

First, Section 2 of S. 659 would stop the Environmental Protection Agency from making science-based management decisions on the use of toxic lead ammunition. Lead is a potent neurotoxicant, for which the Centers for Disease Control states there is no safe level of exposure. Pregnant women and children are especially vulnerable to high lead levels that can trigger severe neurological problems, as are hunters who use lead ammunition – and their families and others who eat meat contaminated by lead ammunition.



Lead-based ammunition is the greatest source of lead knowingly discharged into our lands and water. Every year millions of animals – of over 130 different species – are killed by ingesting lead shot, bullet fragments, or prey contaminated with spent lead ammunition. Dove hunting alone is responsible for an estimated 5.2 to 7 million pounds of lead left behind in the environment by hunters.

A nationwide phase-out of lead shot in migratory waterfowl hunting was adopted in 1991 by the Bush Administration after biologists estimated roughly 1.4 million ducks died each year from ingesting spent lead pellets. President Bush was himself a hunter, and one need not be opposed to hunting to judge that lead is dangerous and inappropriate as a form of ammunition. In addition, the National Park Service prohibits the use of lead ammunition by agency staff for the taking of wildlife. Many forms of less-toxic ammunition are readily available at similar cost to lead ammunition, and many hunters use non-lead ammunition for its superior performance, to prevent unnecessary poisoning of wildlife, and to protect themselves and their families from eating contaminated game meat. Making the switch to these non-toxic forms of ammunition for all species will prove as effective and easy as the switch made for waterfowl hunting.

The EPA has so far taken no action to regulate lead at all, so this provision is solely anticipatory, and aimed at preventing the EPA from regulating a known toxic substance should it find in the future that the science supports such regulation. In terms of both policy and process, Section 2 of S. 659 is unwarranted and constitutes an overreaction by its backers.

Second, Section of S. 659 would create a loophole in the Marine Mammal Protection Act to allow a handful of wealthy trophy hunters to import polar bear trophies into the U.S. in defiance of current law. If passed, this will be the fourth major carve-out by Congress since 1994 for Americans who have hunted polar bears in Canada. Although the number of polar bears affected by this loophole will be relatively small, the cumulative impact of these carve-outs has been detrimental to an imperiled species, and it's the sort of Congressional maneuver that suggests special treatment of a few dozen fat cats who didn't obey the law.

These trophy hunters were not caught up in government bureaucracy or red tape. They purposefully rushed to Canada to kill polar bears after the Bush Administration proposed the species for listing as threatened under the ESA, despite repeated warnings from governmental agencies, hunting groups, and the conservation community that the trophies could face a bar on importation and they were hunting at their own risk. Granting their request would reward them for reckless behavior and encourage hunters to race for trophies the moment any species is considered for listing – when such species most need protection – knowing they can rely on Congress to let them import their trophies later.

Third, Section 5 of S. 659 would weaken the Migratory Bird Treaty Act, which has provided vital protections for almost a century, by making it harder for the Fish and Wildlife Service to prosecute poachers who bait migratory game birds. Current Service regulations (50 CFR 20.11) define a “baited area” to include somewhere where someone has laid feed that could lure migratory birds, including for 10 days after the feed has been removed. The Service includes the 10-day provision because “waterfowl will still be attracted to the same area even after the bait is gone.” Section 5 would delete the 10-day provision and create a series of exclusions for crops. The cumulative effect would be to increase harmful baiting of migratory game birds while making it harder for law enforcement to prosecute poachers.

We also have some concerns about Section 6 of the bill, and want to note them for the record. Guns are already allowed on the majority of public lands, but there are specific reasons why they are restricted in a narrow class of water resource areas. Section 6 is another example of a one-size-fits-all policy that would usurp decision making by land and water managers who are balancing many competing interests. The interests of other resource users should not be subordinated to the group selected for special privileges in this bill.

It is important to note that S. 659 is only one part of a larger package. And, although not before this Committee, S. 405 contains three other particularly dangerous provisions. First, Section 105(a)(2)(A) of S. 405 takes a step unprecedented in federal law by including the cruel and archaic practice of trapping animals with body-gripping traps in its definition of “hunting.” Although roughly 96 percent of affected public lands are already open to hunting, trapping is not currently presumptively allowed in all of these areas. Even with the current restrictions, roughly six million animals are killed in traps every year, according to the Association of Fish and Wildlife Agencies. Held in a painful leghold trap, a beaver, a bobcat, or wolf will try desperately to break free in the hours or days until they succumb to dehydration, predators, or death at the hands of trappers. Legislation to ban steel-jawed leghold traps has been a subject of heated debate in this Congress for decades and no one should minimize the importance of this provision in this bill.

Traps are dangerous and indiscriminate, ensnaring not only target animals but threatened and endangered species, and even pets. This bill would dramatically extend trapping by making it almost impossible for federal wildlife managers to close areas to trapping. This February, a Good Samaritan found a dog named Cub limping along a New Mexico road. Cub was missing one back leg with the other leg barely hanging on, and limping on his exposed bones to move forward. He had clearly been caught in a steel-jawed leghold trap, and a smattering of shotgun pellets in his body suggested that the trapper had found him and failed to put him out of his misery. Thankfully, Cub received veterinary care and is now adjusting to disabled life, but most trapped animals are not so lucky.

Second, Section 109 of S. 405 would allow hunters to take their bows and crossbows into national parks, so long as their arrows are in a case. This will make it far harder for the National Park Service to stop poaching with bows and crossbows in national parks, by forcing rangers to actually catch poachers in the act. Poaching is a serious problem in national parks and there have been numerous string operations about the poaching of bears, elk, and other animals. Cross-bows and bows are silent, increasing the degree of difficulty for wardens charged with the task of catching them doing their illegal killing.

Third, Section 105 of S. 405 would upend current public lands laws by creating an “open unless closed” presumption on approximately 630 million acres of federal public lands – including sensitive wilderness areas – with regard to trapping, hunting, fishing and shooting. Most of this land, which includes Bureau of Land Management (BLM) and Forest Service lands, among others, is already open to hunting, fishing, and shooting. Under current law, agencies have the discretion to enforce closures where they determine that these activities are unsafe or inconsistent with the land’s conservation purpose.

But the bill would force the experts at the BLM and Forest Service to go through a cumbersome, and potentially expensive, bureaucratic process if they determine a need to restrict trapping, hunting, fishing, or shooting to protect these areas. In a resource-scarce environment, this could result in sensitive areas left open to damaging activities simply because agencies have neither the staffing nor the funding to undertake the necessary actions to accomplish a closure. Of particular concern, this “open unless closed” policy would apply to the sensitive wilderness areas that Congress in 1964 set as places “where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” Yet this bill would let man remain in these areas, leaving behind traps and even setting up shooting ranges.

The bill would also prioritize trapping, hunting, fishing, and shooting above other uses of public lands – like hiking, bird watching, and canoeing. Far more Americans engage in these non-consumptive outdoor activities than hunt or trap. The Sportsmen’s Act is not a bill for all Americans; it is not even a bill for all hunters. Reasonable Americans should – and do – have reasonable objections to many of its provisions. For all of these reasons, I urge this Committee to address the subjects that I’ve described in this testimony.



**THE HUMANE SOCIETY**  
OF THE UNITED STATES

United States Senate Committee on Environment and Public Works  
March 17, 2015

Hearing entitled, "Bipartisan Sportsmen's Act of 2015"  
Subcommittee on Fisheries, Water, and Wildlife

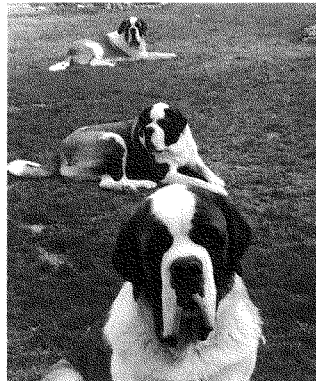
Questions for the Record to Wayne Pacelle, President and CEO, The Humane Society of the United States

**Senator Booker:**

*1) Mr. Pacelle, I am concerned about a provision in the overarching Sportsmen's Act package, S. 405, that could potentially open millions of acres of public lands to trapping. Could you please provide this Committee with information on traps in general, and why your organization opposes this provision?*

Late last fall, a family's Saint Bernard, Brooklyn, went missing near public lands open to hiking outside of Casper, Wyoming. Desperate to find him, the family's children set out on a search mission with their two other Saint Bernards, Jax and Barkley. Less than a mile away from their home, one of the Saint Bernards ran down a hill and suddenly went silent. The children ran after him. One of the children recounted what happened next:

"[The younger child] got a closer look at him and started screaming. 'it's a trap.' And there was a snare trap that was tied around his neck that had suffocated them. My other St. Bernard, 10 feet away, we look at him and he's caught in another trap. And so we both rush over there to try to break the wire free that was tied around his neck, but he was fighting us and was trying to fight to get loose, and the wire just got too tight; and we both, there was nothing we could do.... Later that night, we found Brooklyn, the dog who originally went missing, and we found her in a trap as well."<sup>1</sup>



Jax, Barkley, and Brooklyn – the three Saint Bernards killed by a neck snare last fall. "No animal should have to suffer like that and no person should be forced to helplessly witness it," said the children's aunt. Source: Christina Russo, "'Antiquated' Trapping Laws Can Inflict Torture On Wildlife ... And Family Pets," *The Dodo*, Mar. 25, 2015.

The Wyoming Game and Fish Department ruled out an investigation of this incident, stating that it "did not find anything illegal going on with the trapping activity in this situation," and instead cautioned the public to be more "aware of their surroundings" when on public lands, noting that the Department had no idea where traps are located.<sup>2</sup>

<sup>1</sup> Tom Morton, "Traps Kill Family's Three St. Bernards Near Garden Creek," K2radio.com, Dec. 3, 2014, available at <http://k2radio.com/traps-kill-family-s-three-st-bernards-near-garden-creek/?trackback=tsmclip>

Trappers kill at least six million American “target” animals every year, primarily raccoons, muskrats, coyotes, nutria, beavers, opossum, and foxes.<sup>3</sup> Trappers accidentally kill countless “non-target” animals, including threatened and endangered species<sup>4</sup> and cats and dogs,<sup>5</sup> like Brooklyn, Jax and Barkley. But because trappers are not required to report their “non-target” catches, it is impossible to know how many “non-target” animals traps kill every year.<sup>6</sup>

These archaic devices have been around for almost two centuries. The naturalist Charles Darwin wrote of steel leghold traps during the time of Lincoln’s presidency:

If we attempt to realize the sufferings of a cat, or other animal when caught, we must fancy what it would be to have a limb crushed during a whole long night, between the iron teeth of a trap, and with the agony increased by constant attempts to escape. Few men could endure to watch for five minutes an animal struggling in a trap with a crushed and torn limb ... It is scarcely possible to exaggerate the suffering thus endured from fear, from acute pain, maddened by thirst, and by vain attempts to escape.<sup>7</sup>



Kobe, a 7 year-old husky rescued on December 23, 2014, from a body-gripping trap south of Moose Lake, Minnesota. “It’s unknown how many days Kobe was caught with his face in this trap,” said Friends of Animals Director Cynthia Haglin, “because the current regulations require a trapper to check this type of trap only once every three days.” *Source: Friends of Animals Humane Society, Minnesota.*

Today the leghold traps Darwin described are the most widely used traps in America.<sup>8</sup>

<sup>2</sup> “Snare Traps That Killed 3 St. Bernards Were Completely Legal,” KCWY13, Dec. 4, 2014, *available at* <http://www.kcwy13.com/home/headlines/Snare-Traps-That-Killed-3-St-Bernards-Were-Completely-Legal-284824601.html>.

<sup>3</sup> These numbers are a very low estimate. They rely on self-reporting and in many states exclude predators, whose deaths are not required to be reported at all. *See* Association of Fish and Wildlife Agencies, “National Furbearer Harvest Statistics Database, 2012-13 Harvest Season Data,” *available at* [http://fishwildlife.org/?section=furbearer\\_management\\_resources](http://fishwildlife.org/?section=furbearer_management_resources).

<sup>4</sup> *See, e.g.,* Rob Chaney, “Injured Eagle Shows Risks of Trapping, Missoula Raptor Researcher Says,” *The Missoulian*, Feb. 3, 2015, *available at* [http://missoulian.com/news/local/injured-eagle-shows-risks-of-trapping-missoula-raptor-researcher-says/article\\_a1235f1a-aa7f-5667-a80d-4351160c7007.html](http://missoulian.com/news/local/injured-eagle-shows-risks-of-trapping-missoula-raptor-researcher-says/article_a1235f1a-aa7f-5667-a80d-4351160c7007.html).

<sup>5</sup> *See, e.g.,* John Lauritsen, “Hunter Asks For More Trapping Regulations After Dog Dies in Conibear,” *Minnesota CBS Local*, Dec. 18, 2014, *available at* <http://minnesota.cbslocal.com/2014/12/18/hunter-asks-for-more-trapping-regulations-after-dog-dies-in-conibear/>.

<sup>6</sup> DK Onderka et al, “Injuries to Coyotes and Other Species Caused by Four Models of Footholding Devices,” *Wildlife Society Bulletin* 18:175-182 (1990).

<sup>7</sup> Charles Darwin, “Trapping Agony,” *The Gardeners Chronicle and Agricultural Gazette*, Apr. 1863, *available at* <https://awionline.org/sites/default/files/products/store-trappingagony-101711.pdf>.

<sup>8</sup> Association of Fish and Wildlife Agencies, “Best Management Practices for Trapping Practices in the United States” (2006), *available at* [http://www.fishwildlife.org/files/Introduction\\_BMPs.pdf](http://www.fishwildlife.org/files/Introduction_BMPs.pdf), at 7.

None of the traps routinely used by American trappers meets even the most basic humane standards:

- **Leghold traps** (sometimes called “foothold traps” or “steel-jawed leghold traps”) consist of two steel jaws, sometimes padded, which clamp together on an animal’s foot or leg, wounding but not killing the animal. The European Union and eight U.S. states have completely or partially banned the use of leghold traps on animal welfare grounds.<sup>9</sup> Nature writer and Fund for Animals founder Cleveland Amory described being caught in a leghold trap as like “having your fingers crushed in a car door for 24 to 48 hours.”<sup>10</sup> Even the “Best Management Practices for Trapping Practices in the United States” compiled by the Association of Fish and Wildlife Agencies, allow for up to 30 percent of animals trapped in leghold traps to suffer severe trauma and the remaining 70 percent to suffer mild to moderate trauma.<sup>11</sup> The American Veterinary Medical Association (AVMA) opposes the use of conventional, unmodified steel jawed leghold traps, noting that they “pose a risk of injury to both target and non-target animals ... and intermittent collection of animals caught in leg-hold traps means that fear may sometimes be extended as long as 24-hours.”<sup>12</sup> In fact, this understates the length of suffering endured – some states only require trappers to check leghold traps once every 72 hours.<sup>13</sup>
- **Neck snares** are loops of steel cable designed to catch around the neck of an animal, tightening under the pressure of a mechanical spring or the animal’s thrashing. A 2015 peer-reviewed scientific study concluded that no currently available mechanical or



Cub, the “wonder dog,” who survived getting caught in a leghold trap in New Mexico in February, 2015. “[Veterinarians] think he had been walking on his bones for weeks, since the healing showed it was not a new injury,” Judy Paulsen, from Project Coyote, told The Dodo. “It’s amazing the dog didn’t bleed to death. He must have had such a strong will to live.” *Source: Stephen Messenger, “‘Miracle’ Dog Exposes America’s Shameful Use of Leghold Traps,” The Dodo, Mar. 3, 2015, available at <https://www.thedodo.com/miracle-dog-expose-trap-horror-1022299525.html>.*

<sup>9</sup> G Iossa, CD Soulsbury and S Harris, “Mammal Trapping: A Review of Animal Welfare Standards of Killing and Restraining Traps,” *Animal Welfare* 16: 335 (2007), at 338, 347.

<sup>10</sup> Quoted in Letter to the editor, *The Kingston Daily Freeman*, Nov. 17, 1975.

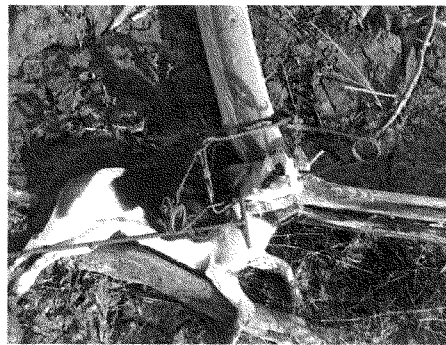
<sup>11</sup> See *Supra* note 9, at 5.

<sup>12</sup> AVMA, Policy Statement on “Trapping and Steel-jawed Leghold Traps,” available at <https://www.avma.org/KB/Policies/Pages/Trapping-and-Steel-jawed-Leghold-Traps.aspx>; AVMA, “Literature Review on the Welfare Implications of Leghold Trap Use in Conservation and Research,” April 30, 2008, available at [https://www.avma.org/KB/Resources/LiteratureReviews/Documents/leghold\\_traps\\_bgnd.pdf](https://www.avma.org/KB/Resources/LiteratureReviews/Documents/leghold_traps_bgnd.pdf).

<sup>13</sup> See, e.g., Wyoming Game and Fish Commission regulations, Chapter 4, Section 9(a), available at [https://wyo.gov/web2011/images/ORDocs/REGULATIONS\\_CH4.pdf](https://wyo.gov/web2011/images/ORDocs/REGULATIONS_CH4.pdf).

manual neck snares meet even the minimal international certification standards, which require most animals to be killed within five minutes.<sup>14</sup> The study cited research showing that, even in ideal laboratory conditions, it took researchers 30 to 40 minutes to kill a red fox with a neck snare.<sup>15</sup> Little data exists on how long animals suffer in neck snares in the wild, but one study found that many animals were still alive over 12 hours after being snared.<sup>16</sup> It also noted that “snared animals can die slowly from their injuries, but also from exposure, exhaustion, dehydration, or starvation” when trappers are not required to routinely check their snares.<sup>17</sup> In Wyoming, where neck snares killed the Saint Bernards Brooklyn, Jax, and Barkley, trappers are only required to check their snares once every seven days.<sup>18</sup>

- **Mechanically Powered Killing Devices**, including body-crushing or rotating-jaw traps (e.g. Conibear™ traps), are designed to kill an animal when two rotating jaws close on each side of the animal’s neck or chest.<sup>19</sup> The number of “non-target” animals killed or injured by body-crushing traps may equal if not exceed the number of target animals captured.<sup>20</sup> The Association of Fish and Wildlife Agencies’ “best practice” calls for these traps to kill only 70 percent of animals within five minutes.<sup>21</sup> During those five minutes, the animal will typically be severely wounded, with open cuts or crushed internal organs. And there is no indication how many trappers follow these “best practices,” which are of course voluntary.



Bella, a 20 month-old beagle, killed by a Conibear trap during a hunting trip on Valentine’s Day 2009, on public land owned by the Army Corps of Engineers near Kanopolis Lake, Kansas. “I had read how to get them off. I’m afraid all my efforts did was prolong the agony of her death,” said Bella’s owner. “I would like to get kill traps off of public hunting land ... Far more hunters and hikers use that area than trappers, and hunters use dogs.”

Source: *Footloose Montana*, available at <http://www.footloosemontana.org/wp-content/uploads/2012/01/Beagle-dies-in-Conibear-KS031309.pdf>.

<sup>14</sup> G Proulx, D Rodtka, MW Barrett, M Cattet, D Dekker, E Moffatt, RA Powell, “Humaneness and Selectivity of Killing Neck Snares Used to Capture Canids in Canada: A Review,” *Canadian Wildlife Biology & Management* 4:1 (2015), at 61.

<sup>15</sup> *Id.* at 57.

<sup>16</sup> *Id.* at 58.

<sup>17</sup> *Id.* at 61.

<sup>18</sup> Wyoming Game and Fish Commission regulations, Chapter 4, Section 9(b), available at [https://wgfd.wyo.gov/web2011/images/ORDocs/REGULATIONS\\_CH4.pdf](https://wgfd.wyo.gov/web2011/images/ORDocs/REGULATIONS_CH4.pdf).

<sup>19</sup> See *supra* note 9, at 6.

<sup>20</sup> BJ Naylor and M Novak, “Catch Efficiency and Selectivity of Various Traps and Sets Used for Capturing American Martens,” *Wildlife Society Bulletin* 22:489-496 (1994).

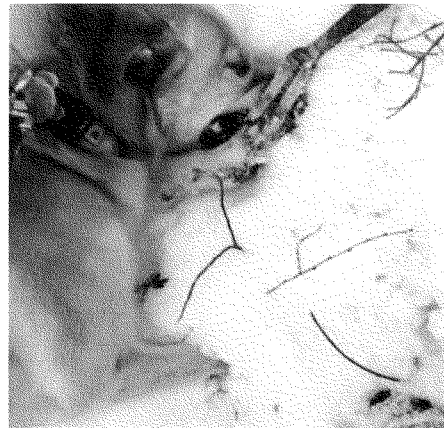
<sup>21</sup> See *supra* note 9, at 6.

- **Submerged Aquatic Traps** are body-crushing traps, cage traps, cable devices, or leghold traps set underwater or on the surface of a lake with a one-way sliding lock to drag the animal under.<sup>22</sup> The Association of Fish and Wildlife Agencies' "best practice" for aquatic traps merely requires "that the equipment must prevent the animal from surfacing once it has submerged."<sup>23</sup> But muskrat and beavers take four and nine minutes respectively to die from drowning-induced hypoxia, even after accounting for their frantic struggling when trapped, which deprives them of oxygen.<sup>24</sup> The AVMA's 2013 Guidelines on Euthanasia states clearly that "Drowning is not a means of euthanasia and is inhumane."<sup>25</sup> Even wildlife managers agree that drowning, although convenient for trappers, does not constitute a humane death.<sup>26</sup>

Section 105(a)(2)(A) of S.405, the "Bipartisan Sportsmen's Act of 2015" would define "trapping" as "hunting." The bill's hunting preference provisions would thus presumptively open most public lands to trapping. But, despite radically increasing the locations in which traps could be used, the bill includes no safeguards to ensure that traps do not inflict horrific pain on humans or animals. The bill also includes no restrictions to protect threatened species, dogs and cats, or children from traps. In its current form the bill will thus cause many more animals to suffer, and create more tragedies, like the deaths of Brooklyn, Jax, and Barkley.

2) *Is it true that many other countries have banned body-gripping traps?*

Yes. More than 80 nations have banned the most commonly used body-gripping trap – the steel-jawed leghold trap – including the United Kingdom, Germany, Norway, Brazil, and Israel.<sup>27</sup> In particular, the Council of the European Communities in



Bella, a Lab-Husky cross caught in a steel-jawed leghold trap while on a walk in November, 2014, in Labrador, Canada. "Seeing Bella stuck in that trap, in excruciating pain, was one of the worst, most helpless feelings of my life," said Peg Pelley. "She's going to be okay now, but this isn't the end of the story. So many other animals, including our two dogs, are still in danger of being caught in traps." *Source: Peg Pelley, via Humane Society International.*

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> See *supra* note 10, at 338.

<sup>25</sup> AVMA, Guidelines for the Euthanasia of Animals: 2013 Edition, at 102 available at <https://www.avma.org/KB/Policies/Documents/euthanasia.pdf>.

<sup>26</sup> JW Ludders, et al., "Drowning is not euthanasia," *Wildlife Society Bulletin* 27:666-670 (1999).

<sup>27</sup> See *supra* note 10, at 335. See also CH Fox, CM Papouchis, *Cull of the Wild: A contemporary analysis of wildlife trapping in the United States* (Sacramento, Ca: The Animal Protection Institute, 2004), at 2; Hansard, Parliament of New South Wales, "Steel-Jawed Leghold Traps" (Sept. 16, 1993), available at <http://www.parliament.nsw.gov.au/prod/parlment/hansart.nsf/V3Key/LC19930916050>.



1991 banned the use of the leghold trap in all Community member nations (today all members of the European Union), and restricted the import of fur from countries using the trap.<sup>28</sup> In banning the trap, the Council noted that “the abolition of the leghold trap will have a positive effect on the conservation status of threatened or endangered species of wild fauna both within and outside the Community.”<sup>29</sup>

In 1997, the EU granted American fur exporters market access after the U.S. represented that the “competent authorities” in all 50 US states had advised that “the use of conventional steel-jawed leghold restraining traps [in all 50 states] is being phased out within six years of the entry into force of the Agreement on Humane Trapping Standards between Canada, the European Community and the Russian Federation.”<sup>30</sup> That Agreement entered into force in July, 2008. Seven years later, steel-jawed leghold traps remain the most commonly used traps in America.

*3) My experience with The Humane Society of the United States has been overwhelmingly positive. In my own state of New Jersey, I have seen The HSUS's disaster team mobilize to provide critical on-the-ground care to animals affected by Hurricane Sandy. And in addition to disaster response, I know the Humane Society works to protect animals across the United States in a wide variety of ways – from promoting humane legislation here on Capitol Hill to working in the trenches with law enforcement on animal fighting raids. But judging by our recent hearing, it's clear to me that not everyone understands the true scope and significance of your organization's efforts. Would you please provide us with additional information on the mission of The Humane Society of the United States and tell us more about its work?*

The Humane Society of the United States and our affiliates provide direct care to more than 100,000 animals each year—more than any other animal welfare organization—through our sanctuaries, veterinary programs, and emergency shelters and rescues. We work to professionalize the field of animal care with our education and training programs.

We confront the largest national and international problems facing animals, which local shelters don't have the reach or the resources to take on, such as animal fighting, puppy mills, horse slaughter and soring, seal killing and other forms of commercial slaughter of marine mammals, captive hunting and the wildlife trade, and inhumane slaughter and factory farming.

While we come to the aid of animals in crisis, we also attack the root causes of problems. Our most important goal is to prevent animals from getting into situations of distress in the first place. We drive transformational change for animals—bringing a wide set of tools to take on the biggest fights, confronting multi-billion dollar industries, and staying the course until we achieve reform. Here are some of the things that The HSUS has accomplished:

<sup>28</sup> Council Regulation (EEC) No 3254/91 of 4 November 1991 prohibiting the use of leghold traps in the Community and the introduction into the Community of pelts and manufactured goods of certain wild animal species originating in countries which catch them by means of leghold traps or trapping methods which do not meet international humane trapping standards, *available at* <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991R3254>.

<sup>29</sup> *Id.*

<sup>30</sup> See Side letter from Donald Kursch, US Charge D'Affaires, Brussels (Dec. 18, 1997), in Official Journal of the European Communities, L 219/35, *available at* [http://ec.europa.eu/environment/biodiversity/animal\\_welfare/hts/pdf/l\\_21919980807en00260037.pdf](http://ec.europa.eu/environment/biodiversity/animal_welfare/hts/pdf/l_21919980807en00260037.pdf).

- **Changing the landscape on animal cruelty.** In the mid-1980s, only four U.S. states had felony penalties for malicious animal cruelty. We methodically went state-by-state to change the status quo, and now all 50 states have felony animal cruelty laws. We've also passed federal laws prohibiting animal crush videos and other forms of animal cruelty.
- **Changing the landscape on animal fighting.** When we began our animal fighting campaign in the 1980s, only a dozen states had felony dogfighting statutes and a half dozen still permitted cockfighting. We lobbied state legislatures, and passed ballot measures against cockfighting in Arizona, Missouri, and Oklahoma, to make cockfighting illegal in every state and dogfighting a felony in every state. We also persuaded the U.S. Congress to upgrade the federal animal fighting statute *four* times in the last 12 years, making it a federal felony to fight animals, possess them for fighting, or to bring a child to an animal fighting spectacle.
- **Ending extreme confinement of farm animals.** In 2008, the vast majority of U.S. veal calves, breeding pigs, and egg-laying hens were kept in crates or cages so small that they couldn't extend their limbs – or sometimes even turn around. We won a ballot measure in California in 2008 to outlaw extreme confinement systems, winning more votes in California than Obama. Ten states now ban some forms of extreme confinement of farm animals. We've worked with more than 60 major food companies – from Costco and Kroger to McDonald's and Subway – to eliminate crate confinement from their pork supply, or cage confinement from their egg supply. And we've recently worked with some of the world's largest food companies – including Compass Group, Nestle, and Starbucks – to implement comprehensive animal welfare sourcing policies.
- **Protecting the oceans for marine animals.** Since The HSUS lobbied for the Marine Mammal Protection Act in 1972, the organization has expanded protections for dolphins, seals, sharks, whales, and other ocean creatures. Our Canadian seal hunt campaign has reduced the number of seal pups slaughtered every year, and recently prompted the European Union to ban the import of seal products. We've worked at the International Whaling Commission to end whaling, and our international affiliate incubated the legal theory that recently led the International Court of Justice to end Japan's Southern Ocean whaling program. We've worked to protect the U.S. dolphin safe tuna program, and to ban the trade in shark fins in nine states, drying up demand for the cruel practice of shark finning.
- **Saving animals from shelter euthanasia.** In 1970, American shelters euthanized about 15 million cats and dogs every year, in large part because most cats and dogs were not spayed and neutered. We ran an aggressive campaign to normalize spay and neuter, promote adoption from shelters, crack down on puppy mills, and help shelters reduce euthanasia numbers. Today, approximately three million adoptable cats and dogs are euthanized in shelters every year, and 87 percent of American cats and dogs are spayed and neutered. Of course, we won't stop until shelters stop euthanizing healthy and adoptable cats and dogs.

We take a mainstream approach and combat the most severe forms of cruelty and abuse. Leaders in the humane movement ranked us the most effective animal organization in the country, in a survey conducted by Guidestar's Philanthropedia. We are approved by the Better Business Bureau's Wise Giving Alliance for all 20 standards for charity accountability, and were named by Worth Magazine as one of the 10 most fiscally responsible charities in America.



#### THE HUMANE SOCIETY OF THE UNITED STATES

*The Humane Society of the United States' logo depicts 19 animals in the shape of the United States, making clear that we work for all animals everywhere.*

HSUS donors expect us to protect all animals – not just to give grants to local shelters – and the results outlined above are the true return on their investment in our work. It is the difference between helping a few million animals in this country, versus helping hundreds of millions or even billions of animals.

#### **Senator Sullivan:**

*1) Are you personally opposed to hunting or do you, as the President of the Humane Society of the United States, an organization whose sole focus is animal welfare, have a different position than the organization you lead?*

The Humane Society of the United States and I are not opposed to hunting. We are opposed to the most inhumane and unfair sport hunting practices, such as the use of body-gripping traps and snares; bear baiting; the hound hunting of bears, bobcats, mountain lions and wolves; contest killing events; and captive-hunting on fenced properties. We oppose live pigeon shoots and other forms of staged hunting where the animals are bred or stocked simply to be shot at as living targets. We also oppose the trophy hunting of rare or endangered populations and the use of lead ammunition, since less toxic alternatives are workable and available in the marketplace.<sup>31</sup> We routinely work with hunters who agree with us that certain practices are inhumane and unacceptable, and we have hunters in leadership positions in our organization, such as on our National Council.

Our critics use a worn-out strategy to divert attention from the issues by recycling a series of old quotes of questionable provenance that I allegedly made while in college and in my first job out of college. These quotes of course are irrelevant to the issue at hand – whether to enact the Sportsmen's Act of 2015. And none represent my view or the view of the HSUS – it is telling that our opponents do not cite a single quote from me, or anyone at the HSUS, opposing hunting during my 20 years with the organization. But the inclusion of these purported quotes (circa 1990), and similarly misleading statements made during the committee hearing, speak to a larger misrepresentation of our mission. I don't know whether this misrepresentation is due to

<sup>31</sup> See HSUS Statement on Wild Animals, available at [http://www.humanesociety.org/about/policy\\_statements/statement\\_wild\\_animals.html](http://www.humanesociety.org/about/policy_statements/statement_wild_animals.html).

disagreements about captive hunting, polar bear trophy hunting, and live pigeon shoots,<sup>32</sup> or due to a simple misapprehension of our mission.

But it is clear that the likely source of these quotes, and the misleading statements made during the committee hearing, is a front group calling itself the Center for Consumer Freedom (CCF). Indeed, the EPW Majority Twitter account has been used in recent weeks to link to a website operated by the CCF, which repeats libelous allegations against our organization.<sup>33</sup> The CCF and its operator, former tobacco lobbyist Rick Berman, have been the subject of repeated exposes by 60 Minutes,<sup>34</sup> The Hill,<sup>35</sup> The New York Times,<sup>36</sup> Bloomberg,<sup>37</sup> and The Boston Globe.<sup>38</sup> Their business model is simple – to tar the reputation of America’s most respected charities and agencies on behalf of special interests who want to silence them. The CCF and Mr. Berman have previously attacked the American Medical Association, Mothers Against Drunk Driving, the Centers for Disease Control and Prevention, and even the National Center on Addiction and Substance Abuse.<sup>39</sup> It’s no mystery why this group is slandering us – we have dared to take on the puppy mill, horse soring, Canadian seal clubbing, trophy hunting and trapping, factory farming, and animal fighting industries. Our concern is that they misled a member of this Committee into repeating their slanderous allegations.

*2) In your testimony you stated that HSUS does not oppose hunting. However, banning all or a vast majority of viable methods of take is the functional equivalent of banning hunting. Please submit for the record a comprehensive list of the methods of take, species and any other kinds of*

<sup>32</sup> Compare “Oklahoma Senator Holds Live Pigeon-Shooting Fundraiser – Video,” *The Guardian*, Sept. 24, 2014, available at <http://www.theguardian.com/world/video/2014/sep/24/senator-inhofe-oklahoma-pigeon-shoot-video> (video depicting event in Oklahoma, in which participants willfully shoot at live subjugated pigeons, killing, maiming, and mutilating them) with 21 Okla. Code §1685 (“Any person who shall willfully ... destroy or kill, or ... maim or mutilate, any animal in subjugation or captivity, whether wild or tame, and whether belonging to himself or to another ... or who shall ... engage in, or in any way further any act of cruelty to any animal, or any act tending to produce such cruelty, shall be guilty of a felony and shall be punished by imprisonment in the State Penitentiary not exceeding five (5) years, or by imprisonment in the county jail not exceeding one (1) year, or by a fine not exceeding Five Hundred Dollars (\$500.00”).

<sup>33</sup> See EPW Majority Twitter Account: “We appreciate @Humane\_Watch bringing attention to the flawed practices of the @HumaneSociety: [tinyurl.com/psyj2du](http://tinyurl.com/psyj2du).” Mar. 26, 2015, available at <https://mobile.twitter.com/EPWRepublicans/status/581195802695041024>.

<sup>34</sup> “Meet Dr. Evil,” CBS 60 Minutes, Sept. 16, 2007, available at <http://www.cbsnews.com/videos/meet-dr-evil/>.

<sup>35</sup> Laura Barron-Lopez, “Oil Industry Advised to Play Dirty with Greens,” *The Hill*, Oct. 31, 2014, available at <http://thehill.com/policy/energy-environment/222421-vet-lobbyist-either-win-ugly-or-lose-pretty-in-fight-with-greens>.

<sup>36</sup> Eric Lipton, “Hard-Nosed Advice From Veteran Lobbyist: ‘Win Ugly or Lose Pretty’; Richard Berman Energy Industry Talk Secretly Taped,” *The New York Times*, Oct. 30, 2014, available at [http://www.nytimes.com/2014/10/31/us/politics/pr-executives-western-energy-alliance-speech-taped.html?\\_r=2](http://www.nytimes.com/2014/10/31/us/politics/pr-executives-western-energy-alliance-speech-taped.html?_r=2).

<sup>37</sup> Mark Dragem and Brian Wingfield, “Union Busting by Profiting From Non-Profit May Breach IRS,” *Bloomberg*, Nov. 2, 2012, available at <http://www.bloomberg.com/news/2012-11-02/union-busting-by-profiting-from-non-profit-may-breach-irs.html>.

<sup>38</sup> Michael Kranish, “Washington’s Robust Market for Attacks, Half-Truths,” *The Boston Globe*, May 19, 2013, available at <http://www.bostonglobe.com/news/politics/2013/05/18/corporations-anonymously-fund-attacks-and-influence-washington-policy-through-nonprofit-groups/qyaJIFcv7yYOQvya6ykAK/story.html>.

<sup>39</sup> William Saletan, “Mad at MADD: Alcohol Merchants Say You Shouldn’t Donate to Mothers Against Drunk Driving. Really?” *Slate*, Aug. 29, 2011, available at [http://www.slate.com/articles/health\\_and\\_science/human\\_nature/2011/08/mad\\_at\\_madd.html](http://www.slate.com/articles/health_and_science/human_nature/2011/08/mad_at_madd.html).

*hunting that HSUS opposes as well as what projected impact it would have on hunting nationally or in a given area if the opposed method is site-specific.*

We oppose the most inhumane and unfair sport hunting practices, such as the use of body-gripping traps and snares; bear baiting; the hound hunting of bears, bobcats, mountain lions and wolves; contest killing events; and captive-hunting on fenced properties. We oppose live pigeon shoots and other forms of staged hunting where the animals are bred or stocked simply to be shot at as living targets. We also oppose the trophy hunting of rare or endangered populations and the use of lead ammunition, since less toxic alternatives are workable and widely available.<sup>40</sup>

The primary impact of ending these practices on hunting nationally would be to not allow the broader enterprise of hunting to be tarred by the most unsporting, inhumane, and publicly unacceptable practices. Traditional rank-and-file hunters reject trophy hunting and trapping practices that cause animals to needlessly suffer, devalue animal life, and deplete rare and endangered populations of animals. For instance, the Boone and Crockett Club's hunting ethics statement provides that the hunter must pursue his prey "in a manner that does not give the hunter an improper advantage over such animals."<sup>41</sup> Live pigeon shoots, hunting with GPS-tracked hounds, bear baiting, captive-hunting, and contest killing events all fail that standard.

Indeed, where states have ended particularly inhumane and unsporting trophy hunting practices, the number of traditional hunters has increased. For example, after Colorado banned the baiting and hounding of bears, the number of bear hunters in the state tripled. Similarly when Oregon and Washington banned the baiting and hounding of bears, Oregon bear tag sales tripled and Washington resident license sales shot up by 343 percent. Traditional hunters do not want to compete against trophy hunters operating at an unfair disadvantage or to take part in an activity tarnished by these extreme and unsporting hunting methods.

Ending the use of steel-jawed leghold traps would also protect hunters' dogs, who are often caught in traps, sometimes fatally. For instance, in Minnesota alone, the Department of Natural Resources says 75 dogs have been caught in traps and snares since 2012, and 17 have died.<sup>42</sup> The Ruffed Grouse Society is supporting increased trapping regulations in Minnesota, with a spokesman for the group explaining that "I've heard from many members who say they quit hunting when the trapping season starts," out of fear for their dogs' safety.<sup>43</sup>

Phasing out the use of toxic lead ammunition would have little effect on hunters, other than helping them to conserve public lands and prevent the toxic poisoning of more than 130 species. A single ingested shotgun pellet or bullet fragment is sufficient to cause brain damage in birds, resulting in inhibition of critical neuromuscular, auditory and visual responses.<sup>44</sup> Studies have

<sup>40</sup> See HSUS Statement on Wild Animals, *available at* [http://www.humanesociety.org/about/policy\\_statements/statement\\_wild\\_animals.html](http://www.humanesociety.org/about/policy_statements/statement_wild_animals.html).

<sup>41</sup> The Boone and Crockett Club, "Fair Chase Statement," *available at* [http://www.boone-crockett.org/huntingEthics/ethics\\_fairchase.asp?area=huntingEthics](http://www.boone-crockett.org/huntingEthics/ethics_fairchase.asp?area=huntingEthics).

<sup>42</sup> Doug Smith, "Ruffed Grouse Society Supports Minnesota Trapping Bill to Reduce Dog Deaths," *Minnesota Star Tribune*, Apr. 2, 2015, *available at* <http://www.startribune.com/sports/blogs/298486391.html>.

<sup>43</sup> *Id.*

<sup>44</sup> MP Dieter and MT Hohman, "δ-Aminolevulinic Acid Dehydratase Enzyme Activity in Blood, Brain, and Liver of Lead-Dosed Ducks," 19 *Environ. Res.* 127–135 (1979).

shown that hunters could easily transition to the widely available and effective non-lead alternatives. A newly released study comparing lead ammunition and non-lead alternatives in a double-blind field test in mourning dove hunting in central Texas concluded that non-lead ammunition performed at least as well as lead ammunition.<sup>45</sup> It also found that “[h]unters were unable to distinguish the ammunition type being used in the field, and we detected no relationship between ammunition type and level of hunter satisfaction.”<sup>46</sup> The U.S. Fish and Wildlife Service prohibited the use of lead ammunition for waterfowl hunting more than 20 years ago, and most hunters look back and say that was the right decision for their sport.

*3) What methods of take, species and any other kinds of hunting does HSUS support?*

The HSUS only opposes the most inhumane and unfair sport hunting practices and the trophy hunting of rare or endangered populations. The HSUS does not oppose fair chase hunting performed humanely and in line with traditional hunting ethics.

*4) Does HSUS believe that wildlife management decisions, such as the setting of hunting seasons and allowable methods of take, are better managed at the ballot box and in state legislatures or wildlife management agencies?*

We support wildlife management that is supported by the best available science and traditional conservation ethics. We work closely with wildlife management agencies all across the country to implement those principles and enforce state wildlife laws. Through our poaching rewards program, we and our affiliates have now offered almost \$500,000 in rewards for the arrest and conviction of poachers in conjunction with state wildlife agencies.<sup>47</sup>

But we also respect the U.S. Constitution and state constitutions, which establish a system of checks and balances, granting the people and their elected representatives the ultimate authority to direct administrative agencies. Of course, these agencies exist to implement the policy decisions made by the citizens and their elected representatives. We thus work to ensure that these agencies respect the wish of the majority of Americans – including the tens of millions of American who hike and watch wildlife but do not hunt or trap – that all wild animals be treated humanely and with dignity. And we resist efforts by trophy hunting and trapping groups to pack agencies with ideological appointees who have no prior background in wildlife management, and to immunize their decisions from legislative oversight. We believe that the people and their representatives should not cede authority over wildlife management decisions to unaccountable agencies – any more than this Committee would cede authority over environmental management decisions to the EPA.

We therefore also oppose efforts by trophy hunting and trapping groups to rewrite state constitutions to strip citizens of their right to have a democratic say on wildlife issues. We were pleased to work with so many Oklahomans in 2002 to defeat a referendum that sought to do this

<sup>45</sup> BL Pierce, TA Roster, MC Frisbie, CD Mason, and JA Roberson Pierce, “A Comparison of Lead and Steel Shot Loads for Harvesting Mourning Doves,” *Wildlife Society Bulletin* 39:1, 103–115 (March 2015).

<sup>46</sup> *Id.* at 103.

<sup>47</sup> See Humane Society Wildlife Land Trust, “Anti-Poaching Rewards Program,” *available at* <http://www.hswlt.org/wildlife-abuse/anti-poaching-rewards-program.html>

very thing. We can only assume that these groups fear the say of citizens on certain extreme hunting and trapping methods – such as the use of steel-jawed leghold traps and live pigeon shoots – because they know that these methods are publicly indefensible.

*5) Your testimony emphasized the human health risks associated with consuming game harvested with traditional ammunition. Please detail, with supporting evidence, all of the documented cases you are aware of where eating game harvested with traditional ammunition has directly caused someone to get lead poisoning.*

Thank you for drawing attention to the human health risks associated with the use of lead ammunition in hunting. In 2013, 30 of the nation's, and the world's, leading environmental health and lead scientists issued an evidence-based consensus statement on the human and wildlife health risks directly caused by lead ammunition. They cited significant scientific evidence finding that:

Lead-based ammunition is a significant source of lead exposure in humans that ingest wild game (Hanning et al., 2003; Levesque et al., 2003; Johansen et al., 2006; Tsuji et al., 2008), and hunters consuming meat shot with lead-based ammunition have been shown to have lead pellets/fragments in their gastrointestinal tract (Carey, 1977; Reddy, 1985).<sup>48</sup>

Based on these findings, these experts – including distinguished scientists at Harvard Medical School, Mount Sinai School of Medicine, Cambridge University, the University of California, and Johns Hopkins University – concluded that:

We, the undersigned, with scientific expertise in lead and environmental health, endorse the overwhelming scientific evidence on the toxic effects of lead on human and wildlife health. In light of this evidence, we support the reduction and eventual elimination of lead released to the environment through the discharge of lead-based ammunition, in order to protect human and environmental health.<sup>49</sup>

I encourage you to read the full consensus statement, which I have attached to my testimony. This consensus statement by the nation's leading scientists echoes the results of numerous scientific studies, which have documented the human health risks associated with consuming meat from animals killed with lead ammunition. These studies concluded, in part:

- *“Lead ammunition or lead fishing sinkers are commonly implicated as the primary exposure source of elevated [blood lead levels] in Alaska,”* according to a 2009 meta-analysis by researchers with the Alaska Department of Health and Social Services, Alaska Native Tribal Health Consortium, and the US Fish and Wildlife Service.<sup>50</sup> The

<sup>48</sup> Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists (2013), available at <http://escholarship.org/uc/item/6dq3h64x>.

<sup>49</sup> *Id.*

<sup>50</sup> LA Verbrugge, SG Wenzel, JE Berner, and AC Matz, “Human Exposure to Lead from Ammunition in the Circumpolar North,” Paper presented at “Ingestion of Lead From Spent Ammunition: Implications For Wildlife And Humans,” in Boise, Idaho (May 12-15, 2008), at 131 (emphasis added).

study also noted that “it is not surprising that people who consume game shot with lead can also have elevated blood lead levels. Numerous studies at both the population and individual levels have implicated and linked lead ammunition to elevated blood lead levels and clinical symptoms in northern peoples.”<sup>51</sup> The study concluded that “use of lead in ammunition comes with risks to humans, especially children, which do not occur with non-lead substitutes,” and recommended “education on the dangers of lead from ammunition to both humans and the environment.”<sup>52</sup>

- “[P]eople risk exposure to lead from bullet fragments when they eat venison from deer killed with standard lead-based rifle bullets and processed under normal procedures. *At risk in the U.S. are some ten million hunters, their families, and low-income beneficiaries of venison donations,*” according to a 2009 study conducted at the Washington Animal Disease Diagnostic Laboratory.<sup>53</sup> In particular, the study found that the levels of lead exposure required to cause human mortality and intellectual impairment “would appear attainable with the repeated consumption of venison possible among deer hunting families, especially those incurring additional exposure from other sources.”<sup>54</sup>
- “[T]he consumption of wild game was significantly associated with an increase in PbB [blood lead levels]” in a 2008 study by researchers with the U.S. Centers for Disease Control and Prevention of 736 North Dakotans.<sup>55</sup> The highest blood lead levels were found amongst participants who consumed all three game types tracked (venison, birds, and other game). Although the study noted the need for further research, it cautioned that “due to increased rate of lead absorption, children as a whole may potentially be more vulnerable to exposure to lead from wild game consumption.”<sup>56</sup>
- “[C]onsuming venison with 21.8 mg/kg (hunter samples) lead every 15 days will result in 90 % of children less than 7 years old having blood lead greater than the 10 µg/dL level of concern,” according to a 2008 study by the Wisconsin Department of Health and Family Services.<sup>57</sup> As a comparison point, blood lead levels of just 5-10 µg/dL in 30 month-old children are associated with a reduction in SAT grades later in life.<sup>58</sup> Based on these results, “*DHHS recommends the use of non-lead ammunition as the simplest and most effective solution to lead poisoning, in both humans and wildlife, arising from the consumption of deer killed with lead ammunition.* To address this issue, DHFS recommends the eventual transition to non-lead ammunition.”<sup>59</sup>

In 2009, *Scientific American* summarized these studies: “New research, however, has shown that eating venison and other game can substantially raise the amounts of lead in human bodies. The

<sup>51</sup> *Id.* at 130.

<sup>52</sup> *Id.* at 132-33.

<sup>53</sup> WG Hunt, RT Watson, JL Oaks, CN Parish, KK Burnham, RL Tucker, JR Belthoff, and G. Hart, “Lead Bullet Fragments in Venison from Rifle-Killed Deer: Potential For Human Dietary Exposure,” *PLoS ONE* 4(4): e5330 (2009), at 1 (emphasis added).

<sup>54</sup> *Id.* at 7.

<sup>55</sup> S Iqbal, K Loring, and W Blumenthal, “North Dakota Lead Exposure Study,” *U.S. Centers for Disease Control and Prevention* (Oct. 18, 2008), at 8 (emphasis added).

<sup>56</sup> *Id.* at 11.

<sup>57</sup> Wisconsin Department of Health and Family Services, “Health Consultation: The Potential for Ingestion Exposure to Lead Fragments in Venison in Wisconsin” (Nov. 4, 2008), at 5.

<sup>58</sup> DJ Pain, RL Cromie, J Newth, MJ Brown, E Crutcher, et al., “Potential Hazard to Human Health from Exposure to Fragments of Lead Bullets and Shot in the Tissues of Game Animals,” *PLoS ONE* 5(4): e10315 (2010), at 16.

<sup>59</sup> *Supra* note 57, at 7 (emphasis added).



findings have prompted some experts to recommend bans on lead ammunition.”<sup>60</sup> Four years later, 15 of the nation’s top environmental health scientists wrote in a 2013 editorial in *Environmental Health*: “No rational deliberation about the use of lead-based ammunition can ignore the overwhelming evidence for the toxic effects of lead, or that the discharge of lead bullets and shot into the environment poses significant risks of lead exposure to humans and wildlife.”<sup>61</sup>

The fact that politicians would question this weight of scientific evidence shows the importance of letting scientists make decisions about lead ammunition. Unfortunately, the Sportsmen’s Act would strip the experts at the EPA of the authority to regulate lead ammunition and lead fishing tackle. It is odd, to say the least, that hunting groups – which normally profess to be guided by science in wildlife management decisions – would support a provision that would stop experts from acting on the best available science on lead ammunition.

*6) Would you support hunting if it’s done with alternative ammunition that does not contain lead?*

We do not oppose traditional sport hunting done with non-lead ammunition. Our opposition is to the inhumane and unfair sporting practices detailed elsewhere in this testimony, and explicitly to the use of lead ammunition, which the nation’s leading scientists have found “poses significant health risks to humans and wildlife.”<sup>62</sup>

*7) Your testimony said HSUS has never opposed hunting for deer, birds and small animals. Yet, you have opposed the hunting of bears, wolves and other species. What is the moral rationale for the Humane Society of the United States being opposed to hunting some species and not others?*

We have long opposed the hunting of animals killed solely for trophies as well as by methods that are inhumane and unsporting. As such, we have opposed the baiting, hounding, and trapping of black bears because all three practices are inhumane, unsporting, and unnecessary. Hunter Ted Williams described bear baiting: “Here’s how it works: Your guide or outfitter festoons the woods with garbage, then plants you (often in a folding chair) a few yards from a bait site that’s being ‘hit.’ When the bear shows up, you ‘harvest’ it.... Once hooked on garbage, bears learn to seek it around human dwellings and campsites.”<sup>63</sup> He quotes former Minnesota Governor Jesse Ventura, who said of bear baiting: “Going out there and putting jelly doughnuts down, and Yogi comes up and sits there and thinks he’s found the mother lode for five days in a row—and then you back-shoot him from a tree? . . . That ain’t sport—that’s an assassination.”<sup>64</sup>

We have opposed the trophy hunting and trapping of wolves because we oppose the trophy hunting of all rare and endangered populations of animals. Responsible hunters eat what they

<sup>60</sup> Scott Streater, “Wild Meat Raises Lead Exposure,” *Scientific American*, Sept. 28, 2009, *available at* <http://www.scientificamerican.com/article/wild-game-deer-venison-condors-meat-lead-ammunition-ban/>.

<sup>61</sup> D Bellinger et al., “Health Risks from Lead-Based Ammunition in the Environment,” 121 *Environ. Health Perspective* 178-179 (2013).

<sup>62</sup> Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists (2013).

<sup>63</sup> Ted Williams, “Bad News Bear Hunters: How Can There Be a “Thrill of The Chase” When There’s No Chase?” *Audubon Magazine*, Sept. 2005, *available at* <http://archive.audubonmagazine.org/incite/incite0509.html>.

<sup>64</sup> *Id.*

kill, and nobody eats wolves. Wolves are still recovering from near extinction at the hands of trophy hunters and trappers over the last 150 years, and today occupy just five percent of their historic range. Two federal courts recently found that efforts to delist gray wolves from their protections under the Endangered Species Act were not justified by the best available science. We strongly oppose Congressional delisting attempts, which seek to override those court rulings and the science.

In line with our policy, we will continue to oppose the most inhumane and unfair sport hunting practices, the trophy hunting of rare or endangered populations, and the use of lead ammunition. But we have not, do not, and will not oppose hunting in general.

*8) Does HSUS support recreational fishing? Are there methods you oppose? If so please detail those methods.*

The HSUS has no policy on recreational fishing, and never has had one.

*9) In the course of the hearing, you said that your ads have a disclaimer stating that the money will not be used to fund animal shelters. What percentage of your 2014 TV ads explicitly (not implicitly) state that none or only a portion of the funding raised by your ads will be used to support local animal shelters?*

We run limited TV ads, all of which state that local humane societies are independent from The HSUS – including 100 percent of our ads in 2014. All of our ads contain images of animals directly helped by our organization, focus exclusively on our programs, and make clear that we use donations to help all animals. The ads also prominently display our logo, which features 19 different animals in the shape of the United States, again emphasizing our comprehensive and national focus. *Our TV ads neither show animal shelters, nor do they have any dialogue about animal shelters – the only reference to shelters is our voluntary mention that they are independent from the HSUS.* This whole issue is a contrivance of the CCF. We urge our critics who repeat the CCF's falsehoods to actually watch our ads, and not conflate them with ads from other organizations.

*10) What is the exact language of disclaimers placed on HSUS television ads?*

"Local humane societies are independent from The HSUS" or "Local humane societies are independent from HSUS"

*11) What percentage of HSUS's television ads running in Oklahoma from 2011 to 2013 had this language?*

To underscore precisely our role, we began including that language in our ads in 2011. To the best of our knowledge, that year 98.5 percent of the ads that ran nationally included the language, as have 100 percent of our ads that have run nationally since.

*12) What percentage of the fundraising television ads your organization is running nationally feature that language? What was the percentage in 2013 and 2014?*

100 percent. The percentage in 2013 was 100 percent. The percentage in 2014 was also 100 percent.

*13) Do you have similar disclaimer language on all of your direct mail solicitations? If not, why do you have it on some television ads but not on fundraising letters?*

All of our direct mail solicitations are absolutely clear about the mission and work of our organization. Our direct mail packages feature letters that clearly and consistently describe our mission as a national animal protection charity that works to protect all animals. For example, our direct mail pieces outline our work with law enforcement to rescue animals from dogfights, dog meat farms, cockfights, puppy mills, and hoarders; our education work to encourage people to make humane choices, like adopting animals or choosing responsible breeders; our corporate engagement work to move retailers away from fur, cosmetics tested on animals, and pork and eggs from facilities that use gestation crates and battery cages; and our advocacy work to crack down on egregious cruelty to animals, animal fighting, puppy mills, factory farms, the Canadian seal slaughter and other abusive practices.

In short, our direct mail accurately explains the breadth of work we do every day for all animals. Indeed, it is telling that neither the CCF nor our other adversaries have ever cited a single piece of our direct mail that suggests we run local animal shelters. We are confident that no donor who opens and reads our mail could have any doubt whatsoever about our mission. I have received a number of solicitation letters from U.S. Senators and I have never seen a disclaimer stating that they are not my state senator. We think our direct mail is equally clear about who we are.

*14) Do you have similar disclaimer language offered upfront in all of your telephone solicitations? If not, why not?*

Our very limited telephone solicitations are also absolutely clear about the mission and work of our organization. Our callers describe actual HSUS programs and ask donors to support them. We are confident that no donor who has a conversation with one of our agents would think we are an organization that runs local animal shelters. Indeed, most of our calls ask for support on specific campaigns we are working on. For instance, our most recent telephone solicitation asked for help with our efforts to rescue dogs from horrific cruelty on South Korean dog meat farms.

*15) Do you think having "Humane Society" in your name coupled with ads featuring mostly dogs and cats perpetuates confusion among donors who think HSUS is actually running pet shelters?*

The HSUS is absolutely clear about our mission, which remains identical to our mission when we were founded in 1954: to prevent cruelty to all animals, everywhere in the United States. The notion that the HSUS – or the American Humane Association or the American Society of Prevention of Cruelty to Animals for that matter – should focus exclusively on shelter animals misunderstands the history and purpose of the organization. Our name preceded that of many local humane societies, and has always described our work as a society working for the humane treatment of all animals.

The HSUS and its affiliates do directly care for over 100,000 animals every year – more than any other animal group – and run one of the nation’s largest animal sanctuaries, horse sanctuaries, and wildlife rehabilitation centers. In terms of animal care, we do it directly – although we give out some grants, we do not rely solely on making grants to local shelters. But we focus on preventing animals from ending up in shelters, sanctuaries, and care centers in the first place.

In that vein, our ads do feature dogs and cats that we rescue from appalling conditions in puppy mills, dog fighting rings, natural disasters, and hoarding situations – and no group does more for animals in these situations than the HSUS and its affiliates. But our ads also feature cows whose abuse at slaughterhouses we have exposed through undercover investigations, chimpanzees whose retirement from laboratories to sanctuaries we have helped to secure, and so many other animals benefited by our programs. In short, our ads reflect the diversity of our work for all animals. The notion that our television ads are in any way misleading is a fiction invented by political opponents of the HSUS and propagated by the CCF and Mr. Berman.

To our knowledge, no member of this Committee is asking the National Rifle Association whether its donors are confused into thinking that the group only works on rifles. Nor is anyone asking whether the American Farm Bureau or Safari Club International’s donors are confused into thinking that the group runs local farms or international safaris. The accusations being made against the HSUS are equally simplistic and overly literal. Frankly, creating a humane society is a much broader concept that includes compassion toward all creatures.

*16) Would you be willing to include a clear message in all of your fundraising, advertising and materials that clarifies that HSUS doesn’t run pet shelters?*

Our messaging focuses on the positive accomplishments of the HSUS and the work we are actively engaged in to help all animals. The notion that we have ever represented ourselves as a foundation for pet shelters is a fabrication invented by groups threatened by our anti-cruelty programs and propagated by the CCF. None of our ads show pet shelters or discuss the work of pet shelters. Instead our materials make clear that we work to help all animals: to stop animal fighting, end the dog meat trade, rescue animals in crisis, crack down on puppy mills, end cruelty on factory farms, prevent cruel and unsporting hunting and trapping practices, end the Canadian seal slaughter, stop horse slaughter and horse soring, and prevent so many other large-scale abuses of animals. If there is any group that should be subject of tough questions, it is the CCF, which masquerades as a non-profit while funneling the majority of its funds to a for-profit PR company wholly owned by its founder.<sup>65</sup>

Moreover, the notion that the government, acting at the behest of groups like the CCF, would try to dictate the content of our materials is alarming. Chief Justice Roberts, writing for the Court,

---

<sup>65</sup> See Mark Dragem and Brian Wingfield, “Union Busting by Profiting From Non-Profit May Breach IRS,” Bloomberg, Nov. 2, 2012, *available at* <http://www.bloomberg.com/news/2012-11-02/union-busting-by-profiting-from-non-profit-may-breach-irs.html>.

recently reaffirmed the “basic First Amendment principle that ‘freedom of speech prohibits the government from telling people what they must say.’”<sup>66</sup>

For those people who are genuinely curious and want to learn more about our work, we have information prominently available for them. For example, in the “Frequently Asked Questions” section on our website, the first question is “What does The HSUS do?” and the second question is “How is The HSUS affiliated with my local humane society?”<sup>67</sup> We tell people on this page:

“Local humane societies and SPCAs are independent entities and are not run by The HSUS or any other national entity. The HSUS works with local humane societies and supports their work through training, evaluations, publications, and other professional services.”

“Additionally, The HSUS operates its own network of animal sanctuaries and rescue operations, providing emergency care and homes to more animals than any other organization in the United States.”

*17) Do you have any reason to believe that your donors are unaware of how little support HSUS gives in direct funding to shelters?*

Our donors support the HSUS because they believe in our mission to help all animals. Our donors know this is our mission – a point reinforced by our monthly magazine, entitled *All Animals*, and our logo, which consists of 19 animals in the shape of the United States. The CCF and its allies have been attacking us for a decade, but our support continues to grow. That’s the best indication that the public not only understands our mission, but is enthusiastic about it.

Our donors also know that we provide extensive support to local shelters. I’m writing the answers to these questions while at Animal Care Expo, the world’s largest conference for animal shelter professionals. We run this conference every year, as well as publishing a magazine, *Animal Sheltering*, and providing extensive training and advocacy work on behalf of local shelters. But our primary focus for companion animals is on preventing animals from ending up in shelters in the first place. Through our innovative Pets for Life program we are working to keep pets in homes, and out of shelters, in some of the most underserved communities across the United States. Through our rural veterinary service programs, we are partnering with veterinarians to provide free and low cost spay and neuter to underserved rural communities. And through our partnership with the Ad Council and Maddie’s Fund on the Shelter Pet Project, we’ve now secured over \$240 million in donated media to promote adoption and reduce intakes for local shelters – a program on a scale that local groups could never run on their own. The Shelter Pet Project’s most recent advertisements, in partnership with the Walt Disney Company, feature Disney princesses educating children on the importance of adopting from local shelters.

*18) Do you believe that your fundraising takes away from local humane societies?*

<sup>66</sup> *Agency for International Development v. Alliance for Open Society Int’l, Inc.*, 570 U.S. \_\_\_, slip op. at 6 (2013) (citing *Rumsfeld v. Forum for Academic and Institutional Rights, Inc.*, 547 U.S. 47, 61 (2006); *West Virginia Bd. of Ed. v. Barnette*, 319 U.S. 624, 642 (1943); and *Wooley v. Maynard*, 430 U.S. 705, 717 (1977))

<sup>67</sup> See [http://www.humanesociety.org/about/contact/frequently\\_asked\\_questions.html](http://www.humanesociety.org/about/contact/frequently_asked_questions.html).

Absolutely not. Americans are charitable people, and their compassion and generosity is not a zero sum game. As we draw attention to the horrific cruelty suffered by too many animals, Americans become more willing to donate to all animal groups, from local shelters to national groups seeking to prevent cruelty. The HSUS' budget accounts for just a fraction of the billions of dollars that compassionate Americans donate every year to animal groups – primarily to local shelters and rescue groups. These local groups understand that the HSUS plays a critical role in preventing cruelty to all animals on a national scale, and in particular in addressing the root causes of the pet overpopulation problem that shelters confront every day. When General Motors does advertising, it helps local car dealerships. When the NRA raises issues, it helps local gun clubs. When a high profile Presidential candidate runs, it helps candidates down the ballot. And when the HSUS advertises and draws attention to animal care issues, it helps local shelters and rescue groups. Our members typically support multiple animal-related charities, in addition to non-animal charities such as their church or other nonprofits.

*19) What percentage of the HSUS budget is dedicated to banning methods of hunting vs funding animal shelters?*

The HSUS is a charity, not a foundation. As such, we work to prevent cruelty through programs, not through grants. We devote resources both to assisting animal shelters and to opposing cruel and unsporting hunting and trapping practices. In particular, we devote extensive resources to running the Animal Care Expo, publishing *Animal Sheltering* magazine, advocating for the interests of local shelters, shutting down puppy mills that contribute to the pet overpopulation crisis, and running Pets for Life and other programs designed to stem the flow of animals into local shelters. Our guiding principle is that we put our budget to the best use to fight cruelty to animals, regardless of the special interest conducting that cruelty, or the power of their political allies seeking to protect them.

*20) Are you aware that polar bear imports under these alleged "carve-outs" have generated almost \$1 million dollars for polar bear research and management over the last 10 years, and that S. 659 would generate an additional \$40,000 for this purpose?*

When a trophy hunter spends \$30,000 to \$50,000 to shoot a polar bear, the hefty fees prompt over-exploitation of already vulnerable populations of bears. Most of this money is pocketed by commercial guides and outfitters and spent on transportation, hunting gear, and other incidentals—not on conservation. Moreover, this money also does not reach impoverished Inuit communities. The Nunavut newspaper, *Nunatsiaq News*, concluded in 2005 that "most of the [financial benefits from sport hunts] never reach Inuit hands."

And \$40,000 cannot compensate for the harmful conservation effects of encouraging trophy hunters and trappers to kill threatened and endangered species as soon as they are proposed for listing, knowing they will subsequently be able to import the trophies. Congress' willingness to grant "one-time amnesties" for polar bear trophy hunters has encouraged trophy hunters to kill more threatened animals, store more trophies, and lobby more for the next "one-time" amnesty. This cycle needs to stop – Congress needs to send a clear signal that it will not indulge wealthy trophy hunters who come back year after year asking for amnesty.

The hearings convened by pro-trophy hunting politicians to discuss granting polar bear hunters special treatment have already cost the taxpayer far more than \$40,000, and the processing of the permits will likely cost the FWS more than \$40,000 again. Senator Whitehouse put it well in his statement during the hearing when he called this “probably the largest amount of Congressional attention ever devoted to the smallest issue in the history of Congress.” The only reason so much Congressional attention has been devoted to this issue is that the hunters of the polar bear trophies are so wealthy. A special government exception for these wealthy polar bear trophy hunters would be a form of government amnesty for the wealthy that makes corporate welfare look good. This Committee needs to stand up to these special interests and reject their request for another amnesty from federal law.

*21) If these alleged “carve-outs” have been detrimental to polar bears, why did the Fish and Wildlife Service for ten years approve imports of polar bears hunted from six populations, finding that Canada had scientifically sound quotas for these populations?*

The Bush Administration in January, 2007, published a proposed rule to list the species as threatened after conducting a 262-page status review that rejected this very argument.<sup>68</sup> Thirteen of the fourteen peer reviewers to whom FWS submitted the proposed rule found that it “represented a thorough, clear, and balanced review of the best scientific information available from both published and unpublished sources of the current status of polar bears” and that it “justified the conclusion that polar bears face threats throughout their range.”<sup>69</sup> The rule was also supported by the U.S. Geological Survey, which conducted “nine scientific reports that analyze and integrate a series of studies on polar bear population dynamics, range-wide habitat use, and changing sea ice conditions in the Arctic.”<sup>70</sup>

Despite this huge volume of scientific evidence, trophy hunting groups led by Safari Club International sued the government to try to undo the rule. The federal district court and the D.C. Circuit Court of Appeals both rejected their arguments.<sup>71</sup> In an echo of how trophy hunting groups have misrepresented my positions, the appellate court noted that several of their arguments “rely on portions of the record taken out of context and blatantly ignore FWS’s published explanations.”<sup>72</sup> Having lost on the science before the agency and on the law before two courts, these groups are now trying to re-litigate their case in Congress. This Committee should not let them.

*22) Are you aware that a Federal judge in California forced the Fish and Wildlife Service to make its listing and the consequent import ban effective immediately, as opposed to at least thirty days after the announcement, as is required by federal law, and most if not all of the polar bear imports at issue here could have been imported in that time?*

<sup>68</sup> See 12-Month Petition Finding and Proposed Rule to List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064 (Jan. 9, 2007).

<sup>69</sup> See Determination of Threatened Status for the Polar Bear (*Ursus maritimus*) Throughout Its Range, 73 Fed. Reg. 28,212, 28,235 (May 15, 2008).

<sup>70</sup> *Id.* at 28,235.

<sup>71</sup> See *In re. Polar Bear Endangered Species Act Listing and § 4(d) Rule Litigation – MDL No. 1993* (DC Cir., Mar. 1, 2013), slip op.

<sup>72</sup> *Id.* at 15.

Senior Federal Judge Claudia Wilken did not act unlawfully in her ruling, as this question implies. In fact, Judge Wilken found that the FWS had allowed trophy hunters *far more time* than the Endangered Species Act required before implementing the import ban. Instead of 30 days' notice, the trophy hunters effectively received 16 months' notice of the impending ban on importing polar bear trophies. The Bush Administration proposed listing polar bears under the Act on January 9, 2007, but the ban only came into force in May, 2008. Judge Wilken concluded that "[t]o allow Defendants more time would violate the mandated listing deadlines under the ESA and congressional intent that time is of the essence in listing threatened species."<sup>73</sup>

Fully 40 of the 41 trophy hunters affected by this provision hunted polar bears in 2008, *more than a year* after the Bush Administration had proposed listing the species as threatened under the Act. They did so in spite of explicit warnings from hunting groups and government agencies not to. For example, in December 2007, the hunting group Conservation Force wrote, "American hunters are asking us whether they should even look at polar bear hunts in light of the current effort by the U.S. Fish & Wildlife Service to list this species as threatened ... The bottom line is, no American hunter should be putting hard, non-returnable money down on a polar bear hunt at this point." It is hard to see how an additional 13 days – the import ban only took effect 17 days after the court opinion anyway – would have allowed any more trophy hunters to import their trophies. At the time, the average processing time for import applications was longer than 13 days. Of course, if these 41 trophy hunters had followed the advice of the government and hunting groups they would not now be lobbying Congress for an amnesty from federal law.

---

<sup>73</sup> *Center for Biological Diversity v. Kempthorne* (N.D. Cal., Apr. 28, 2008), slip op. at 7-8.



Senator SULLIVAN. Thank you, gentlemen. Thank you for your testimony. I now recognize myself for 6 minutes for questions.

Mr. Crane, in your written testimony you discuss the nearly \$7 billion in excise tax payments since the Pittman-Robertson program began. This is obviously a significant amount of money that goes directly to States to run their fish and game departments and to implement local conservation programs. In fact, some have suggested that this money had a direct impact on the recovery of populations such as the white-tailed deer, black bear and the American elk.

If we do not clarify the law by enacting Section 2 of this legislation, what effect will that have on the conservation dollars paid under the Pittman-Robertson account and how will that affect overall State conservation programs?

Mr. CRANE. Mr. Chairman, we are very proud of this uniquely American system. As you pointed out, it is a system of those of us who hunt and fish, the industries that manufacture this pay the taxes and everyone else benefits from it. Seven billion dollars is a lot of money even in this town. So we are very proud of the accomplishments that this system has.

By unnecessarily putting an agency that doesn't have the authority, doesn't have the ability, has declined to take these petitions in the past, and run that risk that somebody will petition this in the future and basically break this financial model, I think we are going to do a tremendous disservice to conservation in America.

I would encourage this committee to leave this provision intact. I think that these issues are much better handled by the State wildlife agencies and those professionals that can deal with them when they rarely occur on a much more localized basis.

Senator SULLIVAN. So the Section 2 provisions, you are supportive of?

Mr. CRANE. Yes, sir.

Senator SULLIVAN. Great. Let me continue with you, Mr. Crane. If a situation occurs where sound science irrefutably identifies a population impact from lead-based ammunition, as was the case with waterfowl, do you think that the government has a role to play in responding? And if so, what would be that kind of role?

Mr. CRANE. I absolutely do. Again, I think the right agencies to handle that are the State wildlife management authorities and the U.S. Fish and Wildlife Service. Where these happen, they have the tools in their toolkit to be able to handle things like season length, like areas that they may have to temporarily close and other ways to address this.

There are no population-wide issues with lead contamination on any species in the United States, save maybe the California Condor, and that has a very long, long history and would take up to much time talking about it.

Senator SULLIVAN. How about you, Mr. Hall, on that issue? I know you must have experience from your previous directorship at Fish and Wildlife.

Mr. HALL. I agree with that. I think if it is endemic, if it is all over the United States, and across the State boundaries, and we have an issue like we did with lead shot for waterfowl hunting, then there is a very appropriate role for the Federal agency to play.

That has not come to bear in any science that I have seen dealing with lead since we shut down the use of lead shot for water fowling.

Therefore, I agree completely that a proper place to do that is where it is locally found. Condor might be an example in California, Arizona. Let the State agencies address it. That is the proper role of the State agencies. I would agree with that.

And if I might, I want to correct just a procedural point that Mr. Pacelle made. That is that we can't compare apples and oranges when we are talking bears and lions. Under the polar bear, it is a United States species. Therefore, it is protected in Alaska and other places. It is one of our species.

So when it was listed as threatened, it was listed as a domestic species, listed. If a lion were listed or some species that is not domestic to the United States, then it would go on the international list of threatened and endangered species. And the U.S. Fish and Wildlife Service, particularly, would defer to the origin country from where the animal was coming on what rules they wanted us to implement. If they had permits from there, we would be able to let them come in.

Thank you for allowing me to clarify the procedure there.

Senator SULLIVAN. Sure. Let me ask a followup question with you. You talked about NAWCA and I mentioned in my opening statement about the private matching money that far exceeds the Federal investment. Help us explain, help some of my constituents to understand, if this is the case, why not shift all the funding to the private sector? What happens if there is no Federal investment? What should the responsibility of the U.S. taxpayer be in this regard, particularly, as I mentioned, in a time of very austere Federal budgets?

Mr. HALL. Thank you for that question. It is a legitimate question that the citizens need to really understand. When we look at the North American model of wildlife management and conservation that Jeff referred to a few minutes ago, that is a partnership. It goes back to Aldo Leopold's concept of the citizen conservationist. That is why we in the private sector are so willing to stand up and put money into the system.

But that needs to have the partnership of the Federal Government relaying that this is a United States value. Our natural resources are something important to us as a Country, us as a people. And by this small token, really one quarter under NAWCA is what is spent by the Federal taxpayer. They get \$4 back for \$1 expended.

As we look at good governance, as we look at efficient governance, I can't think of a program that ever exemplifies the Federal taxpayer getting more back for the resource they own by Constitution and the management of those resources than something that gives them back a \$4 payoff for \$1 investment.

Senator SULLIVAN. Great. Thank you for that.

Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman.

Before you start the clock, let me tell you how I am going to manage my 6 minutes. I do have two brief questions to ask, one of Mr. Crane and one of my good friend, Dale Hall. But then I have

a longer question to ask our friend, Mr. Pacelle. So when I ask this question, I am going to ask you to be brief, if you don't mind.

First of all, Mr. Crane, I have to say this. In your opening statement, you talk about coming from a hunting family. Back when I enjoyed life, I never missed a day of goose season in Oklahoma. People don't realize we have one of the big flyways through there. In fact, I had the first 10-gauge full choke 36-inch double barrel shotgun. And people wondered how in the world I was getting them out further than anybody else.

But anyway, that is not my question. The question is, you heard the statement that Mr. Pacelle said about lead ammunition. What effect would it have if you left EPA in that regulatory position, for lead ammunition?

Mr. CRANE. Again, Senator, a couple of points. First of all, I want to clarify that there are not readily available, widely available alternatives to lead. Ninety-five percent of current ammunition is lead or copper based.

Second, the price of that is probably four times or more should it be available. So while that may not be important to everyone in this room, for our rural folks back in Oklahoma, if their box of shotgun shells goes from \$25 to \$125, and they are trying to feed their families, I think that makes an impact.

And third, and finally, as was asked by the chairman, there is \$7 billion that has gone off the Pittman-Robertson excise tax to support conservation. You apply the same thing to the fishing side of the equation, then the alternatives to that are anywhere from 10 to 20 times more expensive. They don't work as well.

So we have a serious problem here. Let's leave it to the State fish and wildlife agencies.

Senator INHOFE. Thank you. You gave the same answer my son gave me.

Mr. Hall, I look back wistfully at the days when you were at the helm. Your partnership program just was a booming success. It takes away this image that anything, that the government is there saying, we are doing it because the people don't want to take care of their own property. You did such a great job.

The question I have to ask you is, both NAWCA and the Pittman-Robertson need to be reauthorized in this bill. Can you real briefly explain the difference between the two and why they are both important?

Mr. HALL. Yes, sir, thank you. The North American Wetland Conservation Act was passed as the implementing tool for the North American Waterfowl Management Plan that was put together back in the 1980's. It is a standalone program to try and help restore and protect wetlands and grasslands and other waterfowl habitat in order to follow the North American Waterfowl Management Plan.

The Pittman-Robertson excise taxes go into separate grants to the States in order for them to help carry out their operations. This provision here simply for the interest that is gathered on those funds that are collected each year, and that interest has been designated to go into NAWCA so that it can go into making grants as well for wetlands and waterfowl and other habitat.

Senator INHOFE. I see. That is very interesting.

Mr. Pacelle, I have to say that I have had to change my mind twice since I saw you were going to be one of the witnesses. I always thought of your group as being philosophically very liberal and on liberal causes and all that. Until I saw the ad shortly after our disaster, the tornado in Moore, Oklahoma, you had an ad, I think it is still running, and it shows the dogs out there, the pitiful dogs, that hit me hard. Because that is one of the things I do, is help with abandoned dogs and that type of thing.

So I was changing my feelings a little bit until I realized that our Attorney General, Scott Pruitt, has a lawsuit against you based on the fact that in the programs we have had, you have actually extracted, as a result, probably of that ad, I almost contributed myself, some \$1.7 million from Oklahomans. And in the same timeframe that money came in, only \$110,000 was donated to animal shelters and other institutions in my State of Oklahoma.

So Oklahomans paid you \$1.7 million and got back \$110,000. Is that true?

Mr. PACELLE. No, it is not true. I guess if that was a concern of yours, I am glad you have raised it in public, so that I can have an opportunity to address it.

Senator INHOFE. Stop there for a moment. Since you said it wasn't true, your general counsel, is it Roger Kindler?

Mr. PACELLE. Yes, he is general counsel.

Senator INHOFE. Roger Kindler, in those proceedings, and this is a State court proceeding, a district court, he said, Mr. Kindler stated that between 2011 and 2013, donations from within Oklahoma totaled \$1,714,000. Of that total, only \$110,288 in grants came to Oklahoma organizations. Is he a liar?

Mr. PACELLE. Let me clarify. First, we did no fundraising on the Moore, Oklahoma tornado disaster.

Senator INHOFE. No, I said it was around that timeframe.

Mr. PACELLE. Senator Inhofe, we do continuous promotional work and programmatic work. So we don't simply give grants to other organizations. Foundations are grant-making groups. Non-profit charities like The Humane Society of the United States conduct a wide range of programs. And our work is to protect all animals. So it is raiding dogfights, cockfights, supporting shelters. For instance, later this month, we have our annual Care Expo where shelter leaders throughout the Country come to get training. We do work on helping elephants, rhinos, turtles, which I know you are such a devotee of so many marine species of turtles. We run an animal rescue team. We go to Indian reservations.

Senator INHOFE. OK, you do a variety of things.

Mr. PACELLE. The fact that a percentage of our money, which is, I think a great feature of our program, that we give grants to shelters, that is a sliver of the incredible work that we do to save millions and billions of animals in Oklahoma, in the United States and throughout the world.

So Scott Pruitt has not filed a lawsuit against The Humane Society of the United States. He has been driven by the Farm Bureau to make inquiries. I am sure that when he looks at our fundraising materials, he will see that.

Senator INHOFE. But the figures that I used in terms of amounts of money coming back to organizations within my State of Oklahoma are accurate. Some 4 percent.

Mr. PACELLE. We are not a grant-making group, Senator Inhofe. The American Farm Bureau Federation doesn't just give grants to farmers. The American Farm Bureau Federation advocates for the interests of farmers. The congressional Sportsmen's Caucus, the NRA does not just support shooting ranges.

Senator INHOFE. I understand. My time has expired. The only question I would ask you to respond to is, will you agree to give to Scott Pruitt all the information that he has asked?

Mr. PACELLE. We have given General Pruitt all the information about fundraising materials. We are entirely confident that he will see that we do exactly what we say we do. He wanted materials that were entirely unrelated to our issues. Then we sought to enjoin him and won in a State court on that issue.

He can have any materials. We are very transparent.

Mr. SULLIVAN. Mr. Pacelle, can you answer the question?

Mr. PACELLE. We gave him what he wanted and then for additional materials that he sought that were beyond the scope of what he said, he was denied by a court that information.

Senator SULLIVAN. OK, so I am still not sure that is responsive to Senator Inhofe's question.

Mr. PACELLE. He asked if we would give the material to General Pruitt. And I said, yes, we gave him everything that was relevant and we didn't give him the stuff that was a fishing expedition.

Senator SULLIVAN. OK.

Senator INHOFE. That is answered. Thank you.

Senator SULLIVAN. Senator Booker?

Senator BOOKER. Thank you, Mr. Chairman. I truly appreciate your calling this hearing.

Let me start out really quickly by complimenting my colleagues, Senators Heinrich and Murkowski, for coming together across the aisle. Lord knows we need more bipartisan work in the Senate.

Unfortunately, both the portion of this legislation that we are considering today and the larger Sportsmen's Bill contain multiple provisions which need to be modified or eliminated before I could support this bill.

Outdoor recreational activities play an important part in our economy. It is estimated that hunting, angling and recreational shooting and trapping generate about \$90 billion of annual spending and Americans spend another \$550 billion on other outdoor recreational activities. The vast majority, as many as 90 percent or more of the recreational users of our Federal lands, use those lands for activities such as hiking, horseback riding, backpacking, camping, nature study and climbing. That is 90 percent of the use of our Federal lands.

We need to make sure that Congress is balancing the needs of all of our users of Federal lands, and that we are not passing legislation that would put some of our most vulnerable visitors to Federal lands, including our children, at serious, serious risk of harm.

As drafted, the Sportsmen's bill would prohibit the EPA from ever, ever regulating or even assessing the actual science of the human risk posed by lead bullets and lead shot. This is what we

know about lead. Lead exposure is toxic to humans. The effects of lead poisoning can include kidney disease, damage to the central nervous system, nerve disorders and memory and concentrating problems. In large enough doses, lead can even cause brain damage, leading to seizures, coma and actually death.

Lead is especially dangerous for our young children. Childhood lead poisoning is even more pronounced because the lead is absorbed faster, causing slow growth, developmental defects, damage to the brain and nervous system and more.

I saw this in Newark first-hand, the devastating and challenging detrimental impacts of lead poisoning on our kids. It is a crisis. The toxicity of that crisis, of that entrance into the system, has already been reduced or eliminated in gasoline, plumbing, paint, pesticides, toys and other products. We seem to have got it in every other area of our society. But somehow, we are afraid to confront the realities of lead buckshot.

Every year, thousands of tons of lead are put into the environment from this lead ammunition, especially near shooting ranges and heavily hunted sites. Let me repeat. Every year, thousands of tons of lead are put into our environment from lead ammunition. This lead is not only poisonous to our wildlife, it is estimated that as many as 20 million birds and other animals each year die from lead poisoning. Twenty million birds and animals.

But it also gets into our land, our waters, and it gets into our food supply. In addition, a Seattle Times investigation last year found that lead poisoning is a major health threat at America's shooting ranges. Mr. Chairman, I would like to ask that the Seattle Times investigation be entered into the record. Reading it is sickening. And the reality is, we know that there is lead poisoning going on. We know that these are threats to our environment.

Mr. Pacelle, given all that we know about the toxicity and dangers of lead, is there any reason that you are aware for why Congress should permanently, forever, ban the EPA from even assessing the risks posed to human health, almost as if we are afraid of science and knowing the truth? Is there any reason or justification for this whatsoever, Wayne?

Mr. PACELLE. I believe the Fish and Wildlife Service made the right call in 1991 when President George Bush was President, a Republican and a hunter, looking at the evidence, seeing that so many migratory birds and other animals were dying as a consequence of lead. The NRA and a number of other groups opposed that effort then.

Now I do think that the Interior Department is the most appropriate agency to look at this issue. That said, if there is tremendously compelling science and if EPA has toxicologists and others who have something to contribute, Senator Booker, I don't see the compelling rationale for the Congress to preclude EPA from making an examination.

I don't think that is happening now. I don't think EPA is chomping at the bit to do this. I think the debate is better placed in the States and within the Interior Department. But I don't understand this overreaction in terms of including this provision in this bill, when the EPA is not contemplating the issue right now.

Senator BOOKER. Right. But to prevent it from studying the issue, even knowing it in the future, as tons and tons of lead are introduced into our natural environment, consumed by animals, poisoning our children, to not even be able to study it seems to me ridiculous.

Mr. PACELLE. We would like to enter into the record a letter from 168 organizations, local, State and national, opposing that provision and others in this bill. There are 130 different species of wildlife that have been documented in the scientific literature that are poisoned as a consequence of lead ammunition being left in the environment.

And we understand the tradition of hunting in this Country. The fact is now, we have alternatives. We have non-toxic shot. We have other metals that are now much more competitive on price. So we are not talking about doing something that is going to entirely disrupt hunting. There was just a study from the Texas Parks and Wildlife Department about performance of lead versus other forms of shot with dove hunting. And the hunters couldn't tell the difference. It was basically a blind test.

Senator BOOKER. So there are alternatives that are less expensive. They do better in some cases for our hunters. But yet we seem to be afraid of doing what is just reasonable, studying the toxicity of this.

My time is expired. Hopefully we will get another round, Wayne, because I am not done with you yet.

Senator SULLIVAN. Senator Crapo.

Senator CRAPO. Thank you, Mr. Chairman. I appreciate your holding this important hearing on this Bipartisan Sportsmen's package that is within the EPW jurisdiction. Legislation I introduced to protect Americans' Second Amendment rights on lands managed by the U.S. Army Corps of Engineers is thankfully included in this important package.

According to the data compiled by the congressional Research Service, the Corps is responsible for \$12 million acres of land and water, including 422 lake and river projects within recreation, 92,844 campsites, 7,700 miles of trails and 3,544 boat launches. While some Corps lands and waters are open for hunting, there are a small number of authorized shooting ranges. Much of the land managed by the Corps is off limits to lawful possession of firearms.

I wish Senator Whitehouse was still here, because he raised a concern about the fact that this would allow people to own and carry firearms at dams and other hydro facilities, where he thought there would be a concern. This legislation only allows that the possession of firearms in those places that are open to the public and specifically exempts the Federal facilities that I think Senator Whitehouse was talking about.

The fact here is that it is a clear Second Amendment right that Americans should be allowed to exercise. Not only is this restriction a clear violation of the intent of the Second Amendment, but it is also inconsistent with the laws and regulations governing land that other Federal regulatory agencies implement.

Enabling Americans to carry firearms on land managed by the Corps will allow law-abiding citizens to protect themselves and to engage in the kinds of recreation we have already discussed here

on lands and facilities designed for that. This change will also provide needed consistency across Federal lands that will reduce the complication of tracking where one Federal agency's management jurisdiction ends and another begins.

The Supreme Court in the District of Columbia v. Heller affirmed that the Second Amendment is an individual right and the right to an operable firearm for self-defense is one that Americans have. This right should apply on all lands managed by the Federal Government.

Moreover, a Federal district judge in my home State of Idaho agrees. In the case of *Morris v. U.S. Army Corps of Engineers*, brought by plaintiffs in Western Idaho who used Corps-managed land for recreation, including camping, the plaintiffs challenged the regulation as being unconstitutional and in violation of their Second Amendment rights. In October of last year, the Court found that the regulation was in fact unconstitutional and banned the Corps policy, unfortunately, only in Idaho.

Burdening law-abiding citizens of this Country with the additional Second Amendment restrictions that this Corps is now implementing is not the answer to safeguarding the public. Americans' Second Amendment rights must be restored to lands managed by the Corps. My legislation included in this package does just that.

Now, Mr. Chairman, I do have a couple of questions and I hope I can get quickly through them. Mr. Crane, do onerous and confusing firearms regulations for public lands discourage sportsmen and their families from utilizing the land?

Mr. CRANE. Yes, sir. Do you want me to expound on that?

Senator CRAPO. Briefly. I am trying to be brief.

Mr. CRANE. Yes, sir. And as you pointed out, in 2009, the National Park Service and the Wildlife Refuge System, there was legislation that was bipartisan that was passed that allowed carry on those.

The Army Corps lands are the last remaining lands. I think this is just consistent with making it easier and folks to understand where the lines are, as you pointed out. So, yes.

Senator CRAPO. Thank you. Mr. Hall, I would like to followup with you. Are your members unnecessarily burdened by the Corps' conflicting and confusing outright ban on firearms?

Mr. HALL. Our members are as concerned as Jeff's are on what is legal and what is not. When you have the Federal Government, have different arms of the Federal Government have different rules dealing with Federal Government land, our citizens are never clear on what is allowed and not allowed.

I was the Director of the Fish and Wildlife Service when the Park Service issue came up. Although it wasn't mine, I worked with them on getting the legislation passed that you passed here that said that following State law is the proper thing to do.

I think any time that there are different rules on different public lands that are basically confusing to the public that it needs to be clarified.

Senator CRAPO. Thank you, Mr. Hall. I was involved in 2009 when we had the congressional fight to make this change in the law. At that time, all of the dire concerns and consequences were



raised by those who object. Frankly, by those who don't like the see the Second Amendment family and fully implemented, in my opinion. And we haven't seen that kind of problem.

Another question for you, Mr. Hall. According to the Corps' own data, seven of the top ten migratory bird flyways in the United States cross over Corps-managed water. From a waterfowl hunting perspective, would you support a consistent approach to firearms possession across all Corps-managed land?

Mr. HALL. Absolutely. Our members and those that pay the bill and help to get out there a drink just a little bit of the fruit of the vine that they helped grow the vineyard for deserve the right to understand and be able to use those waters.

Senator CRAPO. I only have about 30 seconds left, but I understand that it is possible you may have an example of the kinds of things we are talking about, where a boat ramp might prohibit the possession of firearms, where a person is trying to put a boat in to go out to another place where firearm possession is allowed. Those kinds of restrictions are complicating the ability of Americans to freely utilize their Second Amendment rights in pursuit of hunting or other purposes.

Mr. HALL. I know we have some of those. But I want to be cautious and be accurate. If you would allow me, I will answer that question for the record after this is over with specific examples.

Senator CRAPO. I would appreciate that. Thank you very much, Mr. Hall. I see my time is up, and thank you, Mr. Chairman.

Senator SULLIVAN. Senator Cardin.

Senator CARDIN. Mr. Chairman, thank you very much. Thank you for chairing this hearing, it is very important.

I want to followup on Senator Crapo's point first. It is good to have a bipartisan bill. I have some concerns about some of the provisions, but I do appreciate the manner in which this bill has been put together. It is a real effort to try to get legislation to the finish line. We started this in the last Congress and we made progress. Many of these provisions have been worked on by both Democrats and Republicans, so I very much appreciate that.

There will be interest to see whether there are other areas that may not be in the original bill that we hope will get incorporated. Because quite frankly, we don't get too many bills to the finish line. I think we have a good chance to get this bill to the finish line.

So I want to followup on Senator Crapo's point, because the two of us have worked together on a bill dealing with the national fish habitat conservation, a non-controversial bill that we would hope will be able to be included in the package. It allows for the partnership between State and local governments and the private organizations in order to deal with fish habitat issues, which are, we believe, the sensible way to go about doing this.

Mr. Crane, your organization has been part of these efforts dealing with fish habitat. I would like to get your assessment as to the importance of encouraging partnerships to deal with the fish habitat, specifically the bill that senator Crapo and I have been working on.

Mr. CRANE. Thank you, Senator, and thank you for your leadership along with Senator Crapo on this important legislation. We are supportive of it and we recognize the value of these partnership

not unlike the North American Wetlands Conservation Act. As you pointed out, they leverage private funds. They go across States and effectively look at the conservation goals as a whole. We would be very supportive of working with you and if we can figure out a way that this enhances the bill and the chances for it to get those much-needed 60 votes, we would like to work with you.

Senator CARDIN. Yes. Of course, our objective is to look at areas that do not cause additional concerns on the support. We think this is one of the categories. As you point out, what it basically does is leverage private sector involvement to protect our fish habitats, which is in everyone's interest. Some of the modifications that Senator Crapo and I made in the version this year deal with some of the technical concerns raised in the last Congress. We think we have hit the sweet spot. We look forward to talking to the committee about that.

I want to mention one other area that this committee has acted on in previous Congresses, basically without controversy, and that is neo-tropical bird issues, which deal with the fact that many of our bird species in this Country migrate as far away as down in South America. This is a bill that allows us to participate and protects the habitats of birds that we very much want to see in our community.

Again, I don't believe this is a controversial issue. It has been basically without opposition in this committee in the past. I hope that we will have a chance, Mr. Chairman, as we talk about putting together a bill, looking at those issues that truly are not controversial but give us a chance to make significant progress to protect habitats for beauty, for the economics, for the sportsmen and for all of us to enjoy for future generations.

I yield back my time.

Senator SULLIVAN. Senator Boozman.

Senator BOOZMAN. Thank you, Mr. Chairman, and thank all of you for being here. We really do appreciate your testimony.

Mr. Hall, the bill contains a provision that the Arkansas delegation has worked on, been very active in writing and promoting. The provision helps clarify that farmers are allowed to engage in normal agricultural practices that have added the benefit of providing habitat for ducks. We have seen a lot of misinformation surrounding the important element of the bill.

In your testimony you stated that conservationists have established population-based waterfowl habitat goals that depend on the presence of rice agriculture on landscape. The growth of a second crop of rice is normal agricultural practice. I guess the question is, really a couple of things, does this normal agricultural practice enhance winter waterfowl foraging habitat? And second, would you say that the bill provides a win-win for both farmers and for migratory game birds in that regard?

Mr. HALL. The answer, simple answer is absolutely. What we need to recognize first, and if I may say so as part of the record, with the loss of wetlands that we have had here in the United States, when the wintering habitat comes into question, rice has become a surrogate wetland in order to support those waterfowl populations.

We are at the highest level of nest productivity and nesting waterfowl since we have been taking records in 1955. Yet we have lost so much of the native habitat. The reason we have been able to do that is we have taken advantage of our partnership with agriculture, whether it is winter wheat in the north for nesting, or whether it is rice in the south and west for wintering habitat. In your particular question dealing with the Gulf Coast joint venture, they have actually put 41 percent of the food requirements to be coming from rice. This second ratoon crop is critical.

The rules, as they are stated now, and it is not ever where the ratoon crop comes in, where they grow rice, but in the south it happens that the second one naturally comes in after the harvest. Well, the rules of harvest kick in because you have manipulated the ground. So by causing the farmer to choose between taking care of waterfowl and making additional money on being able to lease out hunting facilities, and we are strong supporters of that, because that brings additional economic value and support for waterfowl management and conservation. To make them choose, we believe, is an absolutely unnecessary question. It is not about the abandonment of fair chase. It is about managing the resources with the regional conservation agricultural practices that are normal. And they do vary from region to region. Therefore, we support this provision.

Senator BOOZMAN. Good. Thank you very much, Mr. Hall.

I would like to yield a minute to Senator Inhofe, if that is OK.

Senator SULLIVAN. Without objection.

Senator INHOFE. Thirty seconds of your time. I want to get to Senator Fischer, because our votes have started.

But for clarification purposes, Mr. Pacelle, when I asked the question about the very effective ad you had, implying that is going to animal shelters and other places, and that you have raised from my citizens in Oklahoma over \$1.7 million, and the total amount that has come back for organizations within Oklahoma from you was \$110,000, and you said no, that wasn't true, and I read you the following statement, your general counsel said that between 2011 and 2013, donations from within Oklahoma totaled some \$1.7 million. Of that total, only about \$110,000 in grants to Oklahoma came to Oklahoma organizations.

Now, is that statement correct?

Mr. PACELLE. The statement is correct.

Senator INHOFE. Mr. Chairman, I only want a yes or no, because we have votes.

Mr. PACELLE. Those ads say that we are not giving the money to animal shelters. The presumption that somehow the ads say we are giving money to shelters is a false presumption.

Senator INHOFE. They are very effective ads to get \$1.7 million out of Oklahoma.

Mr. PACELLE. There is language that says it is not going to local animal shelters. Explicit language. We do all animals. And we do it outside of shelters and inside of shelters.

Senator SULLIVAN. Mr. Pacelle, do you want to take the opportunity to answer that yes or no?

Mr. PACELLE. It doesn't lend itself readily to a yes or no answer. The answer is \$110,000, if that is what Roger Kindler said in terms

of grants to societies in Oklahoma, I am sure that is true. We do so much more outside of the shelters in Oklahoma to help animals.

Senator SULLIVAN. Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

I am proud to be a vice chair of the congressional Sportsmen's Caucus. And I am very happy to be a co-sponsor of the Bipartisan Sportsmen's Act.

A priority that I would like to work on as we consider this legislation is addressing duplicative permitting of pesticides under FIFRA and the Clean Water Act. This duplicative process creates unnecessary resource burdens and challenges for pesticide registrants and users, including the sportsmen community.

Pesticides are actually critical for outdoor recreation, enabling healthy habitats and ecosystems to thrive, while suppressing vector-borne diseases such as the West Nile virus, which threaten outdoor activity of all kinds. Eliminating harmful and invasive pests is critical to vegetation and management. The U.S. State agencies have testified that these FIFRA permitting requirements offer no additional environmental benefits.

While the House acted on legislation to address this problem in both the 112th and 113th Congress, and is already taking action, this year the Senate has yet to address this issue. It is time for this committee and the U.S. Senate to act. So I look forward to working with my colleagues on exploring opportunities to accomplish this goal as we move forward to debate this bill.

Mr. Crane, I am very grateful for the work of the Sportsmen's Caucus in developing this important legislation. Thank you very much. It has been a pleasure to be involved with the Caucus.

For the benefit of everyone here, can you please talk about the work that went into putting together this bill, both the bipartisan cooperation in the Caucus and the Senate, and also the collaboration that we have seen from all of the organizations and partners that are out there in the sportsmen's community?

Mr. CRANE. Yes, Senator. Thank you for your leadership on this.

This process started probably more than 6 years ago. Senator Tester from Montana was the Democratic co-chair of the Caucus. We attempted to assemble in the Senate for the first time a comprehensive Sportsmen's Act. In successive Congresses, it has gotten closer to passage. SO I hope this is going to be the year.

The House has passed similar legislation on a bipartisan basis in the last two Congresses. So again, I hope this is going to be our year. I did in my opening statement hold forth a letter from all the leading sportsmen, hunting, fishing, conservation groups, endorsing the parent bill, S. 405. Again, thank you for your leadership on that.

Senator FISCHER. Thank you, sir. I can tell you, with really the great bipartisan support we have, this should be the year that this passes.

In your testimony you discuss the modifications of definition of sport fishing equipment under the Toxic Substances Control Act. Can you please go into further detail on the potential implications? We see there are anti-hunting and fishing citizen suits that force EPA to expand that TSCA authority to regulations of our ammunition and our tackle as well.

Mr. CRANE. Yes, Senator, and if you will permit me about 15 seconds, I would like to point out, there is a difference between elemental lead, which is on the periodic table. Lead is an inert substance that is found in the earth in molecular lead, which is what is transformed and used in paints and gasoline and things like that. The molecular lead is highly toxic. That was a statement that I would just like to put for the record.

But the definition of fishing tackle under the IRS code basically would involve every single piece, from a fishing rod to a fishing reel to all the terminal tackle. It would basically, if they were successful in being able to push back and put restrictions on lead, you would be going back to the days of Tom Sawyer with a cane pole and a piece of monofilament line. The attendant moneys that are raised through the Wallop-Breaux excise taxes on fishing equipment, it would be devastating to the conservation and economy of the United States.

Senator FISCHER. So it would have really a very harmful impact, not just on the recreation industry but on our conservation practices as well?

Mr. CRANE. This is where the lion's share of the money comes from.

Senator FISHER. Thank you. Mr. Crane and Mr. Hall, you have heard Mr. Pacelle try to defend HSUS's positions here this morning. I would like to give you an opportunity to respond to any of those statements, detailing, I think, his organization's stance on hunting and what impact his organization has on the sportsmen's community.

Mr. CRANE. I will be happy to do that. I would like to focus on the polar bear, but in my opinion and being around in this industry, I am not so sure I take at face value that The Human Society of the United States does not oppose hunting. But I think that is a debate maybe for another time.

In his testimony on the polar bear, he pointed out that when the Service was proposing the listing that people rushed up there to shoot these bears. First of all, you have to book these hunts well in advance. There is a significant deposit that is required for these animals. So the idea that somebody rushed up there is erroneous.

Second, usually, and I will defer to the former Director of the Service, but usually there is a minimum of a 30-day period after a listing occurs to allow people to bring them back in. A judge in California ordered that this would have immediate effect. And it caught these people in a catch-22 position up there. They were victims of something that they don't deserve. This is just seeking justice for those people.

Senator FISCHER. Mr. Hall, do you have any comments?

Mr. HALL. I would simply echo that I agree with Mr. Crane. It is not my experience that HSUS runs out and supports hunting. They may not oppose it, and I am not going to question that; he is going to give his own testimony. But at the same time, we are concerned often with tactics that we think are less than above-board on trying to portray hunting as something of a blood sport and not giving the proper credit back to the people that actually pay for those animals to be there.

Senator FISCHER. Thank you. Thank you, Mr. Chairman.

Senator SULLIVAN. Thank you.

We are going to move into a second round of questioning, but we have a vote pending here, so we are going to limit that to 2 minutes each.

I will begin. Mr. Pacelle, I didn't have a chance to ask you any questions, so I am going to ask one. There was a lot of discussion on lead and its impacts. But importantly, there are 20 million hunters in the U.S. whose families eat game, rely on game, harvest it with traditional ammunition. Can you tell us the percentage of the 20 million families who have gotten lead or get poisoning as a direct result of eating game meat?

Mr. PACELLE. Mr. Chairman, according to the fish and Wildlife Service, there are about 13 million hunters. I am not sure how many hunting families that translates into. We are not contesting the tradition of hunting. If someone is killing a deer and eating a deer, that is arguably a better outcome for the animal that if someone gets meat from a factory farm.

So we have on our national council a life-long hunter, Renee Tatro, from Kansas. It is not a debate for us about hunting.

If you are talking about lead, there is abundant evidence that as lead ammunition fragments, it becomes undetectable for the consumer of the product. There is a study out of North Dakota, I would be happy to submit it, about high lead levels in game meat that has been consumed by North Dakota hunters. There have been a number of other food pantries and others that have raised concerns about this issue as well.

Again, I understand the tradition of hunting. The issue is, if we have an alternative that is increasingly competitive on price and meets all the ballistic properties that lead has, and is indistinguishable, according to this latest survey from dove hunters in Texas, why would we not make a switch if we can do something that is not going to kill as many animals and threaten as many hunting families in terms of consumption? Again, if we can shift to that.

The world changes all the time. We went from the typewriter to the personal computer. The world is going to move away from lead. The question is, are we going to do it in a rational, science-based way? That is what we want. I am not sure it is rational to say, EPA should never be allowed to look at the issue.

Senator SULLIVAN. Thank you.

Senator Booker.

Senator BOOKER. Mr. Pacelle, this is a speed round, so I am going to ask you one question and ask that you submit that for the record, then I am going to give you a question to take for my 60 seconds left.

I have a serious concern about trapping. It is something that I know other countries have banned specific types of traps, because of their inhumane nature, body-gripping traps, specifically, and accidents that happen with body-gripping traps, the unintended consequences of body-gripping traps. So I would appreciate it if you could submit to the record some of your testimony on that. I think it would be objectionable to the overwhelming majority of Americans if they knew more of the truth of what those traps do and how this legislation would open up nearly all Federal lands to such a

barbaric practice that has some pretty negative consequences that are unintended.

But a specific question I want to ask you, because I saw the sort of grilling that you were taking from my honorable colleague and a partner of mine on many efforts, I know you are a non-profit. In the world of non-profits, where some of them are involved in some skeptical practices, yours is actually pretty amazing in terms of the return it gives to the donors, whether it is Oklahoma or New Jersey. I know you get lots of donations from New Jersey.

So for the record, to give you the last 30 seconds I have, would you expound a little bit about donors in Oklahoma and New Jersey and what they are getting for the money they are investing?

Mr. PACELE. Thank you, Senator Booker. Briefly on that issue, The Humane Society of the United States is about protecting all animals. We are the No. 1 direct care provider to animals in the United States in terms of the number of animals that we directly touch. We are the largest wildlife rehab center in the U.S. Again, we see the toxic effects of lead on some of those animals who come into our facility as a consequence of lead poisoning.

We have equine sanctuaries. We have an animal rescue team. We help tens of thousands of street dogs throughout the world, which is a public health issue as well, because of rabies-related concerns.

We do advocacy work for horses, for farm animals, for animals in laboratories, for wildlife. And for anyone to say that The Humane Society of the United States should just give money to shelters as a grant-making exercise so narrow the mission and focus of our work, and it is never anything that we ever said.

Senator BOOKER. The Chairman is my friend and I don't want to tread upon his patience.

Mr. PACELE. Thank you for asking. I appreciate the opportunity to clarify.

Senator SULLIVAN. Thank you, gentlemen. Thank you for your testimony. All the materials requested to be entered into the record are hereby done so without objection.

[The referenced materials follow:]

## Health Risks from Lead-Based Ammunition in the Environment

<http://dx.doi.org/10.1289/ehp.1306945>

Lead is one of the most studied toxicants, and overwhelming scientific evidence demonstrates that lead is toxic to several physiological systems in vertebrates, including the nervous, renal, cardiovascular, reproductive, immune, and hematologic systems (Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists 2013). Furthermore, there is no level of lead exposure in children known to be without adverse effects (Centers for Disease Control and Prevention (CDC) 2012a, 2012b).

In light of this evidence, there is an urgent need to end a major source of lead for animals and humans: spent lead bullets and shotgun pellets. Notably, production of lead-based ammunition in the United States accounted for > 69,000 metric tons consumed in 2012; this is second only to the amount of lead used to manufacture storage batteries (U.S. Geological Survey 2013). However, there are few regulations regarding the release of lead into the environment through discharge of lead-based ammunition. For other major categories of lead consumption, such as lead batteries and sheet lead/lead pipes, environmental discharge and disposal are regulated. Therefore, lead-based ammunition is likely the greatest largely unregulated source of lead that is knowingly discharged into the environment in the United States. In contrast, the release or distribution of other major sources of environmental lead contamination (e.g., leaded gasoline, lead-based paint, lead solder) have been substantially regulated and reduced since the mid-1970s (Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists 2013).

There is a national discussion—polarized at times—of the health risks posed to humans and wildlife from the discharge of lead-based ammunition. To inform this discussion, a group of 30 nationally and internationally recognized scientists with expertise regarding lead and environmental health recently collaborated to create an evidence-based consensus statement (Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists 2013) supporting the reduction and eventual elimination of lead released to the environment through the discharge of lead-based ammunition.

The discharge of lead bullets and shotgun pellets into the environment poses significant health risks to humans and wildlife. The best available scientific evidence demonstrates that the discharge of lead-based ammunition substantially increases environmental lead levels, especially in areas with higher shooting activity (U.S. Environmental Protection Agency 2012) and that the discharge of lead-based ammunition poses risks of elevated lead exposure to gun users (National Research Council 2012). When lead-containing bullets are used to shoot wildlife, they can fragment into hundreds of small pieces, many of which are small enough to be easily ingested by scavenging animals or to be retained in meat prepared for human consumption (Hunt et al. 2009; Knott et al. 2010; Pauli and Burkirk 2007). Consequently, lead-based ammunition may be a significant source of lead exposure in humans that regularly ingest wild game (Hanning et al. 2003; Johansen et al. 2006; Levesque et al. 2003; Tsuji et al. 2008). In addition, lead pellets and fragments have been reported in gastrointestinal tracts of hunters who consume meat from animals shot with lead-based ammunition (Carey 1977; Reddy 1985).

The use of lead pellets in shotgun shells for hunting waterfowl posed a serious threat to wetland birds, and secondarily to bald eagles, in the United States, leading to the U.S. Fish and Wildlife Service's 1991 nationwide regulations requiring use of nontoxic shotgun pellets for hunting waterfowl (Anderson 1992). However, lead poisoning from ingestion of spent lead-based ammunition fragments continues

to pose a particularly serious health threat for scavenging species. These lead-containing fragments remain the principal source of lead exposure to endangered California condors and continue to prevent the successful recovery of these birds in the wild (Church et al. 2006; Finkelstein et al. 2012; Green et al. 2008; Parish et al. 2009; Rideout et al. 2012; Woods et al. 2007). Other wildlife species, such as golden eagles, bald eagles, ravens, turkey vultures, and pumas, are also exposed to the fragments of spent lead ammunition (Burco et al. 2012; Clark and Scheuhammer 2003; Craighead and Bedrosian 2008; Cruz-Martinez et al. 2012; Fisher et al. 2006; Kelly and Johnson 2011; Stauber et al. 2010; Wayland and Bollinger 1999).

No rational deliberation about the use of lead-based ammunition can ignore the overwhelming evidence for the toxic effects of lead, or that the discharge of lead bullets and shot into the environment poses significant risks of lead exposure to humans and wildlife. Given the availability of non-lead ammunition for shooting and hunting (Thomas 2013), the use of lead-based ammunition that introduces lead into the environment can be reduced and eventually eliminated. This seems to be a reasonable and equitable action to protect the health of humans and wildlife.

*The authors declare they have no actual or potential competing financial interests.*

**David C. Bellinger**

Harvard Medical School  
Harvard School of Public Health  
Boston, Massachusetts

**Joanna Burger**

Environmental and Occupational Health Sciences Institute  
Rutgers University  
Piscataway, New Jersey

**Tom J. Cade**

Department of Ecology and Evolutionary Biology (Emeritus)  
Cornell University  
Ithaca, New York

**Deborah A. Cory-Slechta**

Department of Environmental Medicine  
University of Rochester School of Medicine  
Rochester, New York

**Myra Finkelstein**

Department of Microbiology and Environmental Toxicology  
University of California, Santa Cruz  
Santa Cruz, California

**Howard Hu**

Dalla Lana School of Public Health  
University of Toronto  
Toronto, Ontario, Canada

**Michael Kosnett**

Division of Clinical Pharmacology & Toxicology  
Department of Medicine  
University of Colorado School of Medicine  
Aurora, Colorado

**Philip J. Landrigan**

Department of Preventive Medicine  
Icahn School of Medicine at Mount Sinai  
New York, New York





**Bruce Lanphear**  
Child & Family Research Institute  
BC Children's Hospital  
Simon Fraser University  
Vancouver, British Columbia, Canada

**Mark A. Pokras**  
Wildlife Clinic  
Department of Infectious Disease and Global Health  
Cummings School of Veterinary Medicine  
Tufts University  
North Grafton, Massachusetts

**Patrick T. Redig**  
The Raptor Center  
Veterinary Clinical Sciences  
University of Minnesota  
St. Paul, Minnesota

**Bruce A. Rideout**  
Wildlife Disease Laboratories  
Institute for Conservation Research  
San Diego Zoo Global  
San Diego, California

**Ellen Silbergeld**  
Department of Environmental Health Sciences  
Johns Hopkins Bloomberg School of Public Health  
Baltimore, Maryland

**Robert Wright**  
Department of Preventive Medicine  
Icahn School of Medicine at Mount Sinai  
New York, New York

**Donald R. Smith**  
Department of Microbiology and Environmental Toxicology  
University of California, Santa Cruz  
Santa Cruz, California  
E-mail: drsmith@ucsc.edu

## REFERENCES

- Anderson WL. 1992. Legislation and lawsuits in the United States and their effects on nontoxic shot regulations. In: *Lead Poisoning in Waterfowl* (Pain DJ, ed). IWRB Special Publication 16. Simsbury, UK: International Waterfowl and Wetlands Research Bureau, 56–66.
- Burco J, Myers AM, Schuler K, Gilin C. 2012. Acute lead toxicosis via ingestion of spent ammunition in a free-ranging cougar (*Puma concolor*). *J Wildl Dis* 48(1):216–219.
- Carey LS. 1977. Lead shot appendicitis in northern native people. *J Can Assoc Radiol* 28:171–174.
- CDC (Centers for Disease Control and Prevention). 2012a. CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention." Available: [http://www.cdc.gov/nceh/lead/ACCLPP/CDC\\_Response\\_Lead\\_Exposure\\_Reax.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Reax.pdf) [accessed 9 May 2013].
- CDC (Centers for Disease Control and Prevention). 2012b. Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. Available: [http://www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_030712.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_030712.pdf) [accessed 9 May 2013].
- Church MC, Dewasda R, Risebrough RW, Sorenson K, Chamberlain CP, Farry S, et al. 2009. Ammunition is the principal source of lead accumulated by California condors re-introduced to the wild. *Environ Sci Technol* 40:6140–6150.
- Clark AJ, Scheuhammer AM. 2003. Lead poisoning in upland-foraging birds of prey in Canada. *Ecotoxicology* 12:23–30.
- Craighead D, Bedrosian B. 2008. Blood lead levels of common ravens with access to big-game offal. *J Wildl Manage* 72(1):240–245.
- Cruz-Martinez L, Redig PT, Deen J. 2012. Lead from spent ammunition: a source of exposure and poisoning in bald eagles. *Hum Wildl Interact* 6(1):194–194.
- Finkelstein ME, Dusk DF, George D, Burnett J, Brandt L, Church M, et al. 2012. Lead poisoning and the deceptive recovery of the critically endangered California condor. *Proc Natl Acad Sci USA* 109(28):11449–11454.
- Fisher LJ, Pain DJ, Thomas VG. 2006. A review of lead poisoning from ammunition sources in terrestrial birds. *Biol Conserv* 120(3):421–432.
- Green RE, Hunt WG, Parish CN, Newton I. 2008. Effectiveness of action to reduce exposure of free-ranging California condors in Arizona and Utah to lead from spent ammunition. *PLoS ONE* 3(12):e4022. doi:10.1371/journal.pone.0004022 [Online 24 December 2008].
- Hanning RM, Sandhu R, MacMillan A, Moss L, Tsuij LJS, Nisboer E. 2003. Impact of blood lead levels of maternal and early infant feeding practices of First Nation Cree in the Mushkegowuk Territory of northern Ontario, Canada. *J Environ Monit* 5:241–245.
- Health Risks from Lead-Based Ammunition in the Environment—A Consensus Statement of Scientists. 2013. Available: <http://escholarship.org/uc/item/9d93664x> [accessed 9 May 2013].
- Hunt WG, Watson RT, Oaks JL, Parish CN, Burnham KK, Tucker RL, et al. 2009. Lead bullet fragments in vultures from rifle-killed deer: potential for human dietary exposure. *PLoS ONE* 4(4):e5230. doi:10.1371/journal.pone.0005330 [Online 24 April 2009].
- Johansen P, Pedersen HS, Asmund G, Røge F. 2006. Lead shot from hunting as a source of lead in human blood. *Environ Pollut* 142:89–97.
- Kelly TR, Johnson CK. 2011. Lead exposure in free-flying turkey vultures is associated with big game hunting in California. *PLoS ONE* 6(4):e15350. doi:10.1371/journal.pone.0015350 [Online 6 April 2011].
- Knot J, Gilbert J, Mocom D, Green R. 2010. Implications for wildlife and humans of dietary exposure to lead from fragments of lead rifle bullets in deer shot in the UK. *Sci Total Environ* 408:95–99.
- Levesque B, Duchesne JF, Ganiayre C, Rhainds M, Dumas P, Scheuhammer AM, et al. 2003. Monitoring of umbilical cord blood lead levels and sources assessment among the Inuit. *Occup Environ Med* 60:693–695.
- National Research Council. 2012. Potential Health Risks to DOD Firing-Range Personnel from Recurrent Lead Exposure. Washington, DC:National Academies Press.
- Parish CN, Hunt WG, Feltes E, Sieg R, Orr K. 2009. Lead exposure among a reintroduced population of California condors in northern Arizona and southern Utah. In: *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans* (Watson RT, Fuller M, Pokras M, Hunt WO, eds). Boise, ID: The Peregrine Fund, 259–264. Available: <http://www.peregrinefund.org/subsites/conference-lead/PDF/0217%20Parish.pdf> [accessed 9 May 2013].
- Pauli J, Burkirk S. 2007. Recreational shooting of prairie dogs: a portal for lead entering wildlife food chains. *J Wildl Manage* 71(1):103–108.
- Reddy ER. 1985. Retained lead shot in the appendix. *J Can Assoc Radiol* 36:47–48.
- Rideout BA, Stalo L, Papendick R, Pessier A, Fuschner, B, Finkelstein ME, et al. 2012. Patterns of mortality in free-ranging California condors (*Gymnogyps californianus*). *J Wildl Dis* 48(1):95–112.
- Staubert E, Finch N, Tatcott PA, Gay JM. 2010. Lead poisoning of bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles in the U.S. inland Pacific northwest region—an 18-year retrospective study: 1991–2006. *J Avian Med Surg* 24(4):279–287.
- Thomas VG. 2013. Lead-free hunting rifle ammunition: product availability, price, effectiveness, and role in global wildlife conservation. *Ambio* doi:10.1007/s12280-012-0361-7 [Online 4 January 2013].
- Tsuij LJS, Wieman BC, Martin ID, Sutherland C, Wehard JP, Dumas P, et al. 2008. The identification of lead ammunition as a source of lead exposure in First Nations: the use of lead isotope ratios. *Sci Total Environ* 383:281–298.
- U.S. Environmental Protection Agency. 2012. Integrated Science Assessment for Lead (Third External Review Draft). EPA/600/R-10/075C. Washington, DC:U.S. Environmental Protection Agency. Available: <http://cfpub.epa.gov/ncea/isa/recon/isa/epa/lead/lead-242695> [accessed 9 May 2013].
- U.S. Geological Survey. 2013. Mineral Industry Surveys: Lead in January 2013. Available: <http://minerals.usgs.gov/minerals/pubs/commodity/lead/mis-201301-lead.pdf> [accessed 9 May 2013].
- Wayland M, Bollinger T. 1999. Lead exposure and poisoning in bald eagles and golden eagles in the Canadian Prairie Provinces. *Environ Poll* 104(3):341–350.
- Woods CP, Heinrich WR, Farry SC, Parish CN, Osborn SAM, Code TJ. 2007. Survival and reproduction of California condors released in Arizona. In: *California Condors in the 21st Century* (Mee A, Hall LS, eds). Series in Ornithology No. 2. Washington, DC, and Cambridge, MA: American Ornithologists Union and Nuttall Ornithological Club, 57–78. Available: <http://www.peregrinefund.org/docs/pdf/research-library/2007/2007-Woods-condor-survival.pdf> [accessed 9 May 2013].

**Title:**

Health Risks from Lead-Based Ammunition in the Environment - A Consensus Statement of Scientists

**Author:**

Bellinger, David C.  
Bradman, Asa  
Burger, Joanna  
Cade, Tom J.  
Cory-Slechta, Deborah A.  
Doak, Daniel  
Finkelstein, Myra  
Flegal, A. Russell  
Fry, Michael  
Green, Rhys E.  
Hu, Howard  
Jacobs, David E.  
Johnson, Christine  
Kelly, Terra  
Kosnett, Michael  
Landrigan, Philip J.  
Lanphear, Bruce  
Mielke, Howard W.  
Newton, Ian  
Pokras, Mark A.  
Poppenga, Robert H.  
Redig, Patrick T.  
Rideout, Bruce A.  
Risebrough, Robert W.  
Scheuhammer, Tony  
Silbergeld, Ellen  
Smith, Donald R.  
Strupp, Barbara  
Thomas, Vernon G.  
Wright, Robert

**Publication Date:**

03-22-2013

**Series:**

Other Scholarly Works

**Permalink:**

<http://escholarship.org/uc/item/6dq3h64x>

**Keywords:**

Lead, Ammunition, Health risks



eScholarship  
University of California

eScholarship provides open access, scholarly publishing services to the University of California and delivers a dynamic research platform to scholars worldwide.

**Copyright Information:**

All rights reserved unless otherwise indicated. Contact the author or original publisher for any necessary permissions. eScholarship is not the copyright owner for deposited works. Learn more at [http://www.escholarship.org/help\\_copyright.html#reuse](http://www.escholarship.org/help_copyright.html#reuse)



**eScholarship**  
University of California

eScholarship provides open access, scholarly publishing services to the University of California and delivers a dynamic research platform to scholars worldwide.

## Health Risks from Lead-Based Ammunition in the Environment

### A Consensus Statement of Scientists

March 22, 2013

*We, the undersigned, with scientific expertise in lead and environmental health, endorse the overwhelming scientific evidence on the toxic effects of lead on human and wildlife health. In light of this evidence, we support the reduction and eventual elimination of lead released to the environment through the discharge of lead-based ammunition, in order to protect human and environmental health.*

- 1) Lead is one of the most well-studied of all anthropogenic toxins and there is overwhelming scientific evidence that demonstrates:
  - a) Lead is toxic to multiple physiological systems in vertebrate organisms, including the central and peripheral nervous, renal, cardiovascular, reproductive, immune, and hematologic systems. Lead is also potentially carcinogenic; lead is officially recognized as a carcinogen and reproductive toxin in California, and the International Agency for Research on Cancer, the National Toxicology Program, and the US Environmental Protection Agency have identified lead as likely to be carcinogenic to humans.
  - b) There is no level of lead exposure to children known to be without deleterious effects (CDC, 2012). Exposure in childhood to even slightly elevated levels of lead produce lasting neurological deficits in intelligence and behavior.
  - c) Lead is also known to be toxic across different vertebrate organisms, including mammalian and avian species.
- 2) Lead-based ammunition is likely the greatest, largely unregulated source of lead knowingly discharged into the environment in the United States. In contrast, other significant sources of lead in the environment, such as leaded gasoline, lead-based paint, and lead-based solder, are recognized as harmful and have been significantly reduced or eliminated over the past 50 years.
  - a) Lead-based ammunition production is the second largest annual use of lead in the United States, accounting for over 60,000 metric tons consumed in 2012, second only to the consumption of lead in the manufacture of storage batteries (USGS, 2013).
  - b) The release of toxic lead into the environment via the discharge of lead-based ammunition is largely unregulated. Other major categories of lead consumption, such as leaded batteries and sheet lead/lead pipes, are regulated in their environmental discharge/disposal.
- 3) The discharge of lead-based ammunition and accumulation of spent lead-based ammunition in the environment poses significant health risks to humans and wildlife. The best available scientific evidence demonstrates:
  - a) The discharge of lead-based ammunition substantially increases environmental lead levels, especially in areas of concentrated shooting activity (USEPA ISA for Lead draft report, 2012).
  - b) The discharge of lead-based ammunition is known to pose risks of elevated lead exposure to gun users (NRC, 2012).
  - c) Lead-based bullets used to shoot wildlife can fragment into hundreds of small pieces, with a large proportion being sufficiently small to be easily ingested by scavenging animals or incorporated into processed meat for human consumption (Pauli and Burkirk, 2007; Hunt *et al.*, 2009; Knott *et al.*, 2010).

- d) Lead-based ammunition is a significant source of lead exposure in humans that ingest wild game (Hanning *et al.*, 2003; Levesque *et al.*, 2003; Johansen *et al.*, 2006; Tsuji *et al.*, 2008), and hunters consuming meat shot with lead-based ammunition have been shown to have lead pellets/fragments in their gastrointestinal tract (Carey, 1977; Reddy, 1985).
- e) Lead poisoning from ingestion of spent lead-based ammunition fragments poses a serious and significant threat to California wildlife.
  - i. Spent lead-based ammunition is the principal source of lead exposure to the endangered California condor, and lead poisoning in condors is preventing their successful recovery in the wild (Church *et al.*, 2006; Woods *et al.*, 2007; Green *et al.*, 2008; Parish *et al.*, 2009; Rideout *et al.*, 2012; Finkelstein *et al.*, 2012).
  - ii. Many other wild scavenging species, such as golden eagles, bald eagles, ravens, turkey vultures, and pumas are known to be exposed to and affected by lead (Wayland and Bollinger, 1999; Clark and Scheuhammer, 2003; Fisher *et al.*, 2006; Craighead and Bedrosian, 2008; Stauber *et al.*, 2010; Kelly and Johnson, 2011; Burco *et al.*, 2012).

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.

Signed,

**David C. Bellinger, PhD, MSc**  
 Professor  
 Neurology and Environmental Health  
 Harvard Medical School  
 Harvard School of Public Health  
 Boston, MA 02115

**Asa Bradman, PhD, MS**  
 Center for Environmental Research and  
 Children's Health (CERCH)  
 School of Public Health  
 University of California, Berkeley  
 Berkeley, CA 94720

**Joanna Burger, PhD**  
 Distinguished Professor of Biology  
 604 Allison Road  
 Rutgers University  
 Piscataway, NJ 08854

**Tom J. Cade, PhD**  
 Professor Emeritus of Zoology  
 Department of Ecology and Evolutionary  
 Biology, Cornell University, Ithaca, NY  
 6484 Hollilynn Dr.  
 Boise, ID 83709

**Deborah A. Cory-Slechta, PhD**  
 Professor of Environmental Medicine and of  
 Pediatrics  
 University of Rochester School of Medicine  
 Box EHSC  
 Rochester, NY 14642

**Daniel Doak, PhD**  
 Professor and Colorado Chair in  
 Environmental Studies  
 Environmental Studies Program  
 University of Colorado Boulder  
 Boulder, CO 80309

**Myra Finkelstein, PhD**  
 Adjunct Assistant Professor  
 Microbiology and Environmental Toxicology  
 University of California  
 Santa Cruz, CA 95064

**A. Russell Flegal, PhD**  
 Professor  
 Department of Earth & Planetary Sciences  
 University of California, Santa Cruz  
 Santa Cruz, CA 95064

**Michael Fry, PhD**

Research Physiologist (retired)  
Department of Avian Sciences  
University of California, Davis  
Davis, CA 95616

**Rhys E. Green, PhD**

Professor of Conservation Science  
University of Cambridge  
Department of Zoology  
Downing Street  
Cambridge CB2 3EJ  
United Kingdom

**Howard Hu, MD, MPH, ScD**

Director & Professor  
Dalla Lana School of Public Health  
University of Toronto  
Toronto, ON M5T 3M7  
Canada

**David E. Jacobs, PhD, CIH**

Research Director, National Center for  
Healthy Housing  
Adjunct Associate Professor, University of  
Illinois at Chicago School of Public Health  
Washington DC 20016

**Christine Johnson, DVM, PhD**

Associate Professor of Ecosystem Health  
and Epidemiology  
School of Veterinary Medicine, Wildlife  
Health Center  
University of California, Davis  
Davis, CA 95616

**Terra Kelly, DVM, PhD, Dipl. ACZM**

Wildlife Veterinarian and Epidemiologist  
School of Veterinary Medicine, Wildlife  
Health Center  
University of California, Davis  
Davis, CA 95616

**Michael Kosnett, MD, MPH**

Associate Clinical Professor  
Division of Clinical Pharmacology &  
Toxicology  
Department of Medicine, University of  
Colorado School of Medicine  
Department of Environmental and  
Occupational Health,  
Colorado School of Public Health  
Aurora, CO 80045

**Philip J. Landrigan, MD, MSc**

Dean for Global Health  
Ethel H. Wise Professor and Chairman  
Department of Preventive Medicine  
Professor of Pediatrics  
Director, Children's Environmental  
Health Center  
Mount Sinai School of Medicine  
New York, NY 10029

**Bruce Lanphear, MD, MPH**

Clinician Scientist, Child & Family Research  
Institute  
BC Children's Hospital Professor  
Simon Fraser University  
Vancouver, BC V6H 3N1  
Canada

**Howard W. Mielke, PhD**

Professor  
Department of Pharmacology  
Tulane University School of Medicine  
New Orleans, LA 70112

**Ian Newton, D.Sc, OBE, FRS, FRSE**

Emeritus Fellow,  
Centre for Ecology & Hydrology  
Benson Lane, Crowmarsh Gifford  
Wallingford, Oxon OX10 8BB  
United Kingdom

**Mark A. Pokras, DVM**

Associate Professor  
Wildlife Clinic & Center for Conservation  
Medicine Tufts University  
Cummings School of Veterinary Medicine  
N. Grafton, MA 01536

**Robert H. Poppenga, DVM, PhD, DABVT**

CAHFS Toxicology Laboratory  
 School of Veterinary Medicine  
 University of California  
 West Health Sciences Drive  
 Davis, CA 95616

**Patrick T. Redig, DVM, PhD**

Professor of Avian Medicine & Surgery  
 Founder & Director Emeritus of The Raptor  
 Center  
 University of Minnesota  
 St. Paul, MN 55108

**Bruce A. Rideout, DVM, PhD**

Wildlife Disease Laboratories  
 Institute for Conservation Research  
 San Diego Zoo Global  
 PO Box 120551  
 San Diego, CA 92112

**Robert W. Risebrough, PhD**

Research Ecologist (retired)  
 University of California, Berkeley and Santa  
 Cruz  
 Executive Director, Bodega Bay Institute  
 2711 Piedmont Avenue  
 Berkeley, CA 94705

**Tony Scheuhammer, PhD**

Emeritus Scientist  
 National Wildlife Research Centre  
 Carleton University  
 Ottawa, ON K1A 0H3  
 Canada

**Ellen Silbergeld, PhD**

Professor  
 Department of Environmental Health  
 Sciences  
 Department of Epidemiology  
 Department of Health Policy and  
 Management  
 Johns Hopkins University  
 Baltimore, MD 21205

**Donald R. Smith, PhD**

Professor  
 Microbiology and Environmental Toxicology  
 University of California  
 Santa Cruz, CA 95064

**Barbara Strupp, PhD**

Professor  
 Division of Nutritional Sciences  
 Cornell University  
 Ithaca, NY 14853

**Vernon G. Thomas, BA, MA (Oxon), MSc, PhD**

Professor Emeritus  
 Department of Integrative Biology  
 College of Biological Science  
 University of Guelph,  
 Guelph, ON N1G 2W1  
 Canada

**Robert Wright, MD, MPH**

Professor of Pediatrics  
 Department of Preventive Medicine  
 Mount Sinai School of Medicine  
 New York, NY 10029

## References

- Burco, J., Myers, A.M., Schuler, K., and Gillin, C. 2012. Acute lead toxicosis via ingestion of spent ammunition in a free-ranging cougar (*Puma concolor*). *J Wildl. Dis.* 48(1):216-9.
- Carey L.S. 1977. Lead shot appendicitis in northern native people. *J. Can. Assoc. Radiol.* 28:171-4.
- CDC, Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention". June 7, 2012. [http://www.cdc.gov/nceh/lead/ACCLPP/CDC\\_Response\\_Lead\\_Exposure\\_Recs.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf).
- ACCLPP, Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. "Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention", January 4, 2012. [http://www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_030712.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_030712.pdf).
- Church, M., Gwiazda, R., Risebrough, R.W., Sorenson, K., Chamberlain, C.P., Aarry, S., Heinrich, W., Rideout, B., Smith, D.R. 2006. Ammunition is the principal source of lead accumulated by California Condors re-introduced to the wild. *Environ. Sci. Technol.* 40:6143-6150.
- Clark, A.J. and Scheuhammer, A.M. 2003. Lead poisoning in upland-foraging birds of prey in Canada. *Ecotoxicol.* 12:23-30.
- Craighead, D. and Bedrosian, B. 2008. Blood lead levels of common ravens with access to big-game offal. *J. Wildl. Management* 72(1):240-245.
- Finkelstein, M.E., Doak, D.F., George, D., Burnett, J., Brandt, J., Church, M., Grantham, J., and Smith, D.R. 2012. Lead poisoning and the deceptive recovery of the critically endangered California condor. *Proc. Natl. Acad. Sci. U S A.* 109(28):11449-54.
- Fisher, I.J., Pain, D.J., and Thomas, V.G. 2006. A review of lead poisoning from ammunition sources in terrestrial birds. *Biol. Conser.* 131(3):421-432.
- Green, R. E., Hunt, W. G., Parish, C.N., and Newton, I. 2008. Effectiveness of action to reduce exposure of free-ranging California condors in Arizona and Utah to lead from spent ammunition. *PLoS ONE* 3(12): e4022.
- Hanning, R.M., Sandhu, R., MacMillan, A., Moss, L., Tsuji, L.J.S., and Nieboer, E. 2003. Impact of blood lead levels of maternal and early infant feeding practices of First Nation Cree in the Mushkegowuk Territory of northern Ontario, Canada. *J. Environ. Monit.* 5:241-5.
- Hunt, W.G., Watson, R.T., Oaks, J.L., Parish, C.N., Burnham, K.K., Tucker, R.L., Belthoff, J.R., and Hart, G. 2009. Lead bullet fragments in venison from rifle-killed deer: Potential for human dietary exposure. *PLoS ONE* 4(4): e5330.
- Johansen, P., Pedersen, H.S., Asmund, G., and Riget, F. 2006. Lead shot from hunting as a source of lead in human blood. *Environ Pollut.* 142:93-7.
- Kelly, T.R. and Johnson, C.K. 2011. Lead exposure in free-flying turkey vultures is associated with big game hunting in California. *PLoS ONE* 6(4): e15350.
- Knott, J., Gilbert, J., Hoccom, D., and Green, R. 2010. Implications for wildlife and humans of dietary exposure to lead from fragments of lead rifle bullets in deer shot in the UK. *Sci. Total Environ.* 409:95-99.
- Levesque, B., Duchesne, J.F., Gariépy, C., Rhainds, M., Dumas, P., Scheuhammer, A.M., Proulx, J.F., Déry, S., Muckle, G., Dallaire, F., and Dewailly, E. 2003. Monitoring of umbilical cord blood lead levels and sources assessment among the Inuit. *Occup. Environ. Med.* 60:693-5.
- NRC, 2012. Potential Health Risks to DOD Firing-range Personnel from Recurrent Lead Exposure. National Research Council. National Academies Press, Washington, D.C.
- Parish, C. N., Hunt, W. G., Feltes, E., Sieg, R., and Orr, K. 2009. Lead exposure among a reintroduced population of California Condors in northern Arizona and southern Utah.



- Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans, The Peregrine Fund, Boise, Idaho, USA.
- Pauli, J. and Burkirk, S. 2007. Recreational shooting of prairie dogs: A portal for lead entering wildlife food chains. *J. Wildl. Management* 71(1):103–108.
- Reddy, E.R. 1985. Retained lead shot in the appendix. *J. Can. Assoc. Radiol.* 36:47–8.
- Rideout, B.A., Stalis, I., Papendick, R., Pessier, A., Puschner, B., Finkelstein, M.E., Smith, D.R., Johnson, M., Mace, M., Stroud, R., Brandt, J., Burnett, J., Parish, C., Petterson, J., Witte, C., Stringfield, C., Orr, K., Zuba, J., Wallace, M., and Grantham, J. 2012. Patterns of mortality in free-ranging California Condors (*Gymnogyps californianus*). *J. Wildl. Dis.* 48(1):95–112.
- Stauber, E., Finch, N., Talcott, P.A., and Gay, J.M. 2010. Lead poisoning of bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles in the U.S. inland Pacific northwest region—an 18-year retrospective study: 1991–2008. *J. Avian Med. Surg.* 24(4):279–87.
- Thomas, V.G. 2013. Lead-free hunting rifle ammunition: Product availability, price, effectiveness, and role in global wildlife conservation. *Ambio*. Jan 4, DOI: 10.1007/s13280-012-0361-7 [Epub ahead of print].
- Tsujia, L.J.S., Wainman, B., Martina, I., Sutherland, C., Weber, J-P., Dumas, P., and Nieboer, E. 2008. The identification of lead ammunition as a source of lead exposure in First Nations: The use of lead isotope ratios. *Sci. Total Environ.* 393:291–298.
- USGS. Mineral Industry Surveys, Lead. January, 2013; United States Geological Survey, <http://minerals.usgs.gov/minerals>.
- U.S. EPA. Integrated Science Assessment for Lead (Third External Review Draft). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/075C, 2012.
- Wayland, M. and Bollinger, T. 1999. Lead exposure and poisoning in bald eagles and golden eagles in the Canadian Prairie Provinces. *Environ. Poll.* 104(3):341–350.
- Woods, C. P., Heinrich, W. R., Farry, S.C., Parish, C.N., Osborn, S.A.H., and Cade, T.J. (2007). Survival and reproduction of California Condors released in Arizona. California Condors in the 21st Century. A. Mee and L. S. Hall. Washington, DC, and Cambridge, Massachusetts, USA, American Ornithologists Union, Nuttall Ornithological Club. 2: 57–78.

## HUMAN EXPOSURE TO LEAD FROM AMMUNITION IN THE CIRCUMPOLAR NORTH

LORI A. VERBRUGGE<sup>1</sup>, SOPHIE G. WENZEL<sup>1</sup>, JAMES E. BERNER<sup>2</sup>, AND ANGELA C. MATZ<sup>3</sup>

<sup>1</sup>*Alaska Department of Health and Social Services, Division of Public Health, Section of Epidemiology,  
3601 C Street Suite 540, Anchorage, AK 99503, USA.*

E-mail: lori.verbrugge@alaska.gov

<sup>2</sup>*Alaska Native Tribal Health Consortium, Division of Community Health Services, 4000 Ambassador  
Drive, Anchorage, AK 99508, USA.*

<sup>3</sup>*US Fish and Wildlife Service, 101 – 12<sup>th</sup> Avenue, Box 19, Room 110, Fairbanks, AK 99701, USA.*

**ABSTRACT.**—Circumpolar subsistence cultures use firearms, including shotguns and rifles, for hunting game for consumption. Lead shot is still used for waterfowl and seabird hunting in many subsistence areas (despite lead shot bans) because it is inexpensive, readily available, and more familiar than non-toxic or steel shot, which shoot differently. Here we review published literature on lead concentrations and lead isotope patterns from subsistence users in the circumpolar North, indicating that elevated lead exposure is associated with use of lead ammunition. Mechanisms of exposure include ingestion of lead dust, ammunition fragments, and shot pellets in harvested meat, and inhalation of lead dust during ammunition reloading. In Alaska, ammunition-related lead exposures have also been attributed to the use of certain indoor firing ranges, and the melting and casting of lead to make bullets. Since there is no safe lead exposure limit, especially for children, use of lead shot and bullets in subsistence cultures results in unnecessary and potentially harmful lead exposure. In order for lead ammunition to be feasibly phased out, alternatives must be affordable and readily available to subsistence hunters. Community outreach, including describing the harmful effects of even small amounts of lead, especially in children and women of child-bearing age, and training on the different shot patterns, velocities, and distances inherent in using shot and bullet materials other than lead, will also be necessary to promote acceptance of alternatives to lead ammunition. *Received 15 September 2008, accepted 3 October 2008.*

VERBRUGGE, L. A., S. G. WENZEL, J. E. BERNER, AND A. C. MATZ. 2009. Human exposure to lead from ammunition in the circumpolar north. *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.2009.0110

**Key words:** Alaska, ammunition, arctic, game, human, hunters, lead, subsistence, waterfowl.

HUMANS IN THE NORTH have been exposed to lead from many of the same sources as in temperate regions. In the 20<sup>th</sup> century, the greatest exposure was inhalation of atmospherically transported lead produced from leaded gasoline. Other atmospheric sources included combustion of other fossil fuels, particularly coal, non-ferrous metal production (mining, smelting), and waste incineration (AMAP

<sup>3</sup> The findings and conclusions in this document are those of the author(s) and do not necessarily represent the views of the US Fish and Wildlife Service.

2004, AMAP 2002). Lead leachate from lead solder used in food cans may have poisoned the crews of *Erebus* and *Terror*, the ships of the 1850s Franklin expedition to the North Pole (Bayliss 2002). Interestingly, lead solder for canning wasn't banned in the United States until 1995 (Federal Register 60(123): 33106-9), and may still be used elsewhere. Ingestion of lead-based paint chips by children remains an issue worldwide, although in abatement with regulation of leaded paint.

With control of these lead sources, however, blood lead levels in humans have dropped over the past few decades. A phase-out of leaded gas beginning in the 1980s, for example, resulted in a substantial decline in lead levels in humans in North America (Pirkle et al. 1994) and Greenland (Hansen et al. 1991), as well as in snow from Greenland (Robinson 1981) and in the Arctic ice pack. The prevalence of blood lead levels  $\geq 10$   $\mu\text{g/dL}$  dropped from over 80% before 1980 to less than 10% in the 1990s (Pirkle et al. 1998).

Still, some northern populations, especially indigenous peoples dependent upon subsistence foods, continue to have elevated blood lead levels. A primary source is thought to be lead from ammunition, by ingestion of lead fragments in game shot with lead, inhalation of fumes from home production of shot or sinkers (as in rural areas in Russia; AMAP 2004), and inhalation of dust or particles during prolonged shooting. In fact, the Arctic Monitoring and Assessment Programme stated:

*Lead levels in Arctic indigenous peoples have declined since the implementation of controls on lead emissions. Concentrations of lead in blood currently reported are below a level of concern, however, continued monitoring is warranted because of the potent effects of lead on neurological development in the fetus and children (AMAP 1998).*

*This is still valid. In addition, recent data have shown that lead shot can be a significant source of human exposure (AMAP 2003).*

Lead is exceptionally dense, making it ideal for projectiles. It is also relatively soft, which allows it to be formed, even in home environments, into a variety of bullet and shot gauges. This malleability

also results in fracturing of the shot and bullets. The latter can leave macro- and microscopic traces of lead on average 15 cm from bullet pathways in meat (Hunt et al. 2006) and spread over an average of 24 cm and up to 45 cm apart (Hunt et al. 2009). Therefore, even if game is carefully cleaned and damaged meat discarded, embedded and invisible fragments of lead may still contaminate the meat (Stroud and Hunt 2009, Hunt et al. 2009).

In this paper we review data on lead concentrations in people living in the circumpolar north and evaluate lead from ammunition as an important source for current lead exposure. We conclude that exposure to lead from ammunition is unnecessary and potentially harmful to Arctic indigenous populations.

#### REVIEW OF LEAD TOXICOLOGY

**Absorption.**—Lead can enter the human body through three main routes of exposure: eating, breathing, or being shot. The third route has obvious health consequences and will not be discussed further.

People can ingest lead that is present in their immediate environment, such as dust, or that is in food or water. Leachate from lead solder use in canned foods has already been discussed. Wild game that has been shot with lead ammunition can contain lead fragments, particles or dust that is consumed along with the meat. Lead can also be ingested if people handle lead products such as fishing sinkers, and then fail to wash their hands before eating food. Children often ingest lead when they mouth lead-containing toys or objects, or suck their fingers after touching lead objects or lead-containing dust or soil.

In humans, the percentage of lead that is absorbed into the bloodstream after oral ingestion is influenced by several factors, including age. Gastrointestinal absorption of water-soluble lead appears to be higher in children than in adults (ATSDR 2007). Estimates derived from dietary balance studies indicate that children (ages two weeks to eight years) absorb approximately 40–50% of ingested water-soluble lead, while non-fasting adults absorb only 3–10% of ingested water-soluble lead (ATSDR

2007). Nutritional status also affects gastrointestinal absorption of lead; fasting status increases lead absorption. The presence of food in the gastrointestinal tract lowers lead absorption, especially if calcium or phosphate is present in the meal. Children who have calcium or iron deficiencies have a higher absorption of lead from the gastrointestinal tract (ATSDR 2007).

Exposure to lead through inhalation can occur in a variety of ways. When lead is melted to make fishing sinkers, ammunition or other products, especially in a home environment, dangerous levels of lead fumes can be produced and inhaled. Lead can also be inhaled on dust particles, contaminated soils, or via occupational exposure in manufacturing and mining. When leaded gasoline is combusted, tetraalkyl lead is an inhalable byproduct.

Amounts and patterns of deposition of particulate aerosols in the respiratory tract are affected by the size of the inhaled particles, age-related factors that determine breathing patterns (e.g., nose vs. mouth breathing), airway geometry, and airstream velocity within the respiratory tract (ATSDR 2007). Absorption of deposited lead is influenced by particle size and solubility. Larger particles (>2.5 microns) that are deposited in the upper airways can be transferred by mucociliary transport into the esophagus and swallowed. Smaller particles (<1 micron) can be deposited deeper into the lungs including the alveolar region, where intimate contact with the bloodstream enhances absorption (ATSDR 2007).

*Distribution and Excretion.*—The excretory half-life of lead in blood is approximately 30 days for adult humans (ATSDR 2007). Lead that is retained by the body is mostly stored in bone, where it is assimilated due to its chemical similarity to calcium (AMAP 2002). Lead can be mobilized from bone and released into the bloodstream during the process of bone resorption. Mobilization of bone lead can occur during pregnancy and lactation, and after menopause due to osteoporosis (ATSDR 2007). Lead in a pregnant mother's blood is effectively transferred to the fetus, and maternal lead can also be transferred to infants during breastfeeding (ATSDR 2007).

*Toxicity.*—Lead poses a greater risk to children than to adults for several reasons. Lead is more toxic to children than to adults because the nervous system of children is still developing. Also, children absorb a greater percentage of the lead they are exposed to (ATSDR 2007), and children are often exposed to more lead than adults. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. The crawling and mouthing behaviors of older infants and young toddlers place them at particular risk for exposure; blood lead levels (BLLs) in children typically peak at the age of two years for this reason (American Academy of Pediatrics 2005). Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Children's brains are developing rapidly during the first six years of life, which is why exposure to a chemical like lead that targets the brain is most devastating at that critical time.

Lead can delay or impair brain development in children and adversely affect IQ, and impair a child's ability to learn. Lead can also cause anemia and impaired metabolism of vitamin D. The Centers for Disease Control and Prevention (1997) recognized BLLs of  $\geq 10$   $\mu\text{g/dL}$  in children aged  $\leq 6$  years as levels of concern, and based on studies since then, the CDC now recognizes that 10  $\mu\text{g/dL}$  does not define a lower threshold for the harmful effects of lead (Brown 2007). Multiple studies have shown that as blood lead concentrations increase, IQ decreases, for example, by 7.4 points as blood lead increased from 1 to 10  $\mu\text{g/dL}$  in children up to five years old (Canfield et al. 2003), and with significantly higher rates of intellectual decrement in children with maximal BLL <7.5  $\mu\text{g/dL}$  than  $\geq 7.5$   $\mu\text{g/dL}$  (Lanphear et al. 2005). Thus, BLLs less than 10  $\mu\text{g/dL}$  are clearly harmful, and there is growing consensus that there is no "safe" level of lead exposure. Other adverse health effects associated with relatively low BLLs in children include delayed sexual maturation, increased blood pressure, depressed renal glomerular filtration rate, and inhibition of pathways in heme synthesis (ATSDR 2007).

As BLLs rise in children, the harmful health effects of lead become more severe. A child exposed to a large amount of lead may develop anemia, kidney damage, colic, muscle weakness, and brain damage, which can ultimately kill the child (ATSDR 2007). Such symptoms of clinical lead poisoning are commonly observed in children with BLLs of 45 µg/dL or higher; children with BLLs of 70 µg/dL or higher should be hospitalized immediately for treatment (Centers for Disease Control and Prevention 2002).

Studies have reported adverse health effects in adults with blood lead levels between 25–40 µg/dL, including hypertension, subtle or sub-clinical central nervous system deficits, and adverse reproductive outcomes (Centers for Disease Control and Prevention 2002). Lead exposure is clearly related to elevated blood pressure, and may also cause negative clinical cardiovascular outcomes and impaired performance on cardiovascular function tests (Navas-Acien et al. 2007). Cardiovascular and renal effects have been seen in adults chronically exposed to lead at levels <5 µg/dL in blood, and no lower threshold has been established for any lead-cardiovascular association (Navas-Acien et al. 2007).

At high levels of lead exposure, the brain and kidney in adults or children can be severely damaged, and death can result. High levels of lead exposure may also cause miscarriage in pregnant women, and affect testicular hormones in men. Other symptoms of lead poisoning in adults include colic, anemia, and muscle weakness. Clinical symptoms of lead poisoning can occur in adults with BLLs above 40 µg/dL (ATSDR 2007).

#### HUMAN EXPOSURE TO LEAD IN THE ARCTIC

Research on human lead exposure in the Arctic in the last decade has linked elevated lead exposure to use of lead shot or bullets for hunting. Other lead exposures of prior importance have largely been controlled, such as lead-based paints, lead in drinking water, and lead from gasoline. Leaded gasoline was phased out from North American use in the 1980s, with subsequent declines in environmental levels, including blood lead in humans (AMAP 1998, AMAP 2003, Van Oostdam et al. 2003). The

exception may be in northern Russia, where industrial contamination from mining and smelting of lead ores, and use of lead-containing gasoline, continues (AMAP 2003). However, populations in Russia who practice subsistence hunting, such as people on the Kola Peninsula, are probably also exposed to lead from ammunition (AMAP 2003, Odland et al. 1999).

Specific studies of lead exposure from lead shot began decades ago with documentation of residual (embedded or ingested) lead in waterfowl. Embedded lead shot were found in 18–45% of waterfowl, depending upon the species, tested in the USA, Canada, and Western Europe in the 1950s (Elder 1955). In Canada in the 1980s, 15% of 227 pooled breast muscle samples from waterfowl harvested with lead shot had lead concentrations >0.5 mg/kg (Canadian Wildlife Service unpublished data, cited in Scheuhammer and Norris 1995), and Frank (1986) found lead concentrations, some >100 µg/kg, in tissues of waterfowl harvested with lead shot. These fragments, confirmed by radiographs and ranging in size from dust to 1–2 mm, resulted from collision of shot with bone. In the mid-1990s, Hicklin and Barrow (2004) used fluoroscopy on live Canada Geese (*Branta canadensis*), American Black Ducks (*Anas rubripes*), Mallards (*A. platyrhynchos*) and Common Eiders (*Somateria mollissima*) from eastern Canada. Twenty-five percent of 1,624 birds had embedded shot, most of which was assumed to be lead. From 15–29%, depending upon age, of over 700 Common Eiders collected in western Greenland after colliding with boats or drowning in fishing nets had embedded lead shot in them (Merkel et al. 2006). It is clear that both micro- and macroscopic lead particles remain in avian meat that has been shot with lead pellets (Scheuhammer et al. 1998) and in large mammals shot with lead-based rifle bullets (Hunt et al. 2006). Therefore, lead from ammunition is a potential public health concern for indigenous peoples (Tsuji et al. 1999) and others who depend on wild game for food.

In a study specifically designed to examine the link between lead shot use for subsistence hunting of birds and potential human exposure, Johansen et al. (2001) x-rayed 50 Thick-billed Murre (*Uria lomvia*) carcasses bought from hunters in Greenland. The birds had been harvested with lead shot, and

had an average of 3.7 lead pellets per carcass (range 0–12). There was no correlation between the number of pellets and the lead concentration in meat, which ranged from 0.0074–1.63 ppm wet weight, although most lead found in the breast meat was from pellets that had gone through the meat and left fragments. The authors concluded that even after pellets were removed, lead shot fragmented to fine dust upon collision with bone, resulting in substantially greater (although variable) lead concentrations in murrelets shot with lead compared to those shot with steel. They estimated a potential dose of 50 µg of lead from eating one bird. An estimated 200,000 murrelets are harvested annually in Greenland, in addition to other seabirds and waterfowl. The authors concluded that using lead shot to hunt birds could be a significant public health concern (Johansen et al. 2001).

A variety of raptor species have been exposed to or poisoned by lead from predating or scavenging lead-shot game (Hunt et al. 2006) and waterfowl (Pattee and Hennes 1983, Elliott et al. 1992, Pain et al. 1993, Kendall et al. 1996, Miller et al. 1998, Mateo et al. 1999, Samour and Naldo 2002, Pain et al. 2009). Therefore, it is not surprising that people who consume game shot with lead can also have elevated blood lead levels. Numerous studies at both the population and individual levels have implicated and linked lead ammunition to elevated blood lead levels and clinical symptoms in northern peoples.

For example, blood lead levels were monitored in 50 male hunters in Greenland before, during, and after the bird-hunting season in order to establish the association between bird consumption and blood lead concentrations (Johansen et al. 2006). Frequency of reported bird consumption was strongly associated with measured BLLs in the hunters, and eider meals were more important than murre meals as a lead source in the blood. Mean BLLs (12.8 µg/dL) were more than eight times higher in the group reporting more than 30 bird meals per month than in the group reporting no bird consumption (1.5 µg/dL).

At the population level, the Dene/Métis and bird-hunting Inuit in Canada averaged from 3.1–5.0 µg/dL of lead in maternal blood, compared to 1.9–

2.2 µg/dL among Caucasians and other Inuit (Van Oostdam et al. 2003). However, 3.4% and 2.2% of the blood samples from the Inuit and Dene/Métis women, respectively, exceeded the 10.0 µg/dL Canadian Action Level (Walker et al. 2001). In Greenland, blood lead levels in Inuit mothers averaged 3.1–5.0 µg/dL, similar to the Canadian Inuit and Dene/Métis (AMAP 2003). In Siberia, indigenous women had average blood lead levels of 2.1–3.2 µg/dL, while non-indigenous women, who presumably obtained a smaller proportion, if any, of their food from hunting, averaged 0.02–0.04 µg/dL (AMAP 2003). In Nunavik (Arctic Quebec), adult Inuit blood lead levels were elevated and were related to age, smoking and, in particular, daily consumption of waterfowl (Dewailly et al. 2001). Blood lead, adjusted for age and sex, was associated with seabird consumption in Greenland (Bjerrregaard et al. 2004). In that study, Greenlanders who reported consuming sea birds several times a week had a blood lead level >50% higher than those who reported eating sea birds only a few times a month or less.

Lead shot exposure and effects have also been documented at the individual level in northern humans. For example, Madsen et al. (1988) noted that lead shot in the appendix were often seen in lower abdominal x-rays in Denmark, and those with lead in the appendix had greater blood lead concentrations. Of 132 randomly selected radiographic charts from a hospital serving six native Cree communities in Northern Ontario (1990–1995), 15% showed lead shot in the gastrointestinal system (Tsuji and Nieboer 1997). Sixty-two patients in one Newfoundland hospital had from 1–200 lead shot in their appendices (Reddy 1985), and Hillman (1967), Greensher et al. (1974), Durlach et al. (1986), and Gustavsson and Gerhardsson (2005) all documented clinical symptoms resulting from lead shot in human appendices. In the USA in 2005, Cox and Pesola (2005) published a radiograph from an Alaska Native elder with an appendix full of shot, and stated “buckshot is commonly seen in Alaskan natives.”

Using lead isotopes to identify the source of lead when blood lead is elevated combines population and individual assessments. This method was used by Tsuji et al. (2008) to definitively document lead

from ammunition—both shot and bullets—as a source of lead in First Nations Cree in northern Ontario. Lead isotope signatures of southern Ontario urban dwellers were different from those of northern First Nations people, who depended upon subsistence foods. Lead from ammunition had a separate signature from that found on lichens and, significantly, isotope signatures of First Nations people overlapped with that of lead from ammunition. Levesque et al. (2003) used a similar approach to identify the source of lead in cord blood of Nunavik Inuit infants born from 1993–96. Although mobilization of maternal bone lead resulted in less definite signatures than those documented by Tsuji et al. (2008), there was still a strong suggestion that the source of elevated cord blood lead, found in approximately 7% of Inuit newborns, was lead from ammunition. There were also signature differences between Inuit infants from Nunavik in northern Quebec, and Caucasian infants from southern Quebec. In Alaska, recent lead isotope data from blood of Alaska Natives from Bethel on the Yukon-Kuskokwim Delta and Barrow on the North Slope, regions where subsistence waterfowl hunts occur, showed signatures that overlapped with those of shot (Alaska Native Tribal Health Consortium, unpubl. data).

*Blood Lead Surveillance in Alaska.*—Alaska regulations require laboratories and health care providers to report all blood lead test results  $\geq 10$   $\mu\text{g}/\text{dL}$  to the Alaska Division of Public Health, Section of Epidemiology; however, most laboratories report all BLL results (Section of Epidemiology 2008b). The Section of Epidemiology maintains a blood lead surveillance database of all reported blood lead levels from Alaskans ( $>26,000$  records as of August 2008), and conducts individual case follow-up activities for all elevated BLLs.

In Alaska, the majority of adults with BLLs  $\geq 25$   $\mu\text{g}/\text{dL}$  were males who worked in the metal ore mining industry (State of Alaska 2008a). Across all age groups, the majority (81%) of known non-occupational elevated lead exposures involved people exposed on indoor firing ranges, followed by children who were born or adopted from abroad (10%), and people casting lead as a hobby (3.4%) (State of Alaska 2008b).

Major lead sources for children aged  $<6$  years in the contiguous United States are lead-contaminated dust and soil and deteriorated lead-based paint (Brown 2007), but these exposure sources are not frequently encountered in Alaska. The majority of Alaska children aged  $<6$  years with elevated BLLs obtained their lead exposures abroad (State of Alaska 2008b). Many of the other sources of non-occupational lead exposure in Alaskans reflect the hunting and fishing, outdoor lifestyle of Alaska. Lead ammunition or lead fishing sinkers are commonly implicated as the primary exposure source of elevated BLLs in Alaska.

Elevated BLLs have been attributed to use of indoor firing ranges in Alaska (Lynn et al. 2005, Verbrugge 2007). Students shooting on high school rifle teams that used the problematic indoor shooting ranges were among the persons with elevated BLLs. Inadequate ventilation systems and improper maintenance practices at indoor firing ranges were documented at several ranges with lead exposure problems. The cleaning practice of dry sweeping is particularly hazardous, and should never be performed in indoor ranges. Elevated lead exposures have also occurred among Alaskans who hand reload ammunition, and among sportsmen who melt lead to cast their own bullets (State of Alaska 2008b). In June 2001 an adult Alaskan male suffered acute lead poisoning as a result of inhaling lead dust and fumes while melting and casting lead to make fishing sinkers (State of Alaska 2001). The patient had a BLL of 133  $\mu\text{g}/\text{dL}$  and exhibited symptoms of fatigue, stomach pain with gastric upset for several months, and a fever of 102°F for 10 days. The patient was hospitalized and received chelation therapy, and his BLL subsequently declined. The State of Alaska has not yet investigated whether consumption of game shot with lead may also be causing elevated lead exposures in Alaska, although this has recently been added to the list of potential risk factors under consideration during follow-ups for elevated BLLs.

#### REDUCING LEAD EXPOSURE IN CIRCUMPOLAR PEOPLE

In the circumpolar north, many indigenous peoples and other rural inhabitants depend on wild game for subsistence. In Alaska and elsewhere, scientists

have documented the nutritional value of traditional foods such as fish, marine and terrestrial mammals, wild birds, and plants (Egeland et al. 1998, Nobmann et al. 1992). In many rural northern communities, wage-paying jobs are limited and market food is not available or is expensive. Further, wild foods are often nutritionally superior to market foods, which have high levels of processed sugars and fats. Subsistence food gathering is essential if people are to have enough healthy food. Traditional foods represent not just a critical food source, but also an integral part of Native culture and a way of life that has existed for many generations. Risk reduction strategies for lead exposure from ammunition must account for the need for inexpensive shot that is easy to use for subsistence hunting—a niche that is still being filled by purchased and reloaded lead shot in much of the North.

Risk reduction strategies that have been suggested for reducing lead exposure from use of lead shot include culture-specific outreach (see Tsuji 1998) to lead shot users and sellers, with the goal of voluntary behavior changes; capacity-building, which trains community members in outreach regarding lead shot risks and non-lead shot shooting techniques; and regulation, both from within and outside of subsistence communities (Tsuji 1999, AMAP 2003). Some are more successful than others; for example, regulation is often most effective if it is community-generated. Enforcement from outside the community, especially with the large distances and relatively low human population densities in Arctic regions, can be inefficient on broad scales.

After Inuit from Nunavik were found to have high cord blood lead levels, lead shot bans (Dallaire et al. 2003) and public health intervention (Levesque et al. 2003) resulted in “marked” and “significant” decreases in cord blood lead concentrations, from an average of 0.20  $\mu\text{mol/L}$  before the ban in 1999 to 0.12  $\mu\text{mol/L}$  after the ban (Dallaire et al. 2003). In the Mushkegowuk Territory of northern Ontario, collaborative health education outreach with direct community involvement was essential to changing attitudes about the safety of lead shot and inspiring behavioral change (Tsuji et al. 1999). In Alaska, outreach to food preparers, school-age children, and hunters about the risk of lead exposure from lead

shot to human and bird health, resulted in two community-generated injunctions on the use of lead shot in areas covering 83 million acres (2.4 million ha) and numerous subsistence communities on the North Slope and Yukon-Kuskokwim Delta.

Reducing lead exposure from other sources, which may not be as widespread as the use of lead ammunition, could respond well to targeted outreach and regulation. For example, as the Alaskan examples illustrate, lead should not be melted and formed into shot or sinkers in home environments. In indoor shooting ranges, ventilation systems must be built correctly and correctly maintained, dry sweeping should be prohibited, and blood lead testing for regular users such as rifle teams should be performed at the beginning and end of each shooting season.

## CONCLUSION

Since bans on lead in gasoline, instituted primarily in the 1980s and 1990s, lead levels in northern hemisphere humans have generally declined. A notable exception is the blood lead levels of Arctic indigenous peoples who rely on subsistence foods. In many cases, elevated blood lead levels in the Arctic have been associated with ingestion of lead from spent ammunition, primarily shot, although lead from fragmented bullets in big game may have been overlooked as a source until recently (Hunt et al. 2006, Tsuji et al. 2008, Hunt et al. 2009, Titus et al. 2009). Other cases of harmful lead exposure have resulted indirectly from use of lead in ammunition or for fishing (indoor firing ranges, home melting and manufacture of lead sinkers, shot, or bullets, and home reloading). Because subsistence populations by definition hunt much of their food, and because this food is important economically, nutritionally, and socially (Titus et al. 2009), an inexpensive source of ammunition is required. Lead is relatively inexpensive, but use of lead in ammunition comes with risks to humans, especially children, which do not occur with non-lead substitutes. Many approaches to reducing lead exposure have been proposed or implemented. For example, human health agencies can work with ammunition manufacturers and sellers to reduce the availability of lead ammunition, facilitate the availability of inexpensive non-toxic alternatives, and offer training



on the different shot patterns, velocities, and distances inherent in using materials other than lead. The most effective means of reducing lead exposure have included community-based outreach and education on the dangers of lead from ammunition to both humans and the environment. These approaches have achieved positive behavioral changes, and may result in subsistence hunters and their families choosing to use non-toxic shot and bullets for their subsistence needs.

#### LITERATURE CITED

- AMAP. 1998. AMAP Assessment Report: Arctic Pollution Issues. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.
- AMAP. 2002. AMAP Assessment 2002: Arctic Pollution. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.
- AMAP. 2003. AMAP Assessment 2002: Human Health in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.
- AMAP. 2004. Persistent Toxic Substances, Food Security and Indigenous Peoples of the Russian North. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.
- AMERICAN ACADEMY OF PEDIATRICS, COMMITTEE ON ENVIRONMENTAL HEALTH. 2005. Lead exposure in children: prevention, detection, and management. *Pediatrics* 116:1036–1046.
- ATSDR. 2007. Toxicological profile for lead. Agency for Toxic Substances and Disease Registry, Atlanta, Georgia, USA.
- BAYLISS, R. 2002. Sir John Franklins's last arctic expedition: a medical disaster. *Journal of the Royal Society of Medicine* 95:151–153.
- BJERREGAARD, P., P. JOHANSEN, G. MULVAD, H. S. PEDERSEN, AND J. C. HANSEN. 2004. Lead sources in human diet in Greenland. *Environmental Health Perspectives* 112:1496–1498.
- BROWN, M. J. 2007. Interpreting and managing blood lead levels <10 µg/dL in children and reducing childhood exposures to lead: recommendations of CDC's Advisory Committee on Childhood Lead Poisoning Prevention. *MMWR* 56 (RR08):1–14,16.
- CANFIELD, R. L., C. R. HENDERSON, JR., D. A. CORY-SLECHTA, C. COX, T. A. JUSKO, AND B. P. LANPHEAR. 2003. Intellectual impairment in children with blood lead concentrations below 10 µg per deciliter. *New England Journal of Medicine* 348:1517–1526.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. 1997. Screening young children for lead poisoning: guidance for state and local public health officials. US Department of Health and Human Services, Atlanta, Georgia, USA.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. March 2002. Managing elevated blood lead levels among young children: recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention. US Department of Health and Human Services, Atlanta, Georgia, USA.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. Adult blood lead epidemiology and surveillance—United States, 1998–2001. *In: Surveillance Summaries*, December 13, 2002. *MMWR* 51 (No. SS-11):1–10.
- COX, W. M., AND G. R. PESOLA. 2005. Buckshot ingestion. *New England Journal of Medicine* 353:26.
- DALLAIRE, F., E. DEWAILLY, G. MUCKLE, AND P. AYOTTE. 2003. Time trends of persistent organic pollutants and heavy metals in umbilical cord blood of Inuit infants born in Nunavik (Quebec, Canada) between 1994 and 2001. *Environmental Health Perspectives* 111:1660–1664.
- DEWAILLY, E., P. AYOTTE, S. BRUNEAU, G. LEBEL, P. LEVELLOIS, AND J. P. WEBER. 2001. Exposure of the Inuit population of Nunavik (Arctic Québec) to lead and mercury. *Archives of Environmental Health* 56:350–357.
- DURLACH, V., F. LISOVOSKI, A. GROSS, G. OSTERMANN, AND M. LEUTENEGGER. 1986. Appendicectomy in an unusual case of lead poisoning. *Lancet* i(8482):687–688.
- EGELAND, G. M., L. A. FEYK, AND J. P. MIDDAGH. January 15, 1998. The use of traditional foods in a healthy diet in Alaska: Risks in perspective. *State of Alaska Epidemiology Bulletin*. [Online.] Available at [http://www.epi.hss.state.ak.us/bulletins/docs/tr1998\\_01.pdf](http://www.epi.hss.state.ak.us/bulletins/docs/tr1998_01.pdf). Accessed August 21, 2008.
- ELDER, W. H. 1955. Fluoroscope measures of hunting pressure in Europe and North America. *Transactions of the North American Wildlife Conference* 20: 298–322.

- ELLIOTT, J. E., K. M. LANGELIER, A. M. SCHEUHAMMER, P. H. SINCLAIR, AND P. E. WHITEHEAD. 1992. Incidence of lead poisoning in Bald Eagles and lead shot in waterfowl gizzards from British Columbia, 1988–91. Canadian Wildlife Service Progress Notes No. 200, June 1992. Canadian Wildlife Service, Ottawa, Canada.
- FRANK, A. 1986. Lead fragments in tissues from wild birds: A cause of misleading results. *Science of the Total Environment* 54:275–281.
- GREENSHER, J., H. C. MOFENSON, C. BALAKRISHNAN, AND A. ALEEM. 1974. Lead poisoning from ingestion of lead shot. *Pediatrics* 54:641.
- GUSTAVSSON, P., AND L. GERHARDSSON. 2005. Intoxication from an accidentally ingested lead shot retained in the gastrointestinal tract. *Environmental Health Perspectives* 113:491–493.
- HANSEN, J. C., T. G. JENSEN, AND U. TARP. 1991. Changes in blood mercury and lead levels in pregnant women in Greenland 1983–1988. Pages 605–607 in B. Postl, P. Gilbert, J. Goodwill, M. E. K. Moffatt, J. D. O'Neil, P. A. Sarsfield, and T. K. Young (Eds.). *Proceedings of the 8<sup>th</sup> International Congress on Circumpolar Health*, 20–25 May 1990, White Horse, Yukon, Canada. University of Manitoba Press, Winnipeg, Canada.
- HICKLIN, P. W., AND W. R. BARROW. 2004. The incidence of embedded shot in waterfowl in Atlantic Canada and Hudson Strait. *Waterbirds* 27:41–45.
- HILLMAN, F. E. 1967. A rare case of chronic lead poisoning: Polynuropathy traced to lead shot in the appendix. *Industrial Medicine and Surgery* 36:388–398.
- HUNT, W. G., W. BURNHAM, C. N. PARISH, K. K. BURNHAM, B. MUTCH, AND J. L. OAKS. 2006. Bullet fragments in deer remains: Implications for lead exposure in avian scavengers. *Wildlife Society Bulletin* 34:167–170.
- HUNT, W. G., R. T. WATSON, J. L. OAKS, C. N. PARISH, K. K. BURNHAM, R. L. TUCKER, J. R. BELTHOFF, AND G. HART. 2009. Lead bullet fragments in venison from rifle-killed deer: Potential for human dietary exposure. 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.2009.0112
- JOHANSEN, P., G. ASMUND, AND F. RIGET. 2001. Lead contamination of seabirds harvested with lead shot—implications to human diet in Greenland. *Environmental Pollution* 112:501–504.
- JOHANSEN, P., H. S. PEDERSEN, G. ASMUND, AND F. RIGET. 2006. Lead shot from hunting as a source of lead in human blood. *Environmental Pollution* 142:93–97.
- KENDALL, R. J., T. E. LACHER, JR., C. BUNCK, B. DANIEL, C. DRIVER, C. F. GRUE, F. LEIGHTON, W. STANLEY, P. G. WATANABE, AND M. WHITWORTH. 1996. An ecological risk assessment of lead shot exposure in non-waterfowl avian species: Upland game birds and raptors. *Environmental Toxicology and Chemistry* 15:4–20.
- LANPHEAR, B. P., R. HORNING, J. KHOURY, K. YOLTON, P. BAGHURST, D. C. BELLINGER, R. L. CANFIELD, K. N. DIETRICH, R. BORNSCHNEIN, T. GREENE, S. J. ROTHENBERG, H. L. NEEDLEMAN, L. SCHNAAS, G. WASSERMAN, J. GRAZIANO, AND R. ROBERTS. 2005. Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. *Environmental Health Perspectives* 113:894–899.
- LEVESQUE, B., J-F. DUCHESNES, C. GARIEPY, M. RHAINDS, P. DUMAS, A. M. SCHEUHAMMER, J-F. PROUL, S. DERY, G. MUCKLE, F. DALLAIRE, AND E. DEWAILLY. 2003. Monitoring of umbilical cord blood lead levels and sources assessment among the Inuit. *Occupational and Environmental Medicine* 60:693–695.
- LYNN, T., S. ARNOLD, C. WOOD, L. CASTRODALE, J. MIDDLEAUGH, AND M. CHIMONAS. 2005. Lead exposure from indoor firing ranges among students on shooting teams—Alaska, 2002–2004. *MMWR* 54(23):577–579.
- MADSEN, H. H., T. SKJØDT, P. J. JORGENSEN, AND P. GRANDJEAN. 1988. Blood lead levels in patients with lead shot retained in the appendix. *Acta Radiology* 29:745–746.
- MATEO, R., J. ESTRADA, J.-Y. PAQUET, X. RIERA, L. DOMINGUEZ, R. GUITART, AND A. MARTINEZ-VILALTA. 1999. Lead shot ingestion by Marsh Harriers *Circus aeruginosus* from the Ebro delta, Spain. *Environmental Pollution* 104:435–440.
- MERKEL, F. R., K. FALK, AND S. E. JAMIESON. 2006. Effect of embedded lead shot on body

- condition of Common Eiders. *Journal of Wildlife Management* 70:1644–1649.
- MILLER, M. J., M. RESTANI, A. R. HARMATA, G. R. BORTOLOTTI, AND M. E. WAYLAND. 1998. A comparison of blood lead levels in Bald Eagles from two regions on the Great Plains of North America. *Journal of Wildlife Diseases* 34:704–714.
- NAVAS-ACIEN, A., E. GUALLAR, E. K. SILBERGELD, AND S. J. ROTHENBERG. 2007. Lead exposure and cardiovascular disease—a systematic review. *Environmental Health Perspectives* 115:472–482.
- NOBMAN, E. D., T. BYERS, A. P. LANIER, J. H. HANKIN, AND M. Y. JACKSON. 1992. The diet of Alaska Native adults: 1987–1988. *American Journal of Clinical Nutrition* 55:1024–1032.
- ODLAND, J. O., I. PERMINOVA, N. ROMANOVA, Y. THOMASSEN, L. J. S. TSUI, J. BROX, AND E. NIEBOER. 1999. Elevated blood lead concentrations in children living in isolated communities of the Kola Peninsula, Russia. *Ecosystem Health* 5:75–81.
- PAIN, D. J., AND C. AMIARD-TRIQUET. 1993. Lead poisoning of raptors in France and elsewhere. *Ecotoxicology and Environmental Safety* 25:183–192.
- PAIN, D. J., I. J. FISHER, AND V. G. THOMAS. 2009. A global update of lead poisoning in terrestrial birds from ammunition sources. *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.2009.0108
- PATTEE, O. H., AND S. K. HENNES. 1983. Transactions of the 48<sup>th</sup> North American Wildlife and Natural Resources Conference. 1983:230–237.
- PIRKLE, J. L., D. J. BRODY, AND E. W. GUNTER. 1994. The declines in blood lead levels in the United States: the National Health and Nutrition Examination Surveys. *Journal of the American Medical Association* 272:284–291.
- PIRKLE, J. L., R. B. KAUFMANN, D. J. BRODY, T. HICKMAN, E. W. GUNTER, AND D. C. PASCHAL. 1998. Exposure of the USA population to lead, 1991–1994. *Environmental Health Perspectives* 106:745–750.
- REDDY, E. R. 1985. Retained lead shot in the appendix. *Canadian Journal of the Association of Radiologists* 36:47–48.
- ROBINSON, J. 1981. Lead in Greenland snow. *Ecotoxicology and Environmental Safety* 5:24–37.
- SAMOUR, J. H. AND J. NALDO. 2002. Diagnosis and therapeutic management of lead toxicosis in falcons in Saudi Arabia. *Journal of Avian Medicine and Surgery* 16:16–20.
- SCHEUHAMMER, A. M., AND S. L. NORRIS. 1995. A review of the environmental impacts of lead shotshell ammunition and lead fishing weights in Canada. Occasional Paper No. 88, Canadian Wildlife Service, Ottawa, Canada.
- SCHEUHAMMER, A. M., J. A. PERRAULT, E. ROUTHIER, B. M. BRAUNE, AND G. D. CAMPBELL. 1998. Elevated lead concentrations in edible portions of game birds harvested with lead shot. *Environmental Pollution* 102:251–257.
- SECTION OF EPIDEMIOLOGY, Division of Public Health, Department of Health and Social Services, State of Alaska. January 2008. Conditions reportable to public health. Anchorage, Alaska, USA. [Online.] Available at <http://www.epi.hss.state.ak.us/pubs/conditions/ConditionsReportable.pdf>. Accessed August 21, 2008.
- STATE OF ALASKA EPIDEMIOLOGY BULLETIN, November 19, 2001. Cottage industry causes acute lead poisoning. [Online.] Available at [http://www.epi.hss.state.ak.us/bulletins/docs/b2001\\_17.htm](http://www.epi.hss.state.ak.us/bulletins/docs/b2001_17.htm). Accessed August 21, 2008.
- STATE OF ALASKA EPIDEMIOLOGY BULLETIN, January 23, 2008a. Adult blood lead epidemiology and surveillance: Occupational exposures – Alaska, 1995–2006. [Online.] Available at [http://www.epi.hss.state.ak.us/bulletins/docs/b2008\\_02.pdf](http://www.epi.hss.state.ak.us/bulletins/docs/b2008_02.pdf). Accessed August 21, 2008.
- STATE OF ALASKA EPIDEMIOLOGY BULLETIN, March 7, 2008b. Blood lead epidemiology and surveillance: non-occupational exposures in adults and children—Alaska, 1995–2006. [Online.] Available at [http://www.epi.hss.state.ak.us/bulletins/docs/b2008\\_07.pdf](http://www.epi.hss.state.ak.us/bulletins/docs/b2008_07.pdf). Accessed August 21, 2008.
- STROUD, R. K., AND W. G. HUNT. 2009. Gunshot wounds: A source of lead in the environment. *In* R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and*

## - HUMAN LEAD EXPOSURE FROM AMMUNITION -

- Humans. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa.2009.0109
- TITUS, K., T. L. HAYNES, AND T. F. PARAGI. 2009. The importance of Moose, Caribou, deer and small game in the diet of Alaskans. *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.2009.0312
- TSUJI, L. J. S. 1998. Mandatory use of non-toxic shotshell for harvesting of migratory game birds in Canada: cultural and economic concerns. *Canadian Journal of Native Studies* 18:19–36.
- TSUJI, L. J. S., AND E. NIEBOER. 1997. Lead pellet ingestion in First Nation Cree of the Western James Bay region of northern Ontario, Canada: Implications for a nontoxic shot alternative. *Ecosystem Health* 3:54–61.
- TSUJI, L. J. S., E. NIEBOER, AND J. D. KARAGATZIDES. 1999. Lead and the environment: An approach to educating adults. *Journal of American Indian Education* 38:25–38.
- TSUJI, L. J. S., B. C. WAINMAN, I. D. MARTIN, C. SUTHERLAND, J.-P. WEBER, P. DUMAS, AND E. NIEBOER. 2008. The identification of lead ammunition as a source of lead exposure in First Nations: The use of lead isotope ratios. *Science of the Total Environment* 393:291–298.
- VAN OOSTDAM, J., S. DONALDSON, M. FEELEY, AND N. TREMBLAY. 2003. *Canadian Arctic Contaminants Assessment Report II: Human Health*. Ottawa, Canada.
- VERBRUGGE, L. A. 2007. Health consultation – Interior Alaska indoor shooting range. ATSDR, Public Health Service, US Department of Health and Human Services, Atlanta, Georgia, USA. [Online.] Available at <http://www.atsdr.cdc.gov/HAC/pha/InteriorAlaskaIndoorShootingRange/InteriorAlaskaShootingRange061807.pdf>. Accessed August 21, 2008.
- WALKER, J., J. VAN OOSTDAM, AND E. McMULLEN. 2001. Human contaminant trends in Arctic Canada: Northwest Territories and Nunavut environmental contaminants exposure baseline. Final Technical Report. Department of Health and Social Services, Government of the Northwest Territories. Yellowknife, Northwest Territories, Canada.

Date: October 14, 2008

From: Shahed Iqbal, PhD, MBBS  
Officer, Epidemic Intelligence Service  
Air Pollution and Respiratory Health Branch (APRHB)  
Division of Environmental Hazards and Health Effects (DEHHE)  
National Center of Environmental Health (NCEH)

Subject: Epi-AID Trip Report: Assessment of human health risk from consumption  
of wild game meat with possible lead contamination among the residents  
of the State of North Dakota.

To: Douglas H. Hamilton, MD, PhD  
Director, Epidemic Intelligence Service  
Office of Workforce and Career Development (OWCD)

Through: Sharunda D Buchanan, PhD, MS, Director, Division of Emergency and  
Environmental Health Services (DEEHS), NCEH  
Mary Jean Brown, ScD, RN, Chief, Lead poisoning and Prevention Branch,  
DEEHS, NCEH

**Introduction**

Large game hunting plays a significant role in the state economy of North Dakota and is a popular tourist attraction. During hunting season and throughout the year, a substantial proportion of families in ND consume wild game, especially venison. A large proportion of venison (around 17,000 lbs every year) is also donated to local food pantries and serves as an important source of protein for low income families.

Recently, a local physician notified the North Dakota Department of Health (NDDoH) that in 53 of 95 packets of ground venison donated to several food pantries, x-ray analysis revealed evidence of metal fragments. Further analysis identified these fragments as lead, and found the levels were much higher than expected. The bullets used to kill wild game are the most likely source of this lead. The discovery of lead fragments prompted a recommendation from the NDDoH to stop distributing the remaining donated venison. NDDoH also released a public notification to advise people of the unknown risk of lead exposure associated with the consumption of large animals killed by lead bullets. NDDoH then requested assistance from CDC to investigate the human health risk associated with consumption of wild game, with an emphasis on venison, and to assist in the development of scientifically sound recommendations for the safe processing and consumption of wild game killed by lead bullets. The findings of this investigation also have great impact on the surrounding states as large game hunting and the consumption of wild game is highly prevalent in this region of the country.

On May 13, 2008, a CDC team consisting of Epidemic Intelligence Service Officers (EISO) Shahed Iqbal, PhD, MBBS, Kelly Loring, ND, MPH and epidemiologist Wendy Blumenthal, MPH deployed in North Dakota to conduct a study on lead exposure from wild game consumption. Drs. Chinaro Kennedy, DrPH, MPH, and Fuyuen Yip, PhD, MPH supervised the study.

*North Dakota Lead Exposure Study*

**Objectives**

1. To determine whether an increase in blood lead levels (PbB) is associated with consumption of wild game.
2. To identify population subgroups by age, race, sex, and other socio-demographic characteristics who might be at risk of having increased lead levels due to wild game consumption.

**Methods**

A retrospective cohort study was conducted to determine the association between consumption of wild game and PbB. Exposure to wild game was defined based on self-reported consumption or on levels of consumption of wild game meat that included venison, other wild game (e.g., elk, moose), and birds (excluding water fowl). Participants were eligible for inclusion if they were

- a)  $\geq 2$  years of age,
- b) residents of North Dakota,
- c) had sufficient knowledge and understanding of the English language for participation,
- and
- d) agreed to provide blood samples.

Following an NDDoH press release announcing the study, participants were recruited through a convenience sampling approach at local public health clinics in six different cities, namely, Bismarck, Fargo, Grand Forks, Minot, Jamestown, and Dickinson (Figure 1).

Participants were also recruited from two additional sites in Bismarck. From 5/16/2008 to 5/30/2008, data were collected via face-to-face interview. Data collection took place over a 2-week period, but was not conducted simultaneously in all cities.

Before enrolling in to the study, all participants signed a consent form. For any children <18 years of age, parental consent and child assent were obtained. Data were then collected on demographic and housing characteristics (e.g., age of housing, duration of residence in the same household, renovation, visible peeling of paint), current and previous lead-related hobbies (e.g., hunting, lead soldering, car/boat repair) and occupations (e.g., welding, construction, working in lead smelter, refinery, or lead mines), other possible sources of lead exposure (e.g., use of herbal medicine or make up, residence near a lead smelter/mine, use of South/Central American pottery, living in or travelling to South/Central America), and consumption of wild game. Information on frequency, duration, meat processing methods, and average serving size by type of wild game was also collected. Trained phlebotomists, using aseptic precautions, collected venous blood samples from all participants.

Blood samples were shipped, refrigerated with pre-frozen ice packs, to the CDC National Center for Environmental Health, Division of Laboratory Sciences in Atlanta, GA. Blood lead was measured using whole blood and inductively coupled plasma mass spectrometry. The minimum detection level for blood lead was 0.25 µg/dl. For persons with no detectable levels of blood lead (n = 5), a value calculated as the detection limit divided by the square root of 2 was assigned (National Center for Environmental Health 2001).

### **Statistical analysis**

Frequencies and proportions were reported for all variables, including socio-demographic and housing characteristics, lead-related occupations and hobbies, and wild game consumption including type, frequency, and average serving size. Both mean and geometric mean lead levels and frequency for PbB  $\geq 5$  µg/dl were reported. Generalized Estimating Equation (GEE) methods were used to determine unadjusted and adjusted associations between PbB and other



variables using SAS software (version 9.1, Copyright © SAS Institute, Inc., 2002-2003, Cary, NC). Separate GEE models were developed by types of wild game (i.e., venison, other game, birds) to determine the association between frequency, duration, average food serving size, and PbB. Only significant variables in unadjusted models were included in the multivariate model. Race and income, commonly reported predictors of elevated PbB, were included in the multivariate model regardless of their significance in the unadjusted models. Parameter estimates with 95% confidence intervals and significance levels were reported for all models. Multivariate models with two-way interactions with the exposure variable (e.g., consumption of wild game) were considered. Missing values were reported for all frequencies. Some variables were not reported due to unilateral response (e.g., use of herbal medicine, residence near a lead smelter/mine, use of South/Central American pottery, previous blood lead test), ambiguity (e.g., travel to South or Central America), or a high number of missing values (e.g., additional exposure questions for children <6 years of age and pregnant women).

## **Results**

### *Study population*

A total of 742 participants were recruited from the six different cities in North Dakota. Two persons were found to be residents of the neighboring state of Minnesota and were excluded from all analyses (N = 740). The distribution of participants, by location, is provided in Table 1. Capillary blood samples were collected from two children as their parents refused venous blood draw. The results of these tests were included in the analysis. Additionally, one child refused blood draw, and blood draw was incomplete for two children and one adult. Blood samples from 736 persons were therefore included in the final analysis.

### *North Dakota Lead Exposure Study*

Almost half of the participants (48.1%) were  $\geq 55$  years of age. Participation among males (54.5%) was higher than among females (Table 2). Participants were predominantly white (98.2%) and non-Hispanic (96.4%). The majority of the study participants (65.7%) had graduated from college or had higher education. For most participants (73.5%), annual household income was  $\geq \$40,000$ .

Approximately 31.0% of participants shared the same household with at least one other participant (Table 3). Most of the residences were built in or after 1950 (83.1%). More than half of the participants reported living in the same household for  $>10$  years (53.5%) and had some renovation done on the home while they were living there (53.7%). Most participants did not observe any peeling paint inside or outside their homes (85.5%).

With respect to other potential lead exposures, approximately 13.0% of the study participants reported they were currently engaged in at least one lead-related occupation, while 36.5% reported a previous lead-related occupation (Table 4). Most of the participants (63.9%) reported currently having at least one lead-related hobby, and 55.9% reported previously having lead-related hobbies.

#### *Wild game consumption*

Approximately 80.8% (N = 598) of the participants reported consuming at least one type of wild game (i.e., venison, other game, birds), while 86.5% (N = 517) reported consuming more than one type (Table 5). Among those who consumed wild game, almost all reported consuming venison (98.8%), and 64.5% and 84.4% reported consuming other game and birds, respectively. Study participants indicated that they primarily hunted the wild game they consumed, or it was hunted by family members or by friends (98.8%). Most of these participants (81.9%) reported processing their own meat or had family members process the meat. Among them, 92.1%

reported cleaning the meat around the wound channel. The remainder of the participants reported having their meat processed by meat packers/lockers (31.6%) and local butchers (9.2%).

With respect to frequency of consumption, most participants consumed venison throughout the year (80.5%). Nearly half reported consuming other game (49.2%) or birds (52.0%) occasionally or only during the hunting season (Table 6). In a given month, 62.2% of participants reported consuming venison at least once a week; they also reported consuming other game (69.2%) and birds (77.2%) at a frequency of less than once a week. Within the past month preceding the survey, 82.6% of participants had consumed venison; by comparison, only 45.3% and 40.4% had consumed other game and birds, respectively. Most of the participants reported grinding their venison (57.9%) but did not grind other game meat (57.0%) or birds (96.6%). When asked about approximate serving size, participants predominantly reported consuming an average of  $\geq 2$  oz. of venison, of other game, and birds per serving. Most of the participants reported consuming all three types of wild game for  $>10$  years.

#### *Laboratory results*

A total of 734 blood samples—excluding two locally tested capillary samples—were sent to the NCEH laboratory for PbB analysis. Among all participants, the geometric mean PbB was 1.17 $\mu$ g/dl (Table 7); 1.1% had PbB  $\geq 5$   $\mu$ g/dl. None of the participants had PbB above the CDC recommended threshold of  $\geq 10$   $\mu$ g/dl—the level at which CDC recommends case management.

#### *Generalized Estimating Equation (GEE) analysis*

In unadjusted Generalized Estimating Equations (GEE) models, variables including age, sex, education, age of housing, amount of time in the household, renovation, current and previous lead related occupations, current lead related hobbies, family members with lead-related

occupations or hobbies, and consumption of wild game were significantly associated with PbB (Table 8). In a multivariate-adjusted GEE model, age, sex, age of housing, current lead-related hobbies, and wild game consumption were significantly associated with PbB.

Specifically, compared with other age categories, participants aged  $\geq 65$  years had the highest geometric mean PbB (Table 8). After adjusting for all other confounding effects, participants 2–5 years of age, 6–24 years of age, 25–44 years of age, and 45–65 years of age, respectively, had 0.84  $\mu\text{g}/\text{dl}$ , 1.10  $\mu\text{g}/\text{dl}$ , 1.10  $\mu\text{g}/\text{dl}$ , 0.44  $\mu\text{g}/\text{dl}$  lower PbB than those  $\geq 65$  years of age (Table 8). Males had PbB that were 0.28  $\mu\text{g}/\text{dl}$  higher than female participants. Participants living in residences built between 1950 and 1977 or before 1950 had higher PbB (0.19  $\mu\text{g}/\text{dl}$  and 0.43  $\mu\text{g}/\text{dl}$ , respectively) compared with participants living in residences built after 1977. Currently having lead-related hobbies were associated with higher PbB compared with those who did not report lead-related hobbies.

Participants who consumed wild game had 0.30  $\mu\text{g}/\text{dl}$  higher PbB in comparison with those who did not consume wild game (Table 8). The multivariate model did not improve significantly when all two-way interactions between wild game consumption and other variables were considered in the model (data not shown). Participants who did not consume wild game within a month before data collection had significantly lower PbB for all game types (Table 9). Among those who reported consuming other game, a 0.40  $\mu\text{g}/\text{dl}$  increase in PbB was associated with having an average serving size of  $\geq 2$  oz. compared with those who consumed a lesser amount.

## Discussion

In this study, the consumption of wild game was significantly associated with an increase in PbB. This increase could not, however, be attributed to one single game type: a substantial

overlap occurred in the types of wild game the participants consumed. Also, no linear increase in PbB was observed with an increase in the number of wild game types consumed. Nevertheless, after adjusting for other factors, the associated increase in PbB was highest among participants who consumed all three game types (i.e., venison, other game, birds) (data not shown).

Recent consumption of wild game and amount consumed per serving were also significant factors associated with PbB. For all game types, participants who reported consuming wild game within a month prior to data collection had significantly higher PbB in comparison with those who did not consume wild game within a month of the study. This could be explained by the fact that blood lead is an indicator of more recent exposure and supports the finding of a positive association between wild game consumption and PbB; in adults, the excretory half life of lead is approximately 30 days (ATSDR 2007; Rabinowitz et al. 1976). Among participants who reported consuming other wild game, an increase in PbB was also, after adjusting for other factors, associated with a larger average serving size ( $\geq 2$  oz.).

While this study suggests that consumption of wild game meat can adversely affect PbB, no participant had PbB higher than the CDC recommended threshold of  $10\mu\text{g/dl}$ —the level at which CDC recommends case management; and the geometric mean PbB among this study population ( $1.17\mu\text{g/dl}$ ) was lower than the overall population geometric mean PbB in the United States ( $1.60\mu\text{g/dl}$ ) (CDC 2005). The clinical significance of low PbB in this sample population and the small quantitative increase of  $0.30\mu\text{g/dl}$  in PbB associated with wild game consumption should be interpreted in the context of naturally occurring PbB. Despite the decline in PbB in recent decades, the mean PbB in the population is several orders of magnitude higher than the levels of preindustrial human societies ( $0.016\mu\text{g/dl}$ ) and the natural background of PbB in humans (Flegal and Smith 1992; Bellinger 2004). Among adults, increased risk of myocardial and stroke mortality have been observed to be associated with  $\text{PbB} \geq 2\mu\text{g/dl}$  (Menke et al. 2006).

Furthermore, studies have consistently reported adverse neurocognitive effects in children at PbB <10µg/dl (Canfield et al. 2003; Lanphear et al. 2005; Tellez-Rojo et al. 2006; Kordas et al. 2006). Due to increased absorption and an under-developed blood brain barrier, children <6 years of age are considered to be more susceptible to the adverse effects of lead exposures (ATSDR 2007).

Most lead in adults is stored in the bones, and the concentration of lead increases with age. In comparison with 8 mg in children <16 years of age, the body burden of lead is estimated at approximately 200 mg in adults 60–70 years of age (ATSDR 2007; Barry 1975). Lead released from bone storage can therefore contribute to PbB (ATSDR 2007; O’Flaherty et al. 1982). For all game types, participants aged ≥ 65 years frequently reported consuming wild game for more than a decade (data not shown). This long-term cumulative exposure may have resulted in the observed increase in PbB in this age group compared with younger age groups.

Age of housing, male sex, and current lead-related hobbies were other significant factors associated with an increase in PbB. Increased PbB was associated with increase in housing age, which is consistent with our knowledge of environmental exposure to lead (CDC 2005). Higher PbB in males can be explained by the fact that males were almost four times more likely to report consuming wild game compared with females (data not shown). Hunting (53.5%), target shooting (32.0%), home remodeling or painting (18.6%), and reloading (15.7%) were most commonly reported lead-related hobbies and may have substantially contributed to the observed association with PbB.

### **Limitations**

Findings from this study have limited generalizability. The study cohort was predominantly white, educated, and had higher incomes, and did not include persons who

received donated wild game meat from food pantries or other charitable organizations. As high levels of lead were detected in the meat packs donated to local food pantries in North Dakota and the surrounding states (Smith 2008), this group may have greater exposure to lead-contaminated wild game meat.

This study also included a small number of children <6 years of age; however, all of them reported consuming wild game meat. And due to increased rate of lead absorption, children as a whole may potentially be more vulnerable to exposure to lead from wild game consumption. In any event, further research is needed to determine the magnitude of the risk associated with wild game consumption among children and among the population who receives donated meat.

Additionally, most of the data collected were self-reported and may therefore, have been subject to information bias due to misclassification. Although the direction of the bias could not be ascertained, it is unlikely that the findings of the study were qualitatively impacted.

## **Conclusion**

Among those who consumed wild game, most reported hunting as their source. Most participants reported processing the meat themselves and also reported cleaning the meat around the wound channel. Despite these precautions and despite the fact that a wide range of potential confounders were controlled for in the analyses, participants who consumed wild game had higher PbB in comparison with those who did not consume wild game. Careful review of cleaning practices and monitoring of meat packing processes may mitigate the risk of increased PbB from consumption of wild game shot with lead bullets.

**Reference:**

- Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.
- Barry PSI. 1975. A comparison of concentrations of lead in human tissue. *Br J Ind Med*; 32:119-139.
- Bellinger DC. 2004. Lead. *Pediatrics*; 113:1016–22.
- Canfield RL, Henderson Jr. CR, Cory-Slechta DA, Cox C, Jusko TA, Lanphear BP. 2003. Intellectual impairment in children with blood lead concentrations below 10 microg per deciliter. *N Eng J Med*; 348(16):1517–26.
- [CDC] Centers for Disease Control and Prevention. 2005. Preventing lead poisoning in young children. Atlanta, GA.
- [CDC] Centers for Disease Control and Prevention. 2005. Blood lead levels – United States, 1999-2002. *MMWR*; 54(20):513–16
- Flegal AR, Smith DR. Lead levels in pre-industrial humans. *N Eng J Med* 1992; 326(19): 1293–94.
- Kordas K, Canfield R, Lopez P, Rosado J, Vargas G, Cebrian ME, et al. Deficit in cognitive function and achievement in Mexican first graders with low blood concentrations. *Environ Res* 2006; 100: 371–86.
- Lanphear BP, Hornung R, Khoury J, Yolton K, Baghurst P, Bellinger DC, et al. Low level environmental exposure and children's intellectual function: an international pooled analysis. *Environ Health Perspect* 2005; 113:894–99.
- Menke A, Muntner P, Batuman V, Silbergeld EK, Guallar E. Blood lead below 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dl}$ ) and mortality among US adults. *Circulation* 2006;114:1388-1394.
- [NCEH] National Center for Environmental Health. 2001. Division of Laboratory Sciences. Laboratory procedure manual: Lab 06 Blood lead and Cadmium (NHANES 2001-2002). Atlanta, GA: CDC.
- O'Flaherty EJ, Hammond PB, Lerner SI. 1982. Dependence of apparent blood lead half-life on the length of previous lead exposure in humans. *Fundem Appl Toxicol* 2: 49–4.
- Rabinowitz MB, Wetherhill GW, Kopple JD. 1976. Kinetic analysis of lead metabolism in healthy humans. *J Clin Invest* 58: 260–70.
- Smith D. 2008. Lead found in Minnesota venison: Is there a safety risk? *Star Tribune*
- North Dakota Lead Exposure Study*



[internet]. April 11, 2008. Available at :

<http://www.startribune.com/local/17480194.html> [Accessed July 26, 2008]

Tellez-Rojo MM, Bellinger DC, Arroyo-Quiroz C, Lamardid-Figueroa H, Marcado-Garcia A, Schnaas-Arrieta L, et al. Longitudinal associations between blood lead concentrations lower than 10µg/dl and neurobehavioral development in environmentally exposed children in Mexico city. *Pediatrics* 2006; 118(2): e323–e330.

Figure 1: North Dakota study locations

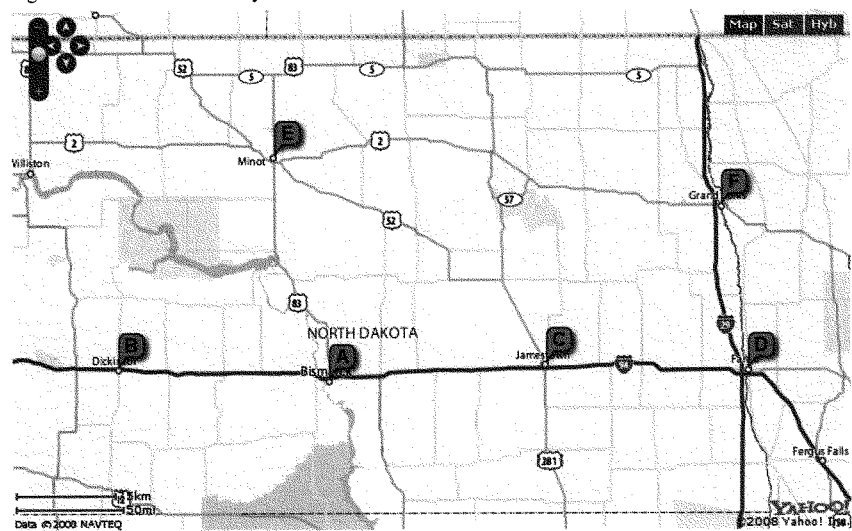


Table 1: Geographical distribution of recruitment of study participants (N=740)

Geographical unit	n(%)
Bismarck	229 (30.9)
Dickinson	70 (9.5)
Fargo	91 (12.3)
Grand Forks	96 (13.0)
Jamestown	126 (17.0)
Minot	128 (17.3)

Table 2: Demographic characteristics of the study participants (N=740)

Variables	n (%)
<b>Age</b>	
2 – 5 yrs	7 (0.9)
6 – 14 yrs	12 (1.6)
15 – 24 yrs	21 (2.8)
25 – 34 yrs	78 (10.5)
35 – 44 yrs	89 (12.0)
45 – 54 yrs	177 (23.9)
55 – 64 yrs	203 (27.4)
65 yrs or more	153 (20.7)
<b>Sex</b>	
Male	403 (54.5)
Female	337 (45.6)
<b>Ethnicity</b>	
Hispanic or Latino	7 (0.9)
Non-Hispanic or Latino	713 (96.4)
<i>Missing (n=19) or Refused (n=1)</i>	20 (2.7)
<b>Race</b>	
White	727 (98.2)
Other	12 (1.6)
Asian (n=4)	
Native Hawaiian/Pacific Islander (n=1)	
American Indian/Alaskan native (n=2)	
Other race (incl. multiracial) (n=5)	
<i>Refused</i>	1 (0.1)
<b>Education</b>	
Less than high school	12 (1.6)
High school graduate or equivalent	75 (10.1)
Some college	167 (22.6)
College grad or more	486 (65.7)
<b>Income</b>	
Less than \$15,000	10 (1.4)
\$15,000 - \$24,999	38 (5.1)
\$25,000 - \$39,999	104 (14.1)
\$40,000 or more	544 (73.5)
<i>Refused</i>	27 (3.6)
<i>Don't know</i>	6 (0.8)
<i>Missing</i>	11 (1.5)

Table 3: Housing characteristics of the study participants (N=740)

Variable	n(%)
<b>Participants from same household</b>	
One person	511 (69.0)
More than 1 person	229 (31.0)
<b>House construction year</b>	
1949 or before	119 (16.1)
1950 to 1977	297 (40.1)
1978 or after	318 (43.0)
<i>Don't know</i>	6 (0.8)
<b>Living in the household</b>	
2 months or less	7 (0.9)
3 months to a year	37 (5.0)
>=1 yr to 5 yrs	164 (22.2)
>=5 yrs to 10 yrs	135 (18.2)
>10 yrs	396 (53.5)
<i>Missing</i>	1 (0.1)
<b>House Renovation/remodeling</b>	
Currently undergoing renovation	42 (5.7)
Done within the last 12 months	76 (10.3)
Done beyond the last 12 months	279 (37.7)
No renovation done	338 (45.7)
<i>Don't know (n=4) or missing (n=1)</i>	5 (0.7)
<b>Peeling paint or paint chips</b>	
None	633 (85.5)
Yes	104 (14.1)
Inside	59 (8.0)
Outside	71 (9.6)
<i>Don't know (n=2) or missing (n=1)</i>	3 (0.4)

Table 4: Study participants' lead-related occupation<sup>1</sup> (N=717) and hobbies<sup>2</sup> (N=740)

	<b>Currently n(%)</b>	<b>Previously n(%)</b>
Lead-related occupations (any)	93 (13.0)	262 (36.5)
Lead-related occupations (more than one)	22 (3.1)	117 (16.3)
Lead-related hobbies (any)	473 (63.9)	414 (55.9)
Lead-related hobbies (more than one)	334 (45.1)	217 (29.3)
Household member ever having a lead-related occupation	166 (22.4)	
Household member ever having lead-related hobbies	411 (55.5)	

<sup>1</sup>Auto repair, battery manufacture/repair, construction, home construction/painting, working in lead smelter/refinery/mine, plumbing or pipe fitting, radiator repair, welding, working in brass/copper foundry, gas station attendant, military/police officer, etc.

<sup>2</sup>Car/boat repair, casting (bullets, fishing weights, etc.), casting lead figures (toys, soldiers), furniture finishing, home remodeling/paint job, hunting, jewelry making, lead soldering, pottery/stained glass making, reloading, target shooting, welding, etc.

Table 5: Wild game consumption by type, source, processing, and cleaning methods

Variables	n (%)
<b>Wild game consumption</b>	<b>598 (80.8)</b>
Venison	591 (98.8)
Other wild game	386 (64.5)
Birds	505 (84.4)
<b>Number of types of wild games consumed (N=598)</b>	
One	81 (13.5)
Two	150 (25.1)
Three	367 (61.4)
<b>Source of wild game</b>	
Food pantries or similar	1 (0.2)
Hunting	591 (98.8)
Other sources	8 (1.3)
<i>Missing</i>	<i>3 (0.5)</i>
<b>Meat processing</b>	
Self/family members	490 (81.9)
Meat packers/processors/lockers	189 (31.6)
Butcher	55 (9.2)
<i>Don't know (n=7) or missing (n=4)</i>	<i>11 (1.8)</i>
<b>Cleans wound channel (N=490)</b>	
Yes	451 (92.1)
No	9 (1.8)
<i>Don't know (n=25) or missing (n=5)</i>	<i>30 (6.1)</i>

Table 6: Wild game consumption frequency, recent consumption, meat processing method, average serving size, and duration

Variable	Venison (N=591)	Other game (N=386)	Birds (N=505)
<b>Consumption in a year</b>			
Occasionally	101 (17.1)	163 (42.2)	180 (35.6)
Hunting season only	11 (1.9)	27 (7.0)	83 (16.4)
Year round	476 (80.5)	192 (49.7)	240 (47.5)
<i>Don't know or missing</i>	3 (0.5)	4 (1.0)	2 (0.4)
<b>Consumption in a given month</b>			
<1 time/wk	222 (37.6)	267 (69.2)	390 (77.2)
1-3 times/wk	278 (47.0)	84 (21.8)	90 (17.8)
>3 times/wk	90 (15.2)	30 (7.8)	20 (4.0)
<i>Don't know or missing</i>	1 (0.2)	5 (1.3)	5 (1.0)
<b>Last time consumed wild game</b>			
<1 month ago	488 (82.6)	175 (45.3)	204 (40.4)
1-6 months	68 (11.5)	104 (26.9)	191 (37.8)
>6 month ago	33 (5.6)	104 (26.9)	107 (21.2)
<i>Don't know or missing</i>	2 (0.3)	3 (0.8)	3 (0.6)
<b>Meat processing method</b>			
Ground	342 (57.9)	107 (27.7)	11 (2.2)
Not ground	91 (15.4)	220 (57.0)	488 (96.6)
Both	157 (26.6)	57 (14.8)	3 (0.6)
<i>Don't know or missing</i>	1 (0.2)	2 (0.6)	3 (0.6)
<b>Portion size in average serving</b>			
<2 oz	57 (9.6)	34 (8.8)	50 (9.9)
>= 2 oz	523 (88.5)	342 (88.6)	446 (88.3)
<i>Don't know or missing</i>	11 (1.9)	10 (2.6)	9 (1.8)
<b>Duration of consumption (years)</b>			
< 1 year	3 (0.5)	10 (2.6)	5 (1.0)
1-3 year	17 (2.9)	14 (3.6)	19 (3.8)
4-10 year	50 (8.5)	34 (8.8)	43 (8.5)
>10 year	514 (87.0)	321 (83.2)	431 (85.3)
<i>Don't know or missing</i>	7 (1.2)	7 (1.8)	7 (1.4)

Table 7: Description of blood lead results (N=736)

<b>Descriptive statistics (µg/dl)</b>	
Mean	1.46
Median	1.19
Standard deviation	1.09
Geometric mean	1.17
Minimum	0.18
Maximum	9.82
<b>Frequency of <math>\geq 5\mu\text{g/dl}</math></b>	<b>8 (1.1%)</b>



Table 8: Geometric mean ( $\mu\text{g/dl}$ ) and unadjusted and multivariate-adjusted associations between PbB and other variables in Generalized Estimating Equations (GEE) models (N = 736)

Variables	Geometric mean PbB ( $\mu\text{g/dl}$ )	Unadjusted		Adjusted	
		Parameter estimates (95% CI)		Parameter estimates (95% CI)	
<b>Age</b>					
2 – 5 yrs	0.88	-1.021 (-1.251, -0.790) <sup>††</sup>		-0.843 (-1.122, -0.563) <sup>††</sup>	
6 – 24 yrs	0.60	-1.234 (-1.532, -0.936) <sup>††</sup>		-1.110 (-1.515, -0.705) <sup>††</sup>	
25 – 44 yrs	0.75	-1.062 (-1.283, -0.841) <sup>††</sup>		-1.051 (-1.298, -0.804) <sup>††</sup>	
45 – 65 yrs	1.29	-0.457 (-0.672, -0.241) <sup>††</sup>		-0.440 (-0.677, -0.203) <sup>†</sup>	
65 yrs or more	1.77	Ref.		Ref.	
<b>Sex</b>					
Male	1.49	0.610 (0.472, 0.748) <sup>††</sup>		0.281 (0.078, 0.484) <sup>*</sup>	
Female	0.89	Ref.		Ref.	
<b>Race</b>					
White	1.18	Ref.		Ref.	
Other	0.98	-0.291 (-0.832, 0.249)		0.274 (-0.245, 0.792)	
<b>Education</b>					
Less than high school	1.95	Ref.		Ref.	
High school graduate or equivalent	1.57	-0.189 (-0.867, 0.489)		0.434 (-0.209, 1.078)	
Some college	1.23	-0.703 (-1.328, -0.078) <sup>*</sup>		-0.001 (-0.593, 0.590)	
College grad or more	1.10	-0.811 (-1.431, -0.190) <sup>*</sup>		-0.023 (-0.615, 0.569)	
<b>Income</b>					
Less than \$15,000	0.99	Ref.		Ref.	
\$15,000 - \$24,999	1.43	0.436 (-0.084, 0.957)		0.120 (-0.375, 0.614)	
\$25,000 - \$39,999	1.03	0.071 (-0.392, 0.534)		0.113 (-0.340, 0.566)	
\$40,000 or more	1.19	0.308 (-0.137, 0.753)		0.395 (-0.073, 0.862)	
<b>House construction year</b>					
1978 or after	1.00	Ref.		Ref.	
1950 to 1977	1.31	0.334 (0.168, 500) <sup>††</sup>		0.191 (0.017, 0.365) <sup>*</sup>	
1949 or before	1.39	0.461 (0.201, 0.721) <sup>†</sup>		0.428 (0.155, 0.702) <sup>*</sup>	
<b>Living in the household</b>					
Less than a year	0.74	Ref.		Ref.	
1 to 5 years	1.05	0.332 (-0.221, 0.884)		-0.068 (-0.617, 0.483)	

North Dakota Lead Exposure Study

6 to 10 years	0.99	0.300 (-0.266, 0.867)	-0.030 (-0.085, 0.256)
More than 10 years	1.31	0.613 (0.064, 1.163)*	-0.250 (-0.917, 0.218)
<b>House renovation/remodeling</b>			
No renovation done	1.10	Ref.	Ref.
Currently undergoing renovation	1.01	-0.134 (-0.401, 0.134)	-0.216 (-0.470, 0.037)
Done within the last 12 months	1.37	0.409 (0.033, 0.786)*	0.178 (-0.168, 0.525)
Done beyond the last 12 months	1.26	0.202 (0.033, 0.371)*	-0.046 (-0.209, 0.118)
<b>Peeling paint or paint chips</b>			
None	1.18	Ref.	
Yes	1.15	0.054 (-0.214, 0.322)	
<b>Current lead-related occupation</b>			
No	1.16	Ref.	Ref.
Yes	1.45	0.412 (0.159, 0.665)*	0.215 (-0.020, 0.450)
<b>Previous lead-related occupation</b>			
No	1.11	Ref.	Ref.
Yes	1.36	0.250 (0.093, 0.407)*	-0.149 (-0.324, 0.026)
<b>Current lead-related hobbies</b>			
No	0.88	Ref.	Ref.
Yes	1.38	0.611 (0.484, 0.738)**	0.338 (0.172, 0.504)**
<b>Previous lead-related hobbies</b>			
No	1.13	Ref.	
Yes	1.21	-0.037 (-0.120, 0.120)	
<b>Household members with lead-related occupations</b>			
No	1.02	Ref.	Ref.
Yes	1.22	0.241 (0.061, 0.421)*	-0.074 (-0.239, 0.091)
<b>Household members with lead-related hobbies</b>			
No	1.09	Ref.	Ref.
Yes	1.29	0.292 (0.128, 0.456)*	0.151 (-0.021, 0.324)
<b>Consumes wild game</b>			
No	0.84	Ref.	Ref.
Yes	1.27	0.428 (0.313, 0.543)**	0.300 (0.157, 0.443)**

Ref. – Reference category; \* p-value <0.05; † p-value <0.001; \*\* p-value <0.0001

North Dakota Lead Exposure Study

Table 9: Multivariate- adjusted association between PbB and frequency, proportion, and duration of wild game consumption by game type<sup>1</sup>

Variables	Venison (N=584)	Other game (N=378)	Birds (N=494)
	Parameter estimates (95% CI)	Parameter estimates (95% CI)	Parameter estimates (95% CI)
<b>Consumption in a given year</b>			
Occasionally	Ref.	Ref.	Ref.
Hunting season only	-0.012 (-0.536, 0.512)	0.072 (-0.276, 0.419)	0.156 (-0.064, 0.376)
All year round	0.005 (-0.267, 0.278)	-0.010 (-0.331, 0.312)	0.151 (-0.116, 0.418)
<b>Consumption in a given month</b>			
<1 time /week	Ref.	Ref.	Ref.
1-3 times/week	0.079 (-0.143, 0.301)	-0.074 (-0.381, 0.234)	0.053 (-0.213, 0.319)
> 3 times/week	0.148 (-0.133, 0.429)	-0.191 (-0.705, 0.323)	0.015 (-0.643, 0.672)
<b>Most recent consumption</b>			
<1 month ago	Ref.	Ref.	Ref.
1-6 months ago	-0.184 (-0.481, 0.112)	-0.461 (-0.790, -0.133)*	-0.279 (-0.516, -0.042)*
>6 months ago	-0.336 (-0.663, -0.009)*	-0.380 (-0.727, -0.032)*	-0.362 (-0.64, -0.081)*
<b>Most often processed</b>			
Ground	Ref.	Ref.	Ref.
Not ground	0.045 (-0.207, 0.296)	0.124 (-0.137, 0.385)	0.136 (-0.354, 0.625)
Both	-0.026 (-0.219, 0.166)	0.083 (-0.249, 0.414)	0.081 (-0.611, 0.772)
<b>Average serving</b>			
<2 oz	Ref.	Ref.	Ref.
≥2 oz	0.099 (-0.146, 0.345)	0.403 (0.068, 0.738)*	0.234 (-0.013, 0.480)
<b>Years of consumption</b>			
< 1 year	Ref.	Ref.	Ref.
1-3 years	-0.075 (-0.948, 0.797)	0.514 (-0.129, 1.158)	0.021 (-0.500, 0.542)
4-10 years	-0.070 (-0.992, 0.853)	0.130 (-0.378, 0.649)	0.176 (-0.403, 0.754)
>10 years	-0.114 (-1.023, 0.794)	0.145 (-0.272, 0.562)	0.182 (-0.283, 0.646)

Ref. – Reference category; \*p-value &lt;0.05; †p-value &lt;0.001; ‡p-value &lt;0.0001;

<sup>1</sup>After adjusting for age, sex, race, age of housing, current and previous lead-related hobbies, current and previous lead related occupations, household member's with lead-related hobbies or occupation

## Appendix 1:

## North Dakota Lead Exposure Study

## General instruction to interviewers

- Make sure to conduct this face to face interview at a time and place convenient to the participant.
- Read all the questions distinctly. If the participant has difficulty in understanding the question, repeat the question or try to explain it with provided definitions, if available. Try to avoid giving your own interpretation of the question.
- Use a proxy respondent for any participant under the age of 18 years. A proxy respondent can be a parent, primary caregiver, grandparent, sibling or any other family member 18 years of age or older.
- Try to obtain any contact information in case the interview is incomplete or in case you need to call back for more information.
- *Italic* fonts are used for instruction purposes only. Do not read them aloud.
- **Bold** fonts are headers/sub-headers. Do not read them aloud.
- CAPITAL fonts are used for definitions/explanations. Read these if the participant has trouble understanding any term or context.
- Assign a participant ID (e.g. NDXXXX) after they have signed an informed consent. Parents or primary caregivers should also sign consent form if the participant is 18 years or younger.
- Provide a copy of the informed consent to the participant.
- Read out **participant's name** where it says 'Participant'.

Interviewer Name: \_\_\_\_\_ Interview Date: \_\_/\_\_/\_\_

Interview status:        1   Completed [date: \_\_/\_\_/\_\_]        2   Not Completed

Participant Name: \_\_\_\_\_

Address \_\_\_\_\_

City: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: (1) \_\_\_\_\_ (2) \_\_\_\_\_

Interviewee relationship to the participant: \_\_\_\_\_

**Start Survey:**

"Thank you for agreeing to be in our study. I would like to ask you a few questions regarding your /participant's consumption of wild game such as deer, pheasant, elk, and other hunted animals, your/ participant's housing, your occupation and issues that can assist us in this lead exposure investigation. This survey will not take more than 15-20 minutes. I will ask you a question and give you some options to choose from. If you have any questions or don't understand what is being asked, please feel free to stop me. You can choose not to answer any question in this survey. All the information you give including your name, address, and your lead results will be kept confidential. Do you have any questions before we start?"

(If 'no') I would like to start by asking you about yourself."

**Section 1: Demographic information**

Q1. What is your/ participant's sex?                      1      Male                      2      Female

Q2. What is your/participant's age?

\_\_\_\_\_ Years \_\_\_\_\_ Months    99    *Don't know*        77    *Refused*

*(If answer is 'Don't know' or 'Refused', ask Q3, otherwise skip to Q4)*

Q3. You can also choose from the following categories:

1      2 to 5 years	2      6 to 14 years	3      15 to 24 years
4      25 to 34 years	5      35 to 44 years	6      45 to 54 years
7      55 to 64 years	8      65 years or more	
99 <i>Don't know</i>	77 <i>Refused</i>	

Q4. Do you consider yourself/participant to be of Hispanic or Latino origin?

1      Hispanic or Latino	2      Not Hispanic or Latino
99 <i>Don't know</i>	77 <i>Refused</i>

Q5. What race best describes you/participant?

1      White	2      Black or African American
3      Asian	4      Native Hawaiian or other Pacific Islander
5      American Indian or Alaskan native	6      Other: _____
99 <i>Don't know</i>	77 <i>Refused</i>

Q6. What is your highest level of education (*List education level of proxy if participant <18 years of age*)?

1      Less than HS graduate	2      HS graduate or equivalent	3      Some college
4      College grad or more	99 <i>Don't know</i>	77 <i>Refused</i>

Q7. What is your/participant's annual household income?

1      less than \$15,000	2      \$15-\$24,999	3      \$25-\$39,000
4      \$40,000 or more	99 <i>Don't know</i>	77 <i>Refused</i>

**NOTES TO INTERVIEWER**

*Has any other member(s) of the participant's household already completed this survey?*

1      Yes (ID of any at least one participating household member: ND_____)
2      No

*(If 'yes', go to section 3, p.4. Otherwise continue with section 2)*

**Section 2: Housing information**

"Now I will ask you a few questions about the house that you/participant live in or consider to be your primary residence."

**PRIMARY RESIDENCE:** PRIMARY RESIDENCE IS THE PLACE WHERE THE YOU/PARTICIPANT SPEND AT LEAST FOUR NIGHTS A WEEK.

Q8. Do you know what year that house/apartment was built?

Year of construction          (Skip to Q10)

99    Don't know (Continue to Q9)

Q9. Which of the following categories do you think most closely matches the year of construction?

1    1978 and after    2    1950 to 1977    3    Before 1949

99    Don't know    77    Refused

Q10. How long have you/participant been living in this house/apartment?

Number   

1    Years

2    Months (record 1 month if it has been less than a month)

99    Don't know    77    Refused

Q11. Has this house/apartment undergone renovation or is it currently undergoing renovation or remodeling? Renovation and remodeling can include the removal of walls, replacement of windows, or paint removal, etc.

1    Currently undergoing renovation/remodeling

2    Renovation/remodeling done within the last twelve months

3    Renovation/remodeling done more than twelve months ago

4    Never been renovated/remodeled

99    Don't know    77    Refused

Q12. Is there any peeling paint or paint chips in this house/apartment? (Check all that apply)

1    No    2    Yes, interior    3    Yes, exterior

99    Don't know    77    Refused

Q13. Is this house/apartment near a lead smelter, lead mine, battery recycling plant, or any other industry that is likely to release lead in to the environment?

1    No    2    Yes, within 1 mile    3    Yes, within 1-5 miles

4    Yes, but more than 5 miles away    99    Don't know    77    Refused

**Section 3: Blood lead test history**

Q14. Have you/participant ever had a blood test for lead?

1 Yes 2 No 99 Don't know 77 Refused

*(If 'yes', ask Q15 and Q16. Otherwise, skip to section 4)*

Q15. Have you/participant ever been told that you have high or elevated blood lead levels that can be harmful for your/participant's health?

1 Yes 2 No 99 Don't know 77 Refused

Q16. Do you/participant know the results from your/ participant's most recent blood lead test?

1 Yes 2 No 77 Refused

(If 'yes') Levels: \_\_\_\_\_ Unit: \_\_\_\_\_ Date tested: \_\_/\_\_/\_\_ or \_\_\_\_\_ months ago

**Section 4: Exposure history***(Ask Q17 if the study participant is 18 years of age or older, otherwise, go to Q18)*

Q17. Were you/participant ever engaged in any of the occupations listed on this card?

*(Present participant with the occupation card and choose one answer option)*

1 Yes, now 2 Yes, previously 3 No 99 Don't know 77 Refused

Occupation	Answer (write #)	Occupation	Answer (write #)
1. Auto repair		9. Lead smelter, refinery, mine	
2. Battery manufacture/repair		10. Military/Police officer	
3. Brass/copper foundry		11. Plastic, glass, ceramic, or rubber industry	
4. Chemical industry		12. Plumbing, pipe fitting	
5. Computer printing		13. Radiator repair	
6. Construction		14. Welding	
7. Gas station attendant		88. Other: _____	
8. Home construction/painting			

Q18. Has anyone else in the household ever been engaged in any of the occupations listed on the card?

1 Yes 2 No 99 Don't know 77 Refused

**Section 4: Contd.**

Q19. Have you/participant ever had any of the hobbies listed on this card? (Present participant with the hobbies card and choose one answer option)			
1 Yes, now      2 Yes, previously      3 No      99 Don't know      77 Refused			
Hobbies	Answer (write one)	Hobbies	Answer (write one)
1. Car/boat repair		8. Lead soldering	
2. Casting (bullets, fishing weights, etc.)		9. Pottery/stained glass making	
3. Casting lead figures (toys, soldiers)		10. Reloading	
4. Furniture finishing		11. Target shooting	
5. Home remodeling/paint job		12. Welding	
6. Hunting		88. Other:	
7. Jewelry making		_____	

Q20. Has anyone else in the household ever been engaged in any of the hobbies listed on the card?

1 Yes      2 No      99 Don't know      77 Refused

Q21. Do you/participant use any traditional Asian cosmetics, for example: Surma, Kohl, Sindoor?

1 Yes      2 No      99 Don't know      77 Refused

Q22. Do you/participant use any herbal or folk remedies, for example: greta, azarcon, pay-loo-ah, ayurvedic products?

1 Yes      2 No      99 Don't know      77 Refused

Q23. Have you/participant ever traveled to or lived in South or Central America or Mexico?

1 Yes      2 No      99 Don't know      77 Refused

Q24. Do you/participant use ceramic or glazed pottery made in South or Central America or Mexico for cooking, eating, or drinking?

1 Yes      2 No      99 Don't know      77 Refused

Q25. Do you/participant eat venison or other game meat or birds (other than water fowl) that are hunted using firearms? (Check all that apply)

1 Venison      2 Other game meat      3 Birds (other than water fowl)

4 No      99 Don't know      77 Refused

(if 'No', 'Don't know' or 'Refused' then go to Section 5, otherwise continue)

**Section 4: Contd.**



Question	Venison	Other game meat	Birds(other than water fowl)
Q26. In a given year, how often do you/participant eat these kinds of meat?	1 Occasionally 2 Hunting season only 3 Year round 99 Don't know 77 Refused	1 Occasionally 2 Hunting season only 3 Year round 99 Don't know 77 Refused	1 Occasionally 2 Hunting season only 3 Year round 99 Don't know 77 Refused
Q27. How often do you/participant eat these kinds of meat in a given month?	1 <1/wk 2 1-3 times/wk 3 > 3 times/wk 99 Don't know 77 Refused	1 <1/wk 2 1-3 times/wk 3 > 3 times/wk 99 Don't know 77 Refused	1 <1/wk 2 1-3 times/wk 3 > 3 times/wk 99 Don't know 77 Refused
Q28. When was the last time you/participant ate these kinds of meat?	1 <1 a month ago 2 1-6 months ago 3 > 6 months ago 99 Don't know 77 Refused	1 <1 a month ago 2 1-6 months ago 3 > 6 months ago 99 Don't know 77 Refused	1 <1 a month ago 2 1-6 months ago 3 > 6 months ago 99 Don't know 77 Refused
Q29. How is the meat most often processed?	1 Ground 2 Not ground 99 Don't know 77 Refused	1 Ground 2 Not ground 99 Don't know 77 Refused	1 Ground 2 Not ground 99 Don't know 77 Refused
Q30. How do you/family most often cook your meat?	1 Stew 2 Barbecue/grill 3 Bake/roast 4 Fry 5 Other 99 Don't know 77 Refused	1 Stew 2 Barbecue/grill 3 Bake/roast 4 Fry 5 Other 99 Don't know 77 Refused	1 Stew 2 Barbecue/grill 3 Bake/roast 4 Fry 5 Other 99 Don't know 77 Refused
Q31. In an average serving, how much meat do you/participant eat?	1 < 2 oz. 2 ≥2 oz. 99 Don't know 77 Refused	1 < 2 oz. 2 ≥2 oz. 99 Don't know 77 Refused	1 < 2 oz. 2 ≥2 oz. 99 Don't know 77 Refused
<b>(2 oz. IS EQUIVALENT TO HALF OF A QUARTER POUNDER HAMBURGER FROM McDonalds)</b>			
Q32. How many years have you/participant been eating these kinds of meat?	1 < 1 year 2 1-3 years 3 4-10 years 4 > 10 years 99 Don't know 77 Refused	1 < 1 year 2 1-3 years 3 4-10 years 4 > 10 years 99 Don't know 77 Refused	1 < 1 year 2 1-3 years 3 4-10 years 4 > 10 years 99 Don't know 77 Refused
Q33. Where do you get your wild game meat? (Check all that apply)			
1 Food Pantries or similar    2 Hunting (self/family/friends)    3 Other sources			
99 Don't know    77 Refused			
<b>(If answer to Q33 is 'Hunting' or 'Other sources' then ask Q34, else go to the next section)</b>			
Q34. Who processes your meat? (Check all that apply)			
1 Self or family member    2 Meat packers/processors/lockers    3 Butcher			
99 Don't know    77 Refused			

**Section 4: Contd.**

*(If answer to Q34 is 'Self or family member' then ask Q35, else go to the next section)*

Q35. Do you/family member remove the meat around the wound channel before cooking the meat?

1 Yes                      2 No                      99 Don't know                      77 Refused

**Section 5: Child section (Ask only if the child is <6 years of age; otherwise go to Section 6)**

Q36. Does the child frequently visit (2 or more times a week) a home or a building (second home, relatives, school, or day care) built before 1978?

1 Yes                      2 No                      99 Don't know                      77 Refused

*(If 'yes', then ask Q37, otherwise skip to Q38)*

Q37. Has that home or building recently been, or is currently being renovated or remodeled?

1 Yes                      2 No                      99 Don't know                      77 Refused

Q38. Does the child frequently visit, or temporarily live with, a person who has/had any of the above mentioned hobbies or occupation? *(Present the occupation and hobbies cards again)*

1 Yes                      2 No                      99 Don't know                      77 Refused

*(If 'yes', then list all that apply)* 1 Hobby (#s): \_\_\_\_\_ 2 Occupation (#s): \_\_\_\_\_

Q39. Does the child often pick up things from the ground and put them in his/her mouth?

1 Yes                      2 No                      99 Don't know                      77 Refused

**Section 6: Assessment of pregnant participants (For female respondents between 18-45 years of age; otherwise end survey and read "End Script")**

Q40. Are you currently pregnant?

1 Yes                      2 No                      77 Refused

*(If 'no', end survey and read 'End script')*

Q41. People sometimes consume non-food items during pregnancy. Have you consumed non-food items such as clay, chalk, dirt, etc. during your pregnancy?

1 Yes                      2 No                      99 Don't know                      77 Refused

Q42. During your pregnancy, have you been told that you are anemic (low number of red blood cells)?

1 Yes                      2 No                      99 Don't know                      77 Refused

**End Script:**

"Thank you again for your time and participation. The information you have given is very important and will help us answer our very important question regarding lead and wild game consumption. As we mentioned earlier, we will now draw a little blood from you/participant. The result of this blood draw and the investigation will be communicated to you as soon as possible. If you have any questions about today's survey, please contact Dr. Kirby Kruger at the State Health Department at 701.328.2378.

**Comments:***(List anything you found to be relevant to the investigation during the whole encounter)*

---

---

---

---

---

---

---

---

# Health Consultation

---

THE POTENTIAL FOR INGESTION EXPOSURE  
TO LEAD FRAGMENTS IN VENISON IN WISCONSIN

NOVEMBER 4, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

**Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at  
1-800-CDC-INFO

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

THE POTENTIAL FOR INGESTION EXPOSURE  
TO LEAD FRAGMENTS IN VENISON IN WISCONSIN

Prepared By:

Wisconsin Department of Health and Family Services  
Under cooperative agreement with the  
Agency for Toxic Substances and Disease Registry

---

**Table of Contents**

Summary and Statement of Issues .....	1
Background .....	1
Discussion .....	3
Child Health Considerations .....	7
Conclusions .....	7
Recommendations .....	7
Public Health Action Plan .....	8
References .....	9
Appendix 1. Venison and lead information distributed to local health officers and posted to the Wisconsin Health Alert [Internet] Network .....	11
Appendix 2. DHFS letter to food pantry managers .....	12
Appendix 3. DHFS/DNR letter to Wisconsin Veterinarians. ....	14
Appendix 4. Blood Lead Concentrations Corresponding to Adverse Health Effects.....	17
Appendix 5. How can lead affect children? .....	19

---

## Summary and Statement of Issues

Bullet fragments in rifle-killed deer have led to concerns about risks of lead exposure associated with human consumption of venison. The presence of lead bullet fragments in venison intended for human consumption has been confirmed, and indicates a completed exposure pathway for the ingestion of lead-contaminated meat. A modeled exposure estimate, based on currently available field data, suggests a significant risk of elevated lead levels in blood among children consuming venison shot with lead ammunition. Because elevated blood lead has not been confirmed among consumers of venison, and because the measured lead content in venison varies greatly, there is an *indeterminate public health hazard* among those consumers. The Wisconsin Department of Health Services (DHS) recommends the use of non-lead ammunition as the simplest and most effective solution to lead poisoning, in both humans and wildlife, arising from the consumption of deer killed with lead ammunition. In addition, food pantries and their clients should be made aware of possible lead fragments in venison; processors of deer should use best practices to avoid lead exposure from venison.

The presence of lead in venison is a topic that has implications for deer hunters and their families, food pantries and their clients, meat processors, and others with a public or private interest in hunting. The purpose of this report is to determine the health implications of eating lead-contaminated venison, based upon laboratory analysis of venison samples and a modeled exposure assessment.

## Background

Wisconsin ranks near the top of all states in the popularity and economic importance of White-tailed deer hunting (WDNR 1998, 2007). Deer hunting is an important part of Wisconsin recreation and tourism, and is a long-held tradition in many families. In addition, the large size of the state's deer population has effects such as crop damage and road vehicle accidents that demand population management. Most of that management is conducted via hunting, traditionally with rifle and shotgun using lead ammunition, as well as bow and arrow.

The issue of human exposure to lead ammunition fragments in venison came to the attention of Public Health indirectly. Hunt *et al.* (2006), concerned about reports of lead poisoned avian scavengers, investigated hunter-shot deer for the presence of lead, hypothesizing that eagles and other birds consumed lead from deer killed but unrecovered, or from discarded entrails. They reported that tiny metal fragments were prevalent in the wounds of these deer, particularly those shot with copper-jacketed and hollow point bullets. Subsequently, concerns were raised in North Dakota, South Dakota, Iowa, Minnesota, and Wisconsin about the potential for human exposure to lead among those consuming venison. North Dakota was the state taking the earliest public health position (NDDOH 2008):

“Earlier this year, Dr. William Cornatzer, a Bismarck physician and hunter, contacted the Department of Health with concerns about the potential of lead fragments from bullets in ground venison. Dr. Cornatzer collected 95 packages of ground venison donated for food pantries. Of those, X-rays detected the presence

---



of metal in 53 packages. The Department of Health recently took five samples targeting the metal pieces, all five of which tested strongly positive for lead....The Department of Agriculture sent a letter to all state- and federal-inspected meat processing plants in North Dakota informing them about the situation, and the Department of Health sent a letter to food pantries with recommendations for disposing of the meat. Additional studies concerning lead in wild game and lead levels in children are being planned by the Department of Health. In addition, the Game and Fish, Health, and Agriculture departments are working to develop guidance about how to properly clean and dress wild game to reduce the chances of lead in meat.”

Venison donated to charity food pantries is a particular concern, as this program is an important outlet for harvested deer while also serving a population having a greater than average exposure to lead in the home. In Wisconsin, food pantry venison is not regulated, unlike commercial and retail meats, which must be inspected before and after processing. The 2006 Wisconsin deer harvest was approximately 500,000 deer (WDNR 2007). From these, about 400,000 pounds of venison were donated to food pantries via 126 meat processors participating in the Department of Natural Resources (WDNR) program.

The Wisconsin Department of Health Services (DHS, formerly Dept. Health and Family Services) has a comprehensive *Childhood Lead Poisoning Prevention Program* devoted to identifying those at risk and interrupting all sources of lead exposure (DHFS 2008). Metallic lead in food is not a new issue. Lead solder in canned foods and lead leachate from ceramic and glass vessels were important sources that were addressed starting in the 1970s. Consumers of wild game are familiar with lead pellets, bullets, and slugs to be avoided in meat. However, the presence of nearly invisible lead fragments in wild game, to our knowledge, had not been widely considered.

Because this issue has implications for an important food distribution program, on April 11, 2008 the DHS asked food pantries to hold venison pending the analysis of venison samples from food pantries (Appendix 1). As the analysis proceeded (see below), DHS concluded that due to the prevalence and concentration of lead seen in venison samples, the frozen venison held in food pantries and other facilities should not be released without further screening. This was conveyed in a second letter to food pantries (Appendix 2). In cooperation with the WDNR, an appeal was made to local veterinarians throughout the state (Appendix 3) for their assistance in screening the venison using their X-ray facilities.

***Venison sampling.*** In Wisconsin, the Departments of Natural Resources and Health Services cooperated to sample and analyze lead in venison from around the state. One hundred eighty three (183) nominal one-pound ground venison samples were collected from freezer stocks of 5 food pantries and 6 meat processors located around the state (“pantry samples”). The samples were screened radiographically by WDNR staff. Of these, 46 samples with radiopaque fragments were submitted to the Wisconsin State Laboratory of Hygiene (WSLH) for lead analysis. Each of the 46 packages was subdivided into nominal ¼ lb “portions” for chemical analysis. Each ¼ lb sample (approx. 0.113 kilograms) was digested in KOH. Any metal fragments recovered following digestion were dissolved in acid and analyzed for Pb (See USDA

---

2004 for method). The lab reported lead concentration as milligrams Pb per kilogram fresh meat (mg/kg). Means  $\pm$  standard deviation are reported in terms of the ¼ pound samples. Reported prevalence was calculated from ¼ pound samples normalized to the 1 pound x-ray screened package size.

One hundred fourteen (114) additional samples of ground and whole cut venison were solicited from WDNR employees in order to more directly sample the hunter population ("hunter samples"). These were screened and analyzed as above. Sixteen of the 114 hunter samples were identified by the submitter as "commercially processed." Therefore, for the purpose of calculating averages, these sixteen were grouped with the pantry samples, for an adjusted total of 199 pantry (or commercially processed) samples and 98 self-processed samples (from hunters).

*Results.* Lead was ultimately detected in 30 of 199 commercially processed samples, a prevalence of 15% (Table 1). The mean lead concentration found among those pantry samples positive for lead was 15.9 mg/kg  $\pm$  32.5 std. dev. The mean lead concentration found among *all* pantry samples was 2.4 mg/kg  $\pm$  13.8 std. dev.

Lead was detected in 8 of 98 hunter samples, a prevalence of 8%. Seven of the eight positives were from ground meat; one was from a whole cut. The mean lead concentration found among those hunter samples positive for lead was 21.8 mg/kg  $\pm$  67.1 std. dev. The mean lead concentration found among *all* hunter samples was 1.8 mg/kg  $\pm$  19.8 std. dev.

**Table 1. Summary of lead content analysis in Wisconsin hunter-killed deer.**

<i>Sample group</i>	<i>Number of samples*</i>	<i>Mean lead conc., lead-positive samples mg/kg <math>\pm</math> std. dev.</i>	<i>Mean lead conc., all samples mg/kg <math>\pm</math> std. dev.</i>	<i>Prevalence of lead-positive samples</i>
<i>Commercial processor</i>	199	15.9 $\pm$ 32.5	2.4 mg/kg $\pm$ 13.8	15%
<i>Hunter processed</i>	98	21.8 $\pm$ 67.1	1.8 mg/kg $\pm$ 19.8	8%

\*Each sample represents a nominal 1 pound package.

## Discussion

*Venison sampling.* The presence of quantified lead bullet fragments in venison intended for human consumption indicates that a completed exposure pathway exists for the ingestion of lead-contaminated meat. To date, there has been no corresponding sampling of blood lead among consumers of venison in Wisconsin. This work represents an initial assessment of the risks of lead in venison.

This health consultation emphasizes the implications of lead found in donated venison. However, it is noteworthy that donated venison represents approximately 2% of the total deer harvest in Wisconsin. The potential exposed population extends well beyond clients of food pantries. Changes in practices that result in lower lead concentrations in venison will have positive effects in the broader population.

The analytical results of lead in venison conducted to date in Wisconsin are characterized by high variability. Each hunter-killed deer is a unique interaction of the anatomical placement of the shot, the type of ammunition used, the ballistics of the individual shot, and details of the processing method. Each of these variables affects the passage of the bullet through the wound, the degree of fragmentation, and ultimately the concentration of lead. As more data is gathered from deer carcasses and processed meat, it may later be possible to state the prevalence of lead in venison killed in a particular way, and to predict whether there are exposure risks to a processed lot of meat based upon samples taken from that lot. Despite these limitations, it is clear that many venison samples contained unhealthy levels of lead.

*U.S. Food and Drug Administration regulatory position.* There is no single standard for permissible amounts of lead in food. Furthermore, FDA regulatory standards and guidelines for lead in food are complicated by the relatively recent recognition (ATSDR 2007, EPA 2008) of lead as a probable human carcinogen.

Health and environmental agencies rely on several standards and guidelines, including FDA guidelines for tolerable levels of daily dietary lead intake, and FDA guidance suggesting specific limits for lead in certain foods such as shellfish and candy (ATSDR 2007, FDA 2007).

For meat and fat products, an international consensus standard of 0.05 mg/kg is under discussion (FDA 2000). While there is no known endogenous role for lead, and no known level of exposure that is without effect, the variety of standards and guidelines acknowledges that some exposure to lead is unavoidable. The FDA's *provisional total tolerable intake levels* provide the following limits on daily lead intake: for adults, 75 µg/day; for pregnant women, 25 µg/day; and for children age five and under, 6 µg/day (FDA 1998).

**Exposure analysis.** Blood lead levels that could result from ingesting Pb-contaminated venison were predicted using the U.S. EPA *Integrated Exposure Uptake Biokinetic Model* (IEUBK, EPA 2007). The model has 100 input parameters that account for the various sources of ingested and inhaled lead in the environment. Default inputs and assumptions were used for all parameters save dietary consumption of Pb-contaminated game meats as a percentage of total meat consumption. The model was run using inputs for game meats at the mean concentrations observed in Wisconsin (Table 1), at an ingestion frequency of either once (3.5%) or twice (7.0%) per month. The ingestion frequency assumes one meat meal per day. The model was also run using the maximum concentrations found in venison (Table 2). Running the model at these maximum concentrations and at the once- or twice-per-month consumption frequency resulted in a model error, and were therefore calculated using a lower exposure frequency.

---

**Table 2. Childhood blood lead concentrations predicted from consuming venison containing lead fragments at concentrations found in Wisconsin.<sup>1</sup>**

Exposure scenario	Pb conc. in venison mg/kg	Consumption frequency (meals/month)	% children with blood Pb above 10 µg/dL	Average blood lead (geometric mean, µg/dL)
maximum	265 <sup>3</sup>	1 per 2 months	100%	34 <sup>2</sup>
maximum	265	1 per 4 months	96%	23
maximum	169 <sup>4</sup>	1 per 2 months	98%	27
medium	21.8 <sup>5</sup>	2 per month	90%	18
medium	21.8	1 per month	65%	12
medium	15.9 <sup>6</sup>	2 per month	81%	15
medium	15.9	1 per month	50%	10
low	2.4 <sup>7</sup>	2 per month	11%	6
low	2.4	1 per month	5%	5
low	1.8 <sup>8</sup>	2 per month	8%	5
low	1.8	1 per month	4%	4
standard	0.05 <sup>9</sup>	2 per month	1%	3.5

Shaded area is "medium" exposure scenario. See uncertainty discussion.

mg/kg: milligram lead per kilogram fresh venison. µg/dL: micrograms lead per deciliter of blood.

<sup>1</sup>Predictions modeled using U.S. EPA Integrated Exposure Uptake Biokinetic Model (EPA 2007).

<sup>2</sup>Exposures associated with blood lead levels above 30 µg/dL are above the range of values calibrated and validated for the model.

<sup>3</sup>Maximum lead concentration found in hunter samples.

<sup>4</sup>Maximum lead concentration found in pantry samples.

<sup>5</sup>Average lead concentration among hunter samples that were positive for lead, n=8.

<sup>6</sup>Average lead concentration among pantry samples that were positive for lead, n=30.

<sup>7</sup>Average lead concentration among all pantry samples, n=199.

<sup>8</sup>Average lead concentration among all hunter samples, n=98.

<sup>9</sup>International consensus standard for lead in meat (FDA 2000).

**Results.** As shown in Table 2., the model predicts that consuming venison with 21.8 mg/kg (hunter samples) lead every 15 days will result in 90 % of children less than 7 years old having blood lead greater than the 10 µg/dL level of concern. If the ingestion frequency is reduced to once every 30 days, the predicted percentage of children with blood lead >10 µg/dL is 65%. A comparable statement for adult blood lead is not included, as the model is designed only for the pharmacokinetic fate of lead in children.

At the mean lead concentration found in pantry samples, the model predicts that consuming venison with 6.2 mg/kg lead every 15 days will result in 80 % of children less than 7 years old having blood lead greater than 10 µg/dL level of concern. If the ingestion frequency is reduced to once every 30 days, the predicted percentage of children with blood lead >10 µg/dL is 50%.

---

*Uncertainty.* The conditions used in the modeled predictions (Table 2) were chosen to reflect a range of risk levels among the wide variation in prevalence and concentration of lead in venison samples. The assumed ingestion frequency may over- or underestimate any particular child. The overall means would tend to underestimate exposures to those consuming venison from pantries and processors having a high prevalence of lead in meat samples. The venison Pb concentrations used in the model are means of only those samples that were positive for lead and are not overall means. However, these averages were 10-42 fold lower than the maximum concentrations of lead seen in some samples (maximum 169 mg/kg in pantry samples; 265 mg/kg in hunter samples). Calculated lead exposure to those children consuming venison with the highest levels of lead measured was at or near 100%, even with a lower frequency of consumption (Table 2). At the lowest calculated lead levels, using the same 15 and 30 day exposure frequencies, the model predicts that most children would have measurable increases in blood lead that are *below* 10 µg/dL. However, this lower estimate is skewed away from the possibility of ingesting venison having very high lead levels. For the purpose of this exposure estimate, it is assumed that a realistic exposure, or the calculated averages of 21.8 and 15.9 mg/kg Pb in venison, lies somewhere between the minimum and the maximum permitted by our data.

**Toxicological effects expected from lead fragments in venison.** Lead is a well-established developmental neurotoxin, and also affects the kidneys, blood formation, reproduction, humoral immunity, and the peripheral nervous system. Due to variation in lead uptake among individuals and among the various chemical forms of lead, the toxicity of lead exposure is usually expressed in terms of its resulting concentration in blood (PbB), and the toxic endpoints corresponding to those blood concentrations. Ten micrograms per deciliter of blood (10 µg/dL) is commonly cited as the level of concern in children (CDC 1991). However, numerous studies (*e.g.* Finkelstein *et al.* 1998; Fels *et al.* 1994) report subtle biochemical, nephric, neuromotor, and cognitive effects in children (and in some studies, adults) chronically exposed to lead corresponding to blood lead levels as low as 2 µg/dL.

Although we know of no formal studies of lead poisoning resulting from ingestion of lead bullet fragments in large game animals, the presence of lead in game birds is well established (Tsuji *et al.* 1999) and some studies (*e.g.* Johansen *et al.* 2006) have measured elevated blood lead (>10 µg/dL in adults) among subsistence hunters who regularly consume waterfowl shot with lead pellets. Several reports have demonstrated clinical lead poisoning among adults retaining two or more lead shot in the appendix (Madsen *et al.* 1988, Hilman 1967). Other reports (*e.g.* Mowad *et al.* 1998) have documented cases in which medical intervention was required for children who intentionally ingested lead fishing sinkers or other metallic lead objects. A recent Minnesota case resulted in a fatality (CDC 2006).

A variety of effects of lead in children and adults correspond to various blood lead levels (see Appendix 4, from ATSDR 2006). Within the limitations of modeled blood lead predictions presented here, some of these effects can be reasonably expected among children and adults consuming venison contaminated with lead fragments.

---

### Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

Developing fetuses and young children are particularly vulnerable to the effects of lead (ATSDR 2006). Children are more sensitive to the effects of lead than adults, have absorb more ingested lead into the body than adults, and no safe blood lead level in children has been determined (see Appendix 5, for a child-specific public health statement).

### Conclusions

- The quantified presence of lead bullet fragments in venison intended for human consumption indicates that a completed exposure pathway exists for the ingestion of lead-contaminated meat.
- The modeled exposure estimates, based on currently available field data, indicate that even at the lowest exposure scenario, there is predicted risk of elevated lead levels in blood among children consuming venison shot with lead ammunition.
- Because elevated blood lead has not been confirmed among consumers of venison, and because the measured lead content in venison varies greatly, there is an *indeterminate public health hazard* among those consumers.

### Recommendations

- Food pantries and their clients should be made aware of possible lead fragments in venison, to include consumption recommendations to protect young children and fetuses from lead exposure.
  - Identifying and discarding those portions of the deer carcass most likely to contain bullet fragments is one way to avoid lead exposure from venison. Best practices for butchering deer should be provided to commercial processors and to hunters.
  - Future venison donations to charity food pantries should be from processors using methods shown to minimize bullet fragments in meat.
  - DHS recommends the use of non-lead ammunition as the simplest and most effective solution to lead poisoning, in both humans and wildlife, arising from the consumption of deer killed with lead ammunition. To address this issue, DHFS recommends the eventual transition to non-lead ammunition.
-

### **Public Health Action Plan**

- Advice to hunters for minimizing the amount of lead in venison has been included in the WDNR 2008 Deer Regulations.
- To verify the effect of revised meat processing recommendations, DHS, in cooperation with WDNR, DATCP, and local and state health agencies, will analyze ground venison samples for the presence of lead following the 2008 deer hunting season.
- DHS will continue to work with state and local health and environmental agencies, with the hunting community, and with food relief programs in providing education on this topic.
- DHS will work with state agencies to encourage the public's awareness of and availability to non-lead hunting ammunition.

### **Consultation author**

Robert Thiboldeaux, Ph.D.  
Toxicologist  
Health Hazard Evaluation Unit  
Bureau of Environmental and Occupational Health  
Division of Public Health  
Wisconsin Department of Health Services

### **Technical team**

Sean M. Strom, Wildlife Toxicologist  
Julie Langenberg, DVM  
Wisconsin Department of Natural Resources

Noel V. Stanton  
DeWayne Kennedy-Parker  
Toxicology/Environmental Sciences Section  
Wisconsin State Laboratory of Hygiene

Rossana Perez-Freytes  
University of Wisconsin  
College of Veterinary Medicine  
DVM/MPH Candidate

Chuck Warzecha, Director  
Bureau of Environmental and Occupational Health  
Division of Public Health  
Wisconsin Department of Health Services

---

---

## References

- ATSDR. 2006. Agency for Toxic Substances and Disease Registry/Division of Toxicology and Environmental Medicine. Lead ToxFAQs: /Chemical Agent Briefing Sheet. Internet: [http://www.atsdr.cdc.gov/cabs/lead/lead\\_cabs.pdf](http://www.atsdr.cdc.gov/cabs/lead/lead_cabs.pdf)
- ATSDR. 2007. *ch. 8 in* Toxicological Profile for Lead. Agency for Toxic Substances and Disease Registry, Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. <http://www.atsdr.cdc.gov/toxprofiles/tp13.pdf>
- CDC. 1991. *Preventing Lead Poisoning in Young Children*. U. S. Department of Health and Human Services, Centers for Disease Control. Internet: <http://www.cdc.gov/nceh/lead/publications/books/plpyc/contents.htm>
- CDC. 2006. Death of a child after ingestion of a metallic charm – Minnesota, 2006. U. S. Department of Health and Human Services, Centers for Disease Control. *Morb. Mortal. Wkly. Rept.* 55:340-341.
- DHFS. 2008. *The legacy of lead: the report on childhood lead poisoning in Wisconsin*. Wisconsin Dept. Health Family Services. Internet: <http://dhs.wisconsin.gov/lead/LegacyofLead/index.HTM>
- EPA. 2007. *Integrated Exposure Uptake Biokinetic Model (IEUBK) for lead in children, ver. 1.0*. Internet: [www.epa.gov/superfund/lead](http://www.epa.gov/superfund/lead).
- FDA. 1998. Dangers of Lead Still Linger, FDA Consumer:Jan.-Feb. 1998. reprinted by: U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. Internet: [www.cfsan.fda.gov/~dms/fdalead.html](http://www.cfsan.fda.gov/~dms/fdalead.html)
- FDA. 2000. Emerging international contaminant issues: Development of Codex alimentarius standards to address the issues. Food Safety Magazine, Feb. 2000. reprinted by: U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. Internet: <http://www.cfsan.fda.gov/~cjm/codexfa2.html>
- FDA. 2007. Pesticides, Metals, Chemical Contaminants & Natural Toxins. U.S. Food and Drug Administration, Center for food safety and applied nutrition. Internet: <http://www.cfsan.fda.gov/~lrd/pestadd.html>
- Fels LM, Herbort C, Pergande M, Jung K, Hotter g, Rosello J, Gelpi E, Mutti A, De Broe M, Stolte H. 1994. Nephron target sites in chronic exposure to lead. *Nephrol. Dial. Transplant.* 9: 1740-6.
- Finkelstein Y, Markowitz ME, Rosen JF. 1998. Low-level lead-induced neurotoxicity in children: an update on central nervous system effects. *Brain Res. Brain Res. Rev.* 27: 168-76.
-



- 
- Johansen P, Pedersen HS, Asmund G, Riget F. 2006. Lead shot from hunting as a source of lead in human blood. *Environ. Poll.* 142: 93-97
- Hilman FE. 1967. A rare case of chronic lead poisoning: polyneuropathy traced to lead shot in the appendix. *Industrial Med. Surg.* 488-92.
- Hunt GW, Burnham W, Parish CN, Burnham KK, Mutch B, Oaks JL. 2006. Bullet Fragments in Deer Remains: Implications for Lead Exposure in Avian Scavengers. *Wildlife Soc. Bull.* 34(1): 167-70.
- Madsen HHT, Skjødt T, Jørgensen PJ, Granjean P. 1988. Blood lead levels in patients with lead shot retained in the appendix. *Acta Radiologica* 29: 745-6.
- Mowad E, Haddad I, Gemmel DJ. 1998. Management of Lead Poisoning from ingested fishing sinkers. *Arch. Pediatr. Adolesc. Med.* 152:485-488.
- NDDOH. 2008. Food Pantries Notified About Lead Fragments Discovered in Donated Ground Venison. North Dakota Department of Health. March 26, 2008 News Release. Internet: <http://www.ndhan.gov/media/news/>.
- Tsuji LJS, Nieboer E, Karagatzides JD, Hanning RM, Katapatuk B. 1999. Lead shot contamination in edible portions of game birds and its dietary implications. *Ecosystem Health* 5: 183-92.
- USDA. 2004. Detection and Identification of Extraneous Material in Meat and Poultry Products. United States Department of Agriculture, USDA SOP MLG 32.01 rev.1 12/3/04 (part C). Internet: <http://www.fsis.usda.gov/Ophs/Microlab/MLg32.01.pdf>
- WDNR 1998. *Wisconsin's Deer Management Program: The Issues Involved in Decision-Making, 2nd Edition*. Wisconsin Department of Natural Resources. Internet: <http://www.dnr.state.wi.us/org/land/wildlife/hunt/deer/Deerbook.pdf>
- WDNR. 2007. Deer Season Forecast. Wisconsin Department of Natural Resources. Internet: [http://www.dnr.state.wi.us/org/caer/ce/news/specialedition/2007\\_Fall\\_Hunting\\_Forecast.html](http://www.dnr.state.wi.us/org/caer/ce/news/specialedition/2007_Fall_Hunting_Forecast.html)
-

**Appendix 1. Venison and lead information distributed to local health officers and posted to the Wisconsin Health Alert [Internet] Network**

TO: Local and Tribal Health Officers, DPH Regional Office Directors

FROM: Chuck Warzecha, Bureau of Environmental and Occupational Health

RE: Possible lead contamination in processed venison at food pantries.

DATE: April 11, 2008

***Please forward this alert to food pantries in your jurisdictions.***

By now you may have heard or seen news out of North Dakota or Minnesota related to lead contamination in venison donated to food pantries in those states. Wisconsin has been in contact with those states and we are also conducting sampling of venison from processors in this state. We are taking the reports from the other states seriously. There have been no reports of illness associated with lead in venison. But, as a precaution we have advised that food pantries with donated venison on their shelves hold any remaining product until we have more information.

The concern stems from studies that show bullet fragments (particularly from high velocity rifles) dispersing widely in the meat, and then incorporated into the ground meat from processors. We are working with the DNR and DATCP to better understand the issue and formulate clearer advice for the public. We are testing venison to determine if bullet particles in wild game pose a health issue. If we get similar results to what Minnesota has received, it is possible we will recommend disposal of the remaining venison at food pantries.

Because of the extensive blood lead surveillance we have done, we are confident that the primary source of lead poisoning in the state comes from chipping and peeling lead paint. Eating venison has not been identified as a concern from this surveillance. However, we are unable to rule this issue out as a possible source of unsafe lead exposure.

We have sent messages to the food pantries in the TEFAP program (The Emergency Food Assistance Program). However, that does not include all food pantries. Please pass this advisory on to other food pantries in your area.

Please address any questions on this matter to Chuck Warzecha (608/264-9880) in the Bureau of Environmental and Occupational Health. Thank you.

---

---

**Appendix 2. DHS (formerly DHFS) letter to food pantry managers.**

**TO:** Food Pantry Managers  
Local and Tribal Health Officers  
DPH Regional Office Directors  
*Please forward this alert to food pantries in your jurisdictions.*

**FROM:** Chuck Warzecha, Rob Thiboldeaux,  
Bureau of Environmental and Occupational Health

**SUBJECT:** Health Concerns about Lead in Venison

June 20, 2008

Thank you for your patience while the Department of Health and Family Services works with the Department of Natural Resources, the Department of Agriculture, Trade, and Consumer Protection, and neighboring states to develop recommendations regarding lead in venison.

At this time, processing guidelines are being established so that food pantries and meat processors can continue their involvement in venison donation programs when hunting season opens again in the fall.

**In addition, based on what we currently know about the health implications of eating venison containing lead, we recommend that remaining venison from food pantries not be consumed or distributed unless the meat has been tested. If it is not possible to test the meat, pantries have the discretion to discard it.**

Using X-ray equipment and lab tests, we have analyzed more than 200 venison samples from food pantries and meat processors throughout the state. The number of samples with lead present was fairly low, about 4%, but not low enough to eliminate the potential for exposure under the right set of circumstances.

Resources are not available for screening all remaining venison stocks. If a food pantry has access to X-ray equipment through a local veterinarian, it may be possible for them to screen their remaining venison and still release uncontaminated meat. A plan to offer this screening is underway, but may take several months to implement.

Although lead in venison does not rival lead paint in older homes as a health risk for Wisconsin children, the risk is not low enough to ignore. Wisconsin's health and environmental agencies continue to study this concern to determine the actual risk.

We do know that pregnant women and children less than six years old are most at risk. These two groups in particular should avoid consuming venison shot with lead bullets or slugs, or

---

venison from an unknown source. Lead poisoning can cause health symptoms that may not immediately be noticed by a casual observer. Lead exposure in young children is known to affect brain development and cause reduced IQ and attention span, impaired growth, reading and learning disabilities, hearing loss, and a range of other health and behavioral effects.

We again thank you for patience while DHFS, DNR, and DATCP work to understand this issue. If you have questions please call Chuck Warzecha 608/264-9880 or Rob Thiboldeaux 608/267-6844.

---

---

**Appendix 3. DHS (formerly DHFS)/DNR letter to Wisconsin Veterinarians.**

TO: Wisconsin Veterinarians  
FROM: Department of Health and Family Services  
SUBJECT: Radiographic Screening for Lead in Food Pantry Venison  
July 1, 2008

Dear Wisconsin Veterinarian,

The Wisconsin Division of Public Health (DHFS) and the Department of Natural Resources (DNR) request your assistance with an issue of public health concern. Recent studies have shown a prevalence of tiny lead fragments in venison shot with lead ammunition. These are typically too small to be seen or removed during meat processing, and can disperse far from the wound channel. This first came to light from studies investigating the potential for eagles to be poisoned by feeding on deer carcasses.<sup>1</sup> More recently, preliminary investigations in Minnesota and Wisconsin, using X-ray screening followed by chemical analysis, have found lead in processed venison stored at charity food pantries and from hunter's home freezers.

Venison to be distributed from charity food pantries is of particular concern to state health and environmental agencies. Based on what we currently know about the health implications of eating venison containing lead, we recommend that venison currently remaining in food pantries not be consumed or distributed *unless the meat has been screened radiographically*. DHFS and DNR do not currently have the resources to screen all the venison remaining at state food pantries from the last season. In order to allow food pantries to confidently release donated venison to the needy, *we seek to enlist the voluntary services of local vets willing to offer their X-ray services to screen packaged meat*.

The lead fragments occur with relatively low incidence (4-20% of 1 lb. meat samples in preliminary work), but often at a high concentration (up to 169 milligrams per kilogram, compared to a FDA-recommended 0.05 mg/kg in meat products). Because this source of lead exposure has not been considered until recently, we do not understand all of its health implications. Most current examples of human lead poisoning involve exposure to lead paint. We do know that subsistence hunters that regularly consume waterfowl from areas where lead shot is used are at high risk lead poisoning, both from ingestion of lead pellets and from meat tainted by pellets in the gizzard.<sup>2</sup> We have little information about the effects of infrequent lead

---

<sup>1</sup> Hunt GW, Burnham W, Parish CN, Burnham KK, Mutch B, Oaks JL. 2006. Bullet Fragments in Deer Remains: Implications for Lead Exposure in Avian Scavengers. *Wildlife Soc. Bull.* 34(1): 167-70.

<sup>2</sup> Johansen P, Pedersen HS, Asmund G, Riget F. 2006. Lead shot from hunting as a source of lead in human blood. *Environ. Pollution* 142: 93-97.

Madsen, *et al.* 1988. Blood lead levels in patients with lead shot retained in the appendix. *Acta Radiologica* 29: 745-46.

---

exposure at the concentrations we see in venison, but our best information is that there is a level of concern, and that the exposure is to be avoided, especially by those most sensitive.

In order to prevent this source of lead exposure, DHFS is working with the DNR, the Department of Agriculture, Trade, and Consumer Protection (DATCP), and neighboring states to develop recommendations regarding lead in venison. Processing guidelines are being established so that food pantries and meat processors can continue with the venison program when hunting season opens in the fall. New processing guidelines should avoid the need for future X-ray screening.

We hope that food pantries who are interested in having their current stores of venison screened for lead will be able to find a veterinary clinic in the community that is willing to provide radiography services. This request for assistance would apply only to the period prior to the 2008 deer season. For the upcoming season, we are working on a separate plan that will include recommendations to meat processors, along with spot checks by the state lab of hygiene to see how well processing techniques are able to eliminate lead from venison.

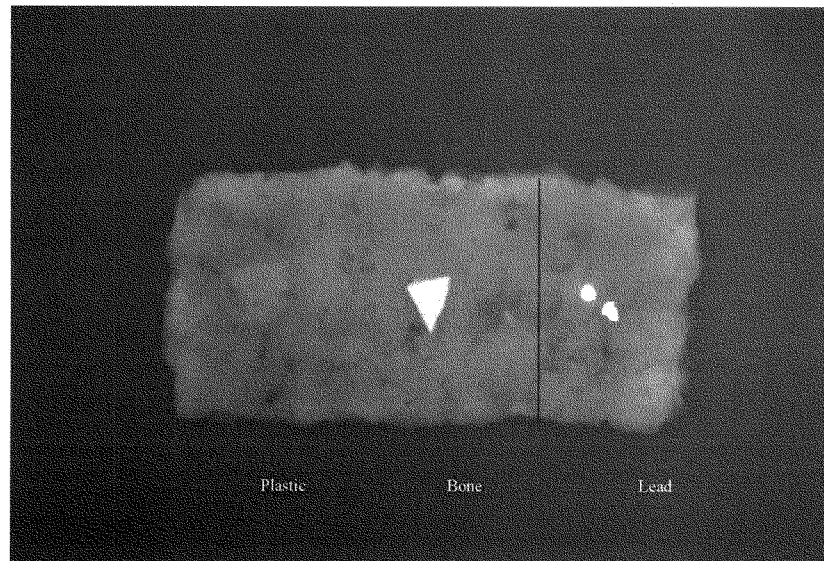
*Screening guidelines.* Based on preliminary work by the DNR, radiography of the wrapped frozen packages of venison is a simple process. Lining up several packages on a large cassette works well, as long as identification of the individual packages is recorded on the film, so that those containing fragments can be later identified. The exposure technique will vary with different equipment, but since the goal is to differentiate metal from soft tissue, details of the exposure technique are not critical. As an aid to interpreting X-ray images, this letter includes a "radiographic scale" demonstrating the appearance of small fragments of plastic, bone, and lead-containing bullets on a background of ground venison.

The goal of the venison radiography is to identify those packages with ANY fragments compatible with lead. These packages should be separated and identified as possibly containing lead when results are communicated to the food pantry. Using this information, *it will be the pantry's responsibility to decide which packages are distributed for consumption and which are discarded.* DHFS recommends that all packages possibly containing lead be discarded.

Thank you for considering helping your local food pantry and your community by participating in this program. In closing, please note that DHFS and DNR make no presumption of commitment from individual veterinarians. The choice is yours, as you will not be reimbursed for your donated time and resources. Nonetheless, if you do choose to provide this support to local food pantries, we are very interested in learning the results of your screening. There is still much to learn on this issue, and your experience will add to our understanding. If you have questions about the program or your clinic's role, please contact Robert Thiboldeaux, PhD, Department of Health and Family Services ([Robert.Thiboldeaux@wi.gov](mailto:Robert.Thiboldeaux@wi.gov); 608-267-6844). If you have questions about the radiographic screening techniques, please contact Julie Langenberg, VMD, Department of Natural Resources ([Julia.Langenberg@wisconsin.gov](mailto:Julia.Langenberg@wisconsin.gov); 608-266-3143).

---

---



Radiography scale illustrating opacities of plastic, bone, and lead fragments in ground venison. Venison containing any objects with an opacity similar to that of lead (to the right of the red line) should be discarded.

---

---

**Appendix 4. Blood Lead Concentrations Corresponding to Adverse Health Effects**

*From:* Agency for Toxic Substances and Disease Registry/Division of Toxicology and Environmental Medicine. 2006. Lead ToxFAQs: /Chemical Agent Briefing Sheet.

Blood Lead Concentrations Corresponding to Adverse Health Effects		
Life Stage	Effect	Blood lead (µg/dL)
Children	Depressed ALAD* activity	< 5
	Neurodevelopmental effects	<10
	Sexual maturation	<10
	Depressed vitamin D	>15
	Elevated EP**	>15
	Depressed NCV***	>30
	Depressed hemoglobin	>40
	Colic	>60
Adult	Depressed ALAD*	< 5
	Depressed GFR****	<10
	Elevated blood pressure	<10
	Elevated EP (females)	>20
	Enzymuria/proteinuria	>30
	Peripheral neuropathy	>40
	Neurobehavioral effects	>40
	Altered thyroid hormone	>40

---



---

	Reduced fertility	>40
	Depressed hemoglobin	>50
<b>Elderly Adult</b>	Neurobehavioral effects	> 4

\*aminolevulinic acid dehydratase (ALAD)

\*\*erythrocyte porphyrin (EP)

\*\*\*nerve conduction velocity (NCV)

\*\*\*\*glomerular filtration rate (GFR)

Source: ATSDR Toxicological Profile for Lead (Draft for Public Comment), 2005.

---

---

**Appendix 5. How can lead affect children?**

**A public health statement from the Agency for Toxic Substances and Disease Registry's *Toxicological Profile for Lead* (ATSDR 2007).**

**1.6 HOW CAN LEAD AFFECT CHILDREN?**

This section discusses potential health effects in humans from exposures during the period from conception to maturity at 18 years of age. Studies carried out by the Centers for Disease Control and Prevention (CDC) show that the levels of lead in the blood of U.S. children have been getting lower and lower. This result is because lead is banned from gasoline, residential paint, and solder used for food cans and water pipes. However, about 310,000 U.S. children between the ages of 1 and 5 years are believed to have blood lead levels equal or greater than 10 µg/dL, the level targeted for elimination among young children in the United States by 2010.

Children are more vulnerable to lead poisoning than adults. Children are exposed to lead all through their lives. They can be exposed to lead in the womb if their mothers have lead in their bodies. Babies can swallow lead when they breast feed, or eat other foods, and drink water that contains lead. Babies and children can swallow and breathe lead in dirt, dust, or sand while they play on the floor or ground. These activities make it easier for children to be exposed to lead than adults. The dirt or dust on their hands, toys, and other items may have lead particles in it. In some cases, children swallow nonfood items such as paint chips; these may contain very large amounts of lead, particularly in and around older houses that were painted with lead-based paint. The paint in these houses often chips off and mixes with dust and dirt. Some old paint contains as much as 50% lead. Also, compared with adults, a bigger proportion of the amount of lead swallowed will enter the blood in children.

Children are more sensitive to the health effects of lead than adults. No safe blood lead level in children has been determined. Lead affects children in different ways depending on how much lead a child swallows. A child who swallows large amounts of lead may develop anemia, kidney damage, colic (severe "stomach ache"), muscle weakness, and brain damage, which ultimately can kill the child. In some cases, the amount of lead in the child's body can be lowered by giving the child certain drugs that help eliminate lead from the body. If a child swallows smaller amounts of lead, such as dust containing lead from paint, much less severe but still important effects on blood, development, and behavior may occur. In this case, recovery is likely once the child is removed from the source of lead exposure, but there is no guarantee that the child will completely avoid all long-term consequences of lead exposure. At still lower levels of exposure, lead can affect a child's mental and physical growth. Fetuses exposed to lead in the womb, because their mothers had a lot of lead in their bodies, may be born prematurely and have lower weights at birth. Exposure in the womb, in infancy, or in early childhood also may slow mental development and cause lower intelligence later in childhood. There is evidence that these effects may persist beyond childhood. Children with high blood lead levels do not have specific symptoms. However, health workers can find out whether a child may have been exposed to harmful levels of lead by taking a blood sample. They can also find out how much lead is in a child's bones by taking a special type of x-ray of the finger, knee, or elbow. This type of test, however, is not routine.

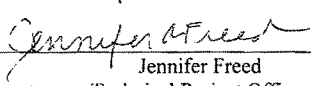
---



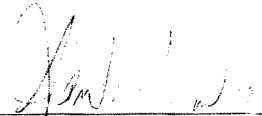
---

### CERTIFICATION

This Health Consultation was prepared by the Wisconsin Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun. Editorial review was completed by the Cooperative Agreement partner.

  
\_\_\_\_\_  
Jennifer Freed  
Technical Project Officer  
CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

  
\_\_\_\_\_  
Alan Yarbrough  
Team Lead  
CAT, CAPEB, DHAC, ATSDR

---

# LEAD BULLET FRAGMENTS IN VENISON FROM RIFLE-KILLED DEER: POTENTIAL FOR HUMAN DIETARY EXPOSURE

W. GRAINGER HUNT<sup>1</sup>, RICHARD T. WATSON<sup>1</sup>, J. LINDSAY OAKS<sup>2</sup>, CHRIS N. PARISH<sup>1</sup>,  
KURT K. BURNHAM<sup>1</sup>, RUSSELL L. TUCKER<sup>3</sup>, JAMES R. BELTHOFF<sup>4</sup>, AND GARRET HART<sup>5</sup>

<sup>1</sup>*The Peregrine Fund, 5668 W. Flying Hawk Lane, Boise, ID 83709, USA.*  
E-mail: grainger@peregrinefund.org

<sup>2</sup>*Washington Animal Disease Diagnostic Laboratory, Pullman, WA 99164-7034, USA.*

<sup>3</sup>*Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA 99164, USA.*

<sup>4</sup>*Department of Biology, Boise State University, 1910 University Drive, Boise, ID 83725, USA.*

<sup>5</sup>*School of Earth & Environmental Sciences, Washington State University, Pullman, WA 99164, USA.*

**ABSTRACT.**—Human consumers of wildlife killed with lead ammunition may be exposed to health risks associated with lead ingestion. This hypothesis is based on published studies showing elevated blood lead concentrations in subsistence hunter populations, retention of ammunition residues in the tissues of hunter-killed animals, and systemic, cognitive, and behavioral disorders associated with human lead body burdens once considered safe. Our objective was to determine the incidence and bioavailability of lead bullet fragments in hunter-killed venison, a widely-eaten food among hunters and their families. We radiographed 30 eviscerated carcasses of White-tailed Deer (*Odocoileus virginianus*) shot by hunters with standard lead-core, copper-jacketed bullets under normal hunting conditions. All carcasses showed metal fragments (geometric mean = 136 fragments, range = 15–409) and widespread fragment dispersion. We took each carcass to a separate meat processor and fluoroscopically scanned the resulting meat packages; fluoroscopy revealed metal fragments in the ground meat packages of 24 (80%) of the 30 deer; 32% of 234 ground meat packages contained at least one fragment. Fragments were identified as lead by ICP in 93% of 27 samples. Isotope ratios of lead in meat matched the ratios of bullets, and differed from background lead in bone. We fed fragment-containing venison to four pigs to test bioavailability; four controls received venison without fragments from the same deer. Mean blood lead concentrations in pigs peaked at 2.29 µg/dL (maximum 3.8 µg/dL) 2 days following ingestion of fragment-containing venison, significantly higher than the 0.63 µg/dL averaged by controls. We conclude that people risk exposure to lead from bullet fragments when they eat venison from deer killed with standard lead-based rifle bullets and processed under normal procedures. At risk in the U.S. are some ten million hunters, their families, and low-income beneficiaries of venison donations. *Reproduced with permission from PLoS ONE 4(4): e5330.*<sup>6</sup>

<sup>6</sup> Reproduced in accordance with the Creative Commons Attribution License with permission of the authors from: Hunt, W. G., R. T. Watson, J. L. Oaks, C. N. Parish, K. K. Burnham, R. L. Tucker, J. R. Belthoff, and G. Hart. 2009. Lead bullet fragments in venison from rifle-killed deer: potential for human dietary exposure. *PLoS ONE* 4(4): e5330. doi: 10.1371/journal.pone.0005330.

HUNT, W. G., R. T. WATSON, J. L. OAKS, C. N. PARISH, K. K. BURNHAM, R. L. TUCKER, J. R. BELTHOFF, AND G. HART. 2009. Lead bullet fragments in venison from rifle-killed deer: potential for human dietary exposure. Reproduced 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.2009.0112

**Key words:** Bullet fragmentation, bush meat, game meat, lead, lead exposure, venison.

LEAD HAS BEEN IMPACTING the health of humankind since the Romans began mining it 2500 years ago, and despite early knowledge of its harmful effects, exposure to lead from a wide variety of sources persists to this day (Warren 2000). Government-based guidelines for acceptable degrees of exposure prior to the 1970s were based upon thresholds of overt toxicity and on apparent acceptance that norms in lead concentrations in a society enveloped in lead-permeated exhaust fumes and lead paint must somehow reflect organic tolerance. Medical science has since concluded that virtually no level of lead exposure can be considered harmless in consideration of its many sublethal, debilitating, and often irreversible effects (Needleman 2004). Lead quantities formerly regarded as trivial are associated with permanent cognitive damage in children (Lanphear et al. 2005), including those prenatally exposed (Schnaas et al. 2006). Lead is associated with impaired motor function (Cecil et al. 2008), attentional dysfunction (Braun et al. 2006), and even criminal behavior (Needleman et al. 2002, Wright et al. 2008). Release of lead stores from bone exposes fetuses during pregnancy (Tellez-Rojo et al. 2004), and adults late in life (Schwartz and Stewart 2007, Shih et al. 2007). Lead is implicated in reduced somatic growth (Hauser et al. 2008), decreased brain volume (Cecil et al. 2008), spontaneous abortion (Borja-Aburto et al. 1999), nephropathy (Ekong et al. 2006), cancer, and cardiovascular disease (Menke et al. 2006, Lustberg and Silbergeld 2002).

Ingested residues of lead ammunition are a recently identified pathway of lead exposure to human consumers of gun-killed game animals. An analysis of North Dakota residents showed that recent ( $\leq 1$  mo) consumers of game meat had higher covariate-adjusted blood lead concentrations than those with a longer interval ( $> 6$  mo) since last consumption (Iqbal 2008). Studies have linked elevated blood

lead concentrations of subsistence hunters in northern Canada, Alaska, Greenland, and elsewhere to consumption of shotgun-killed birds (Hanning et al. 2003, Levesque et al. 2003, Johansen et al. 2004, 2006, Bjerregaard et al. 2004, Tsuji et al. 2008a, 2008b, 2008c; see Burger et al. 1998, Mateo et al. 2007). The hypothesis that rifle bullet fragments are an additional source of human lead exposure is suggested by radiographic studies of deer killed with standard lead-based bullets, which show hundreds of small metal fragments widely dispersed around wound channels (Hunt et al. 2006, Dobrowolska and Melosic 2008, Krone et al. 2009). The possibility of inadvertent lead contamination in prepared meat consumed by hunters and their families is noteworthy, considering the millions of people who hunt big game in the USA (USFWS and USCB 2006) and the thousands of deer annually donated to food pantries for the poor (Comatzter et al. 2009, Avery and Watson 2009). In this report, we test two hypotheses: (1) that fragments of lead from rifle-bullets remain in commercially processed venison obtained under normal hunting conditions in the USA, and (2) humans absorb lead when they eat venison containing bullet fragments.

#### MATERIALS AND METHODS

**Ethics Statement.**—Nine licensed hunters provided the deer carcasses analyzed in this study, and obtained them during the established hunting season and in accordance with normal practices as permitted under the authority of the Wyoming Game and Fish Commission, Cheyenne, Wyoming. The latter institution also granted permission to the authors to convey the processed meat from each carcass to the Washington Animal Disease Diagnostic Laboratory at Washington State University, Pullman, for analysis. The Washington State University Institutional Animal Care and Use Committee approved the lead bioavailability experiment involving eight swine.

*Deer Collection.*—Hunters used conventional center-fire hunting rifles to kill 30 White-tailed Deer (*Odocoileus virginianus*) under normal hunting conditions in Sheridan County, Wyoming in November 2007. All bullets were of 7-mm Remington Magnum caliber and of identical mass (150 grains, 9720 mg); cartridges were of a single brand reported in local mass-market vendor interviews as the most widely sold to deer hunters. Bullets consisted of a lead core (68% of mass) and a copper jacket (32%); lead was exposed only at the 1.7-mm-diameter tip of the bullet. Reported shot distances averaged 116 m (range = 25–172 m). All deer were eviscerated according to the hunters' normal practice. Weights of 29 eviscerated deer averaged 33.8 kg (SD = 7.1). We recorded the positions of bullet entry and exit wounds; 26 deer (87%) were shot in the thorax, and some portion of the projectile exited the animal in 92% of shots. We removed the skin and head, and we excised from each animal a  $\geq 4$  cm section of tibia for isotope analyses and a  $\geq 30$  g sample of muscle (shank) along the tibia to determine background lead levels in each deer.

*Carcass Radiography.*—We radiographed with conventional veterinary equipment the area of the wound channel (lateral view) of eviscerated deer and adjusted exposures to maximize contrast. We included along the margin of each radiograph a strip of clear plastic tape containing arrayed samples of lead bullet fragments (obtained by shooting through light plastic jugs filled with water), comparably-sized samples of bone fragments, and locally-obtained sand and gravel; only the lead fragments were clearly visible in the radiographs at the applied settings. We scanned radiographs into digital format and counted unambiguous metal fragments under 400% magnification. We did not attempt to distinguish between copper and lead in fragment counts.

*Commercial Processing.*—We transported each deer carcass to a different commercial meat processing plant in 22 towns throughout Wyoming and requested normal processing into boneless steaks and ground meat in 2-pound (0.91 kg) packages; we retrieved the processed, frozen, and packaged meat usually within 4 days.

*Radiography of Processed Meat.*—We used digital radiography (EDR6 Digital Radiography, Eklín Medical Systems, Santa Clara, California) and fluoroscopy (MD3 Digital Fluoroscopy, Philips Medical Systems, Best, Netherlands) to scan all the thawed ground meat packages (N = 234); we scanned an additional 49 loin steak packages from 16 carcasses in which radiography had revealed fragments near the spine. We unwrapped every package showing visible radiodense fragments in a subsample of 13 deer, flattened the meat to c. 1-cm thickness on a light plastic plate, and rescanned. We marked the vicinity of each visible fragment with a stainless steel needle and then used a 2.8-cm diameter plastic tube as a “cookie-cutter” to obtain samples of meat with radiodense fragments.

*Analysis of Metal Samples.*—Each of the fragment-containing meat samples was weighed and then divided into approximately 5-g subsamples, each of which was completely digested in a known volume of concentrated nitric acid. Inductively coupled plasma (ICP) analysis was then used to measure the concentrations of lead and copper in each subsample. The lower detection limit for both metals was 2  $\mu\text{g/g}$ . The analysis was performed commercially by the Analytical Sciences Laboratory, University of Idaho, Moscow, where quality management conforms with applicable Federal Good Laboratory Practices (40 CFR Part 160); the Laboratory is accredited through the American Association of Veterinary Laboratory Diagnosticians, which stipulates ISO 17025 quality assurance measures.

*Lead Isotope Analysis.*—We analyzed bullet, bone, and meat samples for lead isotope compositions. Bullet fragments were cleaned in dilute (1M) HCl, leached with 2 ml of 7M  $\text{HNO}_3$ , and then removed from the acid leachate. The leachate was then dried and treated with 2 drops of 14M  $\text{HNO}_3$ . Bone and meat samples were digested in 14M  $\text{HNO}_3$ , dried and treated with 2 drops of 14M  $\text{HNO}_3$ . Lead was separated using standard HBr and HCl on an anion-exchange column (Bio Rad, AG 1X8). Isotope compositions were determined with a ThermoFinnigan Neptune MC-ICPMS at the Washington State University GeoAnalytical Laboratory. Reproducibility of the lead standard (NBS-981), run before, during, and after the samples, was  $<0.012\%$  (2 SE,  $n = 4$ ) for  $\text{Pb}^{206}/\text{Pb}^{204}$ , and  $<0.018\%$  for  $\text{Pb}^{208}/\text{Pb}^{204}$ .

Lead concentrations in the procedural blanks were negligibly small.

**Bioavailability Experiment.**—We tested the bioavailability of ingested bullet fragments by feeding processed venison known by radiography to contain radiodense fragments to pigs. The latter were considered a good model for the absorption of lead from the human gastrointestinal tract (USEPA 2007). We used eight female Yorkshire/Landrace and Berkshire/Duroc cross-bred pigs, 70–82 days of age and weighing 28.2–32.7 kg (mean 30.3 kg) at the termination of the experiment. All were initially fed 1.36 kg of standard pelleted pig grower ration divided into two meals per day, then acclimated for 7 days to consuming cooked ground commercial beef patties mixed with the pellet ration. We gradually increased the amount of ground meat from 113 g per meal to 500 g, as pellet amounts were correspondingly decreased. We withheld all food for 24 hours prior to the venison feeding trial.

Ground venison and venison steaks from four deer were used in the feeding trial. Each of the eight pigs consumed 1.26–1.54 kg of meat over two feedings 24 hours apart on days 0 and 1 of the experiment; no pig consumed meat from more than one deer. Four pigs received venison containing fluoroscopically visible metal fragments. The total amount of lead fed to each pig was unknown, but quantitative analysis of similar packages from other deer in the study showed 0.2–168 mg (median 4.2 mg) of lead. The four control pigs were simultaneously fed equivalent amounts of venison with no fluoroscopically visible fragments from the same four deer. We assessed background levels of lead in each deer from shank meat, collected well away from any potential bullet contamination. All venison for the test and control pigs was either already ground, or finely chopped if steaks, and cooked in a microwave oven until brown. For feeding, we mixed the cooked venison in a bowl with small amounts of pig ration to improve palatability. We verified that all meat was eaten, and we monitored the pigs for signs of illness.

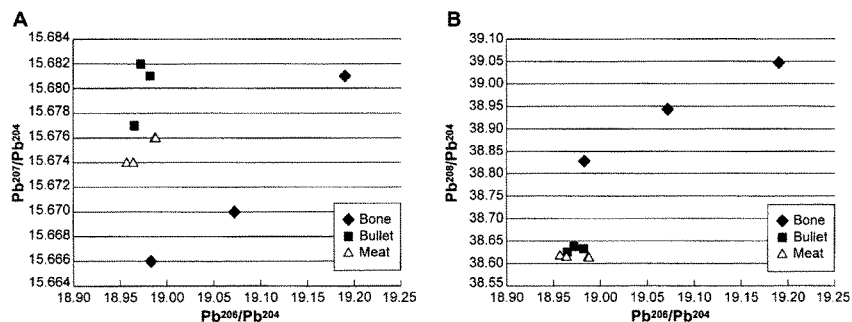
We collected anticoagulated blood samples (2 ml whole blood in EDTA) from each pig at 1 hour prior to feeding venison on day 0, and on days 1, 2, 3, 4, 7 and 9 after feeding venison, and stored the

samples at 4°C until testing. Lead levels were determined by inductively coupled plasma mass spectrometry (ICP-MS) with a lower detection limit of 0.5 µg/dL; we assigned all values below the detection limits as 0.5 µg/dL. We compared mean blood lead concentrations between control pigs and test pigs on days 0 through 9 using 2-way ANOVA with repeated measures and restricted maximum likelihood (REML) estimation; we performed linear group contrasts for each day. A single outlier datum among control pigs on day 4 (6.8 µg/dL) was an order of magnitude higher than a retest of the same sample (0.54 µg/dL); the latter was consistent with all other control samples. We omitted both results from statistical analysis, resulting in a sample of three rather than four control pigs on day 4. We used JMP (SAS Institute, Cary, NC, USA, Vers. 7.0.1) for all statistical analyses.

## RESULTS

**Bullet Fragments in Venison.**—Wound radiographs of all 30 eviscerated deer showed metal fragments (median = 136 fragments, range = 15–409) and offered a measure of fragment dispersion, albeit two-dimensional. Extreme distance between fragment clusters in standard radiographs averaged 24 cm (range ± SD = 5–43 ± 9 cm), and maximum single fragment separation was 45 cm. Radiography revealed visible metal fragments in the ground meat of 24 (80%) of the 30 deer. At least one fragment was visible in radiographs of 74 (32%) of 234 packages of ground meat; 160 (68%) revealed no fragments, 46 (20%) had one, 16 (7%) had two, and 12 (5%) showed 3–8 fragments. An average of 32% of ground meat packages (N = 3–15 packages, mean 7.8) per deer showed metal fragments (range = 0–100% of packages). The ground meat derived from one deer showed more fragments (N = 42) than counted in the radiograph of the carcass (N = 31), and two ground meat packages (2 deer) each contained a single shotgun pellet which had not been detected on the carcass radiographs. No relationship was apparent between the number of metal fragments counted in carcasses and those subsequently counted in ground meat from the same individual (correlation coefficient 0.06). In the aggregate, we observed 155 metal particles in the ground meat packages, 3.1% of the 5074 we counted in the carcasses. Of 16 deer carcasses with metal frag-

## - LEAD BULLET FRAGMENTS IN VENISON -



**Figure 1.** Plots of lead isotope ratios in ground meat samples containing radiodense fragments from four deer. Ratios from lead-in-meat samples clustered with those of unfired bullets but were distinct from bone lead ratios. Note that there are four meat data points (open triangles) in each graph, but two have almost identical positions and are superimposed.

ments near the spine, four (25% of selected deer, 8% of 49 packages) showed fragments in processed loin steaks (1–9 fragments). Additional fragments may have occurred in 220 unscanned packages of steaks derived from all animals.

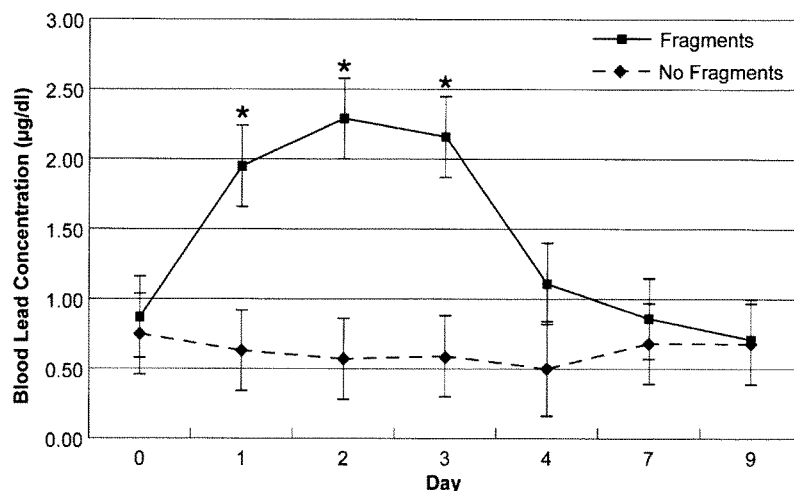
ICP analysis of radiodense fragments excised from ground meat packages from 13 deer identified lead in 25 (93%) of 27 samples; aggregate lead fragment mass per package averaged 17.2 mg (range  $\pm$  SD = 0.2–168  $\pm$  39.8 mg) or 0.03% of the lead component of bullet mass. Nine samples contained copper at levels above background values, including the two samples with no detectable lead. Lead concentrations in unprocessed muscle tissue collected from the shank and well away from the bullet path of the same 13 deer were all below the detection limit of 2.0  $\mu$ g/g and served as internal controls for measures of lead in ground meat.

The ratio of lead isotopes 206/204 plotted against 207/204 ratios (Figure 1a) and 208/204 ratios (Figure 1b) showed that meat samples with elevated lead levels from four deer, and lead from bullets from the same boxes ( $N = 3$ ) supplying the bullets used to kill those deer, formed tight clusters distinct from ratios of background lead in tibial bone. Variation in the bone ratios apparent in Figure 1 likely represent long term, cumulative lead exposure encompassing varied sources of natural and anthropogenic lead.

**Bioavailability Experiment.**—All the pigs consumed all the venison provided to them within 2 hours. None of the experimental animals showed any signs of lead toxicosis or other illness for the duration of the experiment; none exhibited vomiting or diarrhea which might have affected gastrointestinal physiology or retention times in the stomach or intestines.

Blood lead concentrations in the four control pigs ranged from below the level of ICP-MS detection (0.5  $\mu$ g/dL) to 1.2  $\mu$ g/dL throughout the experiment (mean  $\pm$  SD = 0.63  $\pm$  0.19  $\mu$ g/dL; Figure 2). Blood lead concentrations in pigs fed metal fragment-containing venison ranged from below the level of detection to 1.4  $\mu$ g/dL on day 0, immediately prior to feeding venison. The 2-way ANOVA revealed a significant interaction between treatment (feeding venison either with fragments or no fragments) and day ( $F_{6,35,32} = 3.413$ ,  $P = 0.009$ ; Figure 2). Mean blood lead concentrations in the pigs fed fragment-containing venison were significantly elevated above those of control pigs on days 1, 2 and 3 post-exposure (linear contrast:  $F_{1,39,79} = 10.39$ ,  $P = 0.003$ ,  $F_{1,39,79} = 17.76$ ,  $P = 0.0001$ , and  $F_{1,39,79} = 14.71$ ,  $P = 0.0004$ , respectively; Figure 2); the maximum observed value was 3.8  $\mu$ g/dL. Blood lead concentrations did not differ ( $P > 0.05$ ) between the control pigs and exposed pigs on days 0, 4, 7 and 9 (Figure 2).





**Figure 2.** Mean blood lead concentrations observed during swine feeding experiment. Mean ( $\pm$  SE) blood lead concentrations ( $\mu\text{g/dL}$ ) in four pigs fed venison containing radiographically dense fragments (Fragments) compared with four control pigs fed venison without visible fragments (No Fragments) on days 0 and 1. Asterisks indicate days when means differed significantly between test and control groups.

### DISCUSSION

Our findings show that people risk exposure to lead when they eat venison from deer killed with standard lead-based rifle bullets and processed under normal commercial procedures. Evidence includes a high proportion (80%) of deer showing at least one bullet fragment in one or more ground meat packages, a substantial frequency of contamination (32% of all ground meat packages), a majority (93%) of assayed fragments identified as lead, isotopic homogeneity of bullet lead with that found in the meat, and increased blood lead concentrations in swine fed fragment-containing venison. Considering that all the carcasses we brought to the processors contained fragments (15-409 fragments counted in radiographs), the high rate of removal evident in the ground meat implies meticulous care on the part of the processors to avoid contamination, but an apparent inability of 80% of them to do so entirely. We conclude that, in a majority of cases, one or more consumers of a hunter-killed,

commercially-processed deer will consume bullet lead.

We interpret the absorption of lead into the bloodstream of all four test pigs as clear evidence of the bioavailability of lead from ingested bullet fragments (Figure 2), and we infer that human consumption of venison processed under prevailing standards of commerce results in increased blood lead concentrations. The rate of bioavailability cannot be calculated from our experiment because the exact amounts of lead in the meat packages were unknown. Rather, we directed our test at the condition experienced by human consumers of venison from rifle-killed deer of variable amounts of lead patchily distributed as fragments in ground meat or steak.

Depuration of lead in blood does not imply its excretion, but rather the sequestration of a substantial proportion in soft tissues and ultimately in bone from which it may eventually be mobilized, as dur-

ing pregnancy (Tellez-Rojo et al. 2004) or in old age (Schwartz and Stewart 2007). The observed elevations in blood lead concentrations, while not considered overtly toxic, would nevertheless contribute to cumulative lead burdens, and would be additive with further meals of contaminated venison. Observed blood lead concentrations of up to 3.8 µg/dL, and daily means of 2.3 and 2.2 µg/dL in the experimental animals, do approach what is considered significant with respect to adverse effects in humans by contemporary assessments (Gilbert and Weiss 2006, Levin et al. 2008). Whereas the CDC advisory level for intervention in individual children is 10 µg/dL in blood (CDC 1991), studies now associate as little as 2 µg/dL with increased risk of cardiovascular mortality in adults (Menke et al. 2006) and impaired cognitive function in children (Jusko et al. 2008). Hauser et al. (2008) detected an impact threshold of 5 µg/dL on male maturation rates, and Lanphear et al. (2005) concluded that "...lead exposure in children who have maximal blood lead concentrations <7.5 µg/dL is associated with intellectual deficits." These latter values would appear attainable with the repeated consumption of venison possible among deer hunting families, especially those incurring additional exposure from other sources.

Factors that may influence dietary lead exposure from spent lead bullets include the frequency and amount of venison consumption, degree of bullet fragmentation, anatomical path of the bullet, the care with which meat surrounding the bullet wound is removed, and any acidic treatments of the meat that would dissolve lead, i.e., coating the hanging carcass with vinegar or the use of acidic marinades in cooking. Exposure to lead from spent bullets is easily preventable if health-minded hunters use lead-free copper bullets now widely available and generally regarded as fully comparable to lead-based bullets for use in hunting (Carter 2007). The potential for toxic exposure to copper from these bullets is presumably insignificant because little or no fragmentation occurs (Hunt et al. 2006), and there is no meat wastage from having to discard tissue suspected of contamination.

Fragmenting lead bullets have been in use for hunting since the early 1900s (Stroud and Hunt 2009). Although hunter numbers have diminished slightly

in recent years, there were 10.7 million big game hunters in the United States in 2006, the majority of whom still use lead-based bullets (USFWS 2006, Watson and Avery 2009). Many state wildlife agencies annually issue multiple deer harvest permits to individuals, effectively offering venison as a year-round protein staple for some families; game meat is the principal source of protein for a considerable proportion of Alaska's population (Titus et al. 2009). Hunter-donated venison to food pantries and shelters for low income families in most states produced an estimated minimum of 9 million venison meals associated with the 2007/08 hunting season (Avery and Watson 2009). With these concerns, we anticipate that health sciences will further examine the bioavailability of lead from bullets and shot, the epidemiology of exposure, and the possible consequences among hunters, their families, and others who consume venison.

#### ACKNOWLEDGEMENTS

The data were collected as part of The Peregrine Fund's California Condor Restoration Project, which is supported by the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, Bureau of Land Management, The Charles Engelhard Foundation, Liz Claiborne and Art Ortenberg Foundation, Nina Mason Pulliam Charitable Trust, Grand Canyon Conservation Fund, National Fish and Wildlife Foundation, Jane Smith Turner Foundation, and other important donors. We thank P. and L. Widener, R. Berry, P. Jenny, B. Mutch, A. Montoya, P. Juergens, B. Oakleaf, R. Green, T. Hunt, A. Siedenstrang, the Wyoming Game and Fish Department, the University of Idaho Analytical Sciences Laboratory-Holm Research Center, and The Peregrine Fund Research Library for help with this project. S. McGeehan and T. Case performed laboratory analyses for heavy metals. D. Lewis, G. Turner, G. Van Orden, and J. Luft provided care for the pigs and performed blood collection.

#### LITERATURE CITED

- AVERY, D., AND R. T. WATSON. 2009. Distribution of venison to humanitarian organizations in the U.S. and Canada. *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.2009.0114.
- BJERREGAARD, P., P. JOHANSEN, G. MULVAD, H. S. PEDERSEN, AND J. C. HANSEN. 2004. Lead sources in human diet in Greenland. *Environmental Health Perspectives* 112:1496-1498. DOI: 10.1289/ehp.7083.
- BORJA-ABURTO, V. H., I. HERTZ-PICCIOTTO, M. R. LOPEZ, P. FARIAS, C. RIOS, AND J. BLANCO. 1999. Blood lead levels measured prospectively and risk of spontaneous abortion. *American Journal of Epidemiology* 150:590-597.
- BRAUN, J. M., R. S. KAHN, T. FROELICH, P. AUINGER, AND B. P. LANPHEAR. 2006. Exposure of environmental toxicants and attention deficit hyperactivity disorder in U.S. children. *Environmental Health Perspectives* 114:1904-1909. DOI: 10.1289/ehp.9478.
- BURGER, J., R. A. KENAMER, I. L. BRISBIN, JR., AND M. GOCHFELD. 1998. A risk assessment for consumers of Mourning Doves. *Risk Analysis* 18:563-573.
- CARTER, A. 2007. Xtraordinary. Shooting Illustrated Magazine, July 2007. National Rifle Association Publication. Fairfax, Virginia, USA.
- CDC (Centers for Disease Control and Prevention USA). 1991. Preventing lead poisoning in young children. [Online.] Available at <http://www.cdc.gov/nceh/lead/publications/prevleadpoisoning.pdf>. Accessed 2008 November 3.
- CECIL, K. M., C. J. BRUBAKER, C. M. ADLER, K. N. DIETRICH, M. ALTAYE, J. C. EGELHOFF, S. WESSEL, I. ELANGOVAN, R. HORNUNG, K. JARVIS, AND B. P. LANPHEAR. 2008. Decreased brain volume in adults with childhood lead exposure. *PLoS Med* 5:741-750. DOI: 10.1371/journal.pmed.0050112.
- CORNATZER, W. E., E. F. FOGARTY, AND E. W. CORNATZER. 2009. Qualitative and quantitative detection of lead bullet fragments in random venison packages donated to the Community Action Food Centers of North Dakota, 2007. *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.2009.0111.
- DOBROWOLSKA, A., AND M. MELOSIK. 2008. Bullet-derived lead in tissues of the Wild Boar (*Sus scrofa*) and Red Deer (*Cervus elaphus*). *European Journal of Wildlife Research* 54:231-235. DOI: 10.1007/s10344-007-0134-y.
- EKONG, E. B., B. G. JAAR, AND V. M. WEAVER. 2006. Lead-related nephrotoxicity: A review of the epidemiologic evidence. *Kidney International* 70:2074-2084. DOI: 10.1038/sj.ki.5001809.
- GILBERT, S. G. AND B. WEISS. 2006. A rationale for lowering the blood lead action level from 10 to 2 µg/dL. *NeuroToxicology* 27:693-701. DOI: 10.1016/j.neuro.2006.06.008.
- HANNING, R. M., R. SANDHU, A. MACMILLAN, L. MOSS, L. J. S. TSUJI, AND E. NIEBOER. 2003. Impact on blood Pb levels of maternal and early infant feeding practices of First Nation Cree in the Mushkegowuk Territory of northern Ontario, Canada. *Journal of Environmental Monitoring* 5:241-245. DOI: 10.1039/b208220a.
- HAUSER, R., O. SERGEYEV, S. KORRICK, M. M. LEEM, B. REVICH, E. GITIN, J. S. BURNS, AND P. L. WILLIAMS. 2008. Association of blood lead levels with onset of puberty in Russian boys. *Environmental Health Perspectives* 116:976-980. DOI: 10.1289/ehp.10516.
- HUNT, W. G., W. BURNHAM, C. N. PARISH, K. K. BURNHAM, B. MUTCH, AND J. L. OAKS. 2006. Bullet fragments in deer remains: Implications for lead exposure in avian scavengers. *Wildlife Society Bulletin* 34:167-170. Also DOI: 10.4080/ilsa.2009.0123.
- IQBAL, S. 2008. Epi-Aid Trip Report: Assessment of human health risk from consumption of wild game meat with possible lead contamination among the residents of the State of North Dakota. National Center for Environmental Health, Centers for Disease Control and Prevention: Atlanta, Georgia, USA. [Online.] Available at [http://www.rmef.org/NR/rdonlyres/F07627AA-4D94-4CBC-B8FD-4F4F18401303/0/ND\\_report.pdf](http://www.rmef.org/NR/rdonlyres/F07627AA-4D94-4CBC-B8FD-4F4F18401303/0/ND_report.pdf). Accessed 2009 March 23.
- JOHANSEN, P., G. ASMUND, AND F. RIGET. 2004. High human exposure to lead through consumption of birds hunted with lead shot. *Environmental Pollution* 127:125-129. DOI: 10.1016/S0269-7491(03)00255-0.
- JOHANSEN, P., H. S. PEDERSEN, G. ASMUND, AND F. RIGET. 2006. Lead shot from hunting as a

- source of lead in human blood. *Environmental Pollution* 142:93-97.  
DOI: 10.1016/j.envpol.2005.09.015.
- JUSKO, T. A., C. R. HENDERSON, B. P. LANPHEAR, D. A. COREY-SLECHTA, AND P. J. PARSONS. 2008. Blood lead concentrations <10 µg/dL and child intelligence at 6 years of age. *Environmental Health Perspectives* 116:243-248. DOI: 10.1289/ehp.10424.
- KRONE, O., N. KENNTNER, A. TRINOGGA, M. NADJAFZADEH, F. SCHOLZ, J. SULAWA, K. TOTSCHKE, P. SCHUCK-WERSIG, AND R. ZIESCHANK. 2009. Lead poisoning in White-tailed Sea Eagles: Causes and approaches to solutions in Germany. *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.2009.0207.
- LANPHEAR, B. P., R. HORNUNG, J. KHOURY, K. YOLTON, P. BAGHURST, D. C. BELLINGER, R. L. CANFIELD, K. N. DIETRICH, R. BORN-SCHNEIN, T. GREENE, S. J. ROTHENBERG, H. L. NEEDLEMAN, L. SCHNAAS, G. WASSERMAN, J. GRAZIANO, AND R. ROBERTS. 2005. Low-level environmental lead exposure and children's intellectual function: An international pooled analysis. *Environmental Health Perspectives* 113:894-899. DOI: 10.1289/ehp.7688.
- LEVESQUE, B., J. F. DUCHESNE, C. GARIEPY, M. RHAINDS, P. DUMAS, A. M. SCHEUHAMMER, J. F. PROULX, S. DERY, G. MUCKLE, F. DALLAIRE, AND E. DEWAILLY. 2003. Monitoring of umbilical cord blood lead levels and sources assessment among the Inuit. *Occupational and Environmental Medicine* 60:693-695.
- LEVIN, R., M. J. BROWN, M. E. KASHTOCK, D. E. JACOBS, E. A. WHELAN, J. RODMAN, M. R. SCHOCK, A. PADILLA, AND T. SINKS. 2008. U.S. lead exposures in U.S. children, 2008: Implications for prevention. *Environmental Health Perspectives* 116:1285-1293.  
DOI: 10.1289/ehp.11241.
- LUSTBERG, M., AND E. SILBERGELD. 2002. Blood lead levels and mortality. *Archives of Internal Medicine* 162:2443-2449.
- MATEO, R., M. RODRÍGUEZ-DE LA CRUZ, D. VIDAL, M. REGLERO, AND P. CAMARERO. 2007. Transfer of lead from shot pellets to game meat during cooking. *Science of the Total Environment* 372:480-485.  
DOI: 10.1016/j.scitotenv.2006.10.022.
- MENKE, A., P. MUNTNER, V. BATUMANN, E. SILBERGELD, AND E. GUALLAR. 2006. Blood lead below 0.48 µmol/L (10µg/dL) and mortality among US adults. *Circulation* 114:1388.  
DOI: 10.1161/circulationaha.106.628321.
- NEEDLEMAN, H. L. 2004. Lead poisoning. *Annual Review of Medicine* 55:209-222.
- NEEDLEMAN, H. L., C. MCFARLAND, R. B. NESS, S. E. FIENBERG, AND M. J. TOBIN. 2002. Bone lead levels in adjudicated delinquents: A case control study. *Neurotoxicology and Teratology* 24:711-717.
- SCHNAAS, L., S. J. ROTHENBERG, M. F. FLORES, S. MARTINEZ, C. HERNANDEZ, E. OSORIO, S. R. VELASCO, AND E. PERRONI. 2006. Reduced intellectual development in children with prenatal lead exposure. *Environmental Health Perspectives* 114:791-797. DOI: 10.1289/ehp.8552.
- SCHWARTZ, B. S., AND W. F. STEWART. 2007. Lead and cognitive function in adults: A questions and answers approach to a review of the evidence for cause, treatment, and prevention. *International Review of Psychiatry* 19: 671-692.  
DOI: 10.1080/09540260701797936.
- SHIH, R. A., H. HU, M. G. WEISSKOPF, AND B. S. SCHWARTZ. 2007. Cumulative lead dose and cognitive function in adults: a review of studies that measured both blood lead and bone lead. *Environmental Health Perspectives* 115:483-492. DOI: 10.1289/ehp.9786.
- STROUD, R. K., AND W. G. HUNT. 2009. Gunshot wounds: A source of lead in the environment. *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.2009.0109.
- TELLEZ-ROJO, M. M., M. HERNANDEZ-AVILA, H. LAMADRID-FIGUEROA, D. SMITH, L. HERNANDEZ-CARDENA, A. MERCADO, A. ARO, J. SCHWARTZ, AND H. HU. 2004. Impact of bone lead and bone resorption on plasma and whole blood lead levels during pregnancy. *American Journal of Epidemiology* 160:668-678. DOI: 10.1093/aje/kwh271.
- TITUS, K., T. L. HAYNES, AND T. F. PARAGI. 2009. The importance of moose, caribou, deer and

- small game in the diet of Alaskans. *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.2009.0312.
- TSUJI, L. J. S., B. C. WAINMAN, I. D. MARTIN, C. SUTHERLAND, J-P. WEBER, P. DUMAS, AND E. NIEBOER. 2008a. The identification of lead ammunition as a source of lead exposure in First Nations: The use of lead isotope ratios. *Science of the Total Environment* 393:291-298. DOI: 10.1016/j.scitotenv.2008.01.022.
- TSUJI, L. J. S., B. C. WAINMAN, I. D. MARTIN, C. SUTHERLAND, J-P. WEBER, P. DUMAS, AND E. NIEBOER. 2008b. Lead shot contribution to blood lead of First Nations people: The use of lead isotopes to identify the source of exposure. *Science of the Total Environment* 405:180-185. DOI: 10.1016/j.scitotenv.2008.06.048.
- TSUJI, L. J. S., B. C. WAINMAN, I. D. MARTIN, J-P. WEBER, C. SUTHERLAND, E. N. LIBERDA, AND E. NIEBOER. 2008c. Elevated blood-lead levels in First Nation People of northern Ontario Canada: Policy implications. *Bulletin of Environmental Contamination and Toxicology* 80:14-18. DOI: 10.1007/s00128-007-9281-9.
- USEPA (United States Environmental Protection Agency). 2007. Estimation of relative bioavailability of lead in soil and soil-like materials using in vivo and in vitro methods. Office of Solid Waste Emergency Response 9285.7-77. [Online.] Available at [http://www.epa.gov/superfund/health/contaminants/bioavailability/lead\\_tsd\\_main.pdf](http://www.epa.gov/superfund/health/contaminants/bioavailability/lead_tsd_main.pdf). Accessed 2008 November 3.
- USFWS AND USCB [United States Fish and Wildlife Service and United States Census Bureau]. 2006. 2006 National survey of fishing, hunting, and wildlife-associated recreation. [Online.] Available at [http://library.fws.gov/nat\\_survey\\_2006\\_final.pdf](http://library.fws.gov/nat_survey_2006_final.pdf). Accessed 2008 Nov 3.
- WARREN, C. 2000. *Brush with Death: A Social History of Lead Poisoning*. Johns Hopkins University Press, Baltimore, Maryland, USA.
- WATSON, R. T., AND D. AVERY. 2009. Hunters and anglers at risk of lead exposure in the United States. *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.2009.0117.
- WRIGHT, J. P., K. N. DIETRICH, M. D. RIS, R. W. HORNUNG, S. D. WESSEL, B. P. LANPHEAR, M. HO, AND M. N. RAE. 2008. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Medicine* 5:732-740. DOI: 10.1371/journal.pmed.0050101.

Senator SULLIVAN. The subcommittee hearing on the Bipartisan Sportsmen's Act of 2015 is hereby adjourned. Thank you again.  
 [Whereupon, at 11:19 a.m., the hearing was adjourned.]  
 [Additional material submitted for the record follows.]

STATEMENT OF DAVID SOLLMAN, EXECUTIVE DIRECTOR,  
 FUR INDUSTRIES OF NORTH AMERICA

On behalf of the Fur Industries of North America, an organization that represents wildlife trappers throughout the country, we appreciate the opportunity to provide information to the Committee on the current State of trap technology and ongoing research programs. While trapping is not a direct subject of the Bipartisan Sportsmen's Act, we recognize that trapping is an important component of wildlife management and that issues related to trapping have been raised during debate on this important legislation. We, therefore, offer the following information on the current status of trap technology research, best management practices and our international obligations under agreements on humane trapping.

In 1997, the United States and the European Union signed an Agreed Minute on humane standards for trapping of furbearing animals. The Agreed Minute represents a binding international treaty commitment of the United States. Concurrently, an agreement was reached between Canada, Russia and the EU. The Agreement on International Humane Trap Standards (AIHTS) seeks to develop humane methods for the capturing of furbearing animals. The Agreed Minute reflects the U.S. commitment to the principles of the AIHTS.

As a result, the United States is committed to ongoing programs designed to meet U.S. obligations by testing trapping devices that measure humaneness, safety, selectivity, practicality and efficiency that are incorporated in the Agreement. Accordingly, the program was designed, with Federal oversight, to allow State control of the research. While as a constitutional matter, trapping is regulated by the states, this is more than an issue of State vs. Federal control over trapping. States have the right to regulate their respective wildlife populations. Also, State control is more practical because of: (1) the competency of the states residing with their respective DNRs; and (2) the great diversity of habitats across the country, which require state-specific solutions to issues of wildlife management.

To date, research has been completed and best management practice recommendations have been distributed on traps for 21 species with two more soon to be released. Over 100 trap types have been tested and a substantial number of devices have been identified that meet international animal welfare standards. Those traps that fail to meet international standards have also been identified. These findings have been published and distributed by the states to wildlife managers, users and available to the general public. Future efforts will increase State level education, outreach, and training to ensure that best management practices are integrated into professional and agency programs.

The Agreed Minute specifically obligates the U.S. Government to fund an annual research program to improve the quality of traps and to ensure new traps meet welfare criteria set forth in the Agreement. The United States research program, undertaken by the USDA National Wildlife Research Center, has been developed in partnership with the State Fish and Wildlife Agencies, which have regulatory authority over trapping. Failure to maintain this commitment could result in reduced access to European and other markets for American fur products. For this reason, the USDA and the States have maintained their commitment to continued research and development in this important area.

We appreciate the opportunity to provide this information to the Committee as it considers issues that relate to wildlife management.

---

March 24, 2015

Re: Please oppose S. 405, the so-called "Bipartisan Sportsmen's Act of 2015"

Dear Senator:

On behalf of our more than 100 national, regional, and local organizations and our millions of members, we write to express our strong opposition to S. 405, the so-called "Bipartisan Sportsmen's Act of 2015" and its related Senate bills (S. 556, S. 659). We oppose this legislation because it threatens the conservation of fish, wildlife, and habitats that benefit all Americans. While there are many adverse special interest provisions contained in this legislation, the following aspects of the bill clearly demonstrate the harm it will do and why it must be opposed.

## ROLLBACK OF PUBLIC LANDS PROTECTION

S. 405 contains several alarming rollbacks of long-standing Federal environmental and public land laws, including the National Environmental Policy Act (NEPA), the Wilderness Act, and the National Forest Management Act. These rollbacks would reduce or eliminate important protections for America's public lands that have been in place for decades.

In regards to NEPA, for example, the bill exempts all decisions on Bureau of Land Management (BLM) and United States Forest Service (USFS) lands regarding trapping and recreational hunting, fishing, and shooting from compliance with NEPA by mandating that these lands be open to these activities. NEPA ensures that agencies assess and consider the impacts of their land-use decisions before those decisions are put into action. It also serves as an effective platform for the public to assess the environmental consequences of proposed agency actions and to weigh in on governmental decisions before they are finalized.

Underlying changes to the Wilderness Act embedded in S. 405 seek to overturn decades of congressional protection for wilderness areas. For example, the bill would require lands managed by the USFS and BLM, including wilderness areas, to be managed as "open unless closed" to recreational shooting. This includes "sport, training, competition, or pastime whether formal or informal" in designated wilderness. Wilderness areas have always been closed to competitive events and commercial enterprises by statute and regulation.

Moreover, the bill prioritizes hunting, trapping, recreational fishing, and recreational shooting in most Wilderness areas by requiring that all Federal land managers (except for lands managed by the National Park Service or the United States Fish & Wildlife Service) facilitate the use of and access to lands under their control for these activities. The agencies could interpret prioritizing hunting, trapping, fishing, and recreational shooting in wilderness areas to mean that they can permit management measures such as the use of motorized vehicles in these areas to artificially increase game or fish numbers. Such measures would be inconsistent with the concept of wilderness and the Wilderness Act.

Further, section 106 of S. 405 would significantly change current practices and open up all wilderness areas across the country to commercial filming activities and their attendant problems, preventing Federal land managers from protecting designated wildernesses from commercial filming production. The language in this section that exempts "cameras or related equipment used for the purpose of commercial filming or similar projects" from the prohibitions on motorized and mechanized equipment in designated wilderness could lead to calls to allow motorized access in wilderness areas for commercial filming. Congress recognized that wilderness areas can easily be damaged by commercialization. The Wilderness Act's section 4(c) provides that, except as specifically provided otherwise, "there shall be no commercial enterprise . . . within any wilderness area." We are deeply concerned that making exceptions for commercial filming would lead to opening wilderness areas to even more commercial enterprises.

Such changes are in direct conflict with the stated purpose of the Wilderness Act to establish areas "where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." It is also in direct opposition to the Act's fundamental mandate that Federal agencies preserve the wilderness character of these lands so that they are left "unimpaired for future use and enjoyment as wilderness."

The legislation promotes the priorities of various special interests by making substantive policy changes to public land law. It prioritizes recreational shooting activities by promoting and facilitating the establishment of target ranges on public lands. As defined, recreational shooting activities are unrelated to, and potentially at odds with, the unique natural resource values of the various Federal land management systems on which they would occur.

Under the National Forest Management Act, forest managers manage for the resilience of our national forests so that both current and future generations can benefit from multiple uses of the land. In some cases, managers need the flexibility to stop certain actions to promote long-term use of the forest resources. Requiring that all Forest Service lands be "open unless closed" to hunting, trapping, fishing, and shooting is one example of many where this legislation undercuts their ability to do that.

Appropriate management of our public lands plays a critical role in stewardship for biodiversity as well as for recreational opportunities. The natural resource management laws affected by this legislation were created to ensure public lands were managed to protect biodiversity. This stable habitat, in turn, allows for healthy wildlife populations, which can prevent them from needing to be listed under the

Endangered Species Act. They work to ensure that our wildlife and public land resources thrive and that hunters, birders, and anglers alike can enjoy them for generations to come. By weakening these important laws, the proposed legislation would significantly undermine these important public land values.

#### LEAD AMMUNITION POLLUTION

Second, S. 405 would remove the Environmental Protection Agency's (EPA) authority to regulate toxic lead or any other toxic substance used in ammunition or fishing equipment under the Toxic Substances Control Act. A nationwide ban on lead shot in migratory waterfowl hunting was adopted in 1991 after biologists estimated roughly two million ducks died each year from ingesting spent lead pellets. The hunting industry groups that want to prevent the EPA from regulating lead ammunition and fishing tackle are the same groups that protested the ban on lead shot for waterfowl hunting in 1991. Despite the doom-and-gloom rhetoric, hunters know two decades later that this didn't lead to the end of duck or goose hunting. A Federal agency should be able to carry out its duties without uncalled for and unscientific laws impeding this process. Such decisions should be left to the discretion of Federal agencies based solely on the best available science on the impacts of toxic substances such as lead. Congress should not tie the hands of professional scientists and prevent them from even evaluating or considering future policies to protect the public and the environment.

Switching to non-lead hunting ammunition isn't about stopping hunting or taking anyone's guns away. In fact, some of the staunchest supporters of the effort to rid our public lands of lead are hunters. The switch to non-lead hunting ammunition in California, for example, proves that replacement of toxic lead in ammunition is compatible with hunting. Hunters have been hunting with copper rounds in 14 California counties since non-lead hunting ammunition requirements went into effect in 2008 to protect endangered California condors from lead poisoning.

#### POLAR BEARS IN PERIL

S. 405 would allow the import of 41 sport-hunted polar bear trophies from Canada. This would be the latest in a series of import allowances that Congress has approved, and the cumulative effect is devastating to our most imperiled species. Despite having notice of the impending prohibition on import of polar bear trophies from Canada for 16 months (between January 2007 and May 2008), a number of trophy hunters went forward with their hunts anyway. In fact, the 41 individuals all hunted polar bears AFTER the Bush administration proposed the species for listing as threatened under the Endangered Species Act and all but one hunted more than a year after the listing was proposed. They were given repeated warnings from hunting organizations and government agencies that trophy imports would likely not be allowed as of the listing date, and that they were hunting at their own risk. If this behavior were rewarded through a congressional waiver, it could accelerate the pace of killing any species that is proposed for listing in the future, since hunters would believe they could get the trophies in even after a listing becomes final. Each new allowance may involve only a few animals, but the cumulative impacts of these waivers time and time again lead to more reckless trophy killing.

#### CONCLUSION

This bill is extreme and reckless. It would undermine decades of land management and planning practices and would topple the delicate balance between allowing for public use and the need to protect public resources. In regards to increased public land access for recreational hunting and fishing, it is also unnecessary. Hunting and fishing are already permitted on 85 percent of public lands. This bill's proponents seek to solve a problem that does not exist, and the legislation they propose could in fact cause serious damage to America's natural heritage.

Please oppose S. 405, as well as any related legislation such as S. 556 and S. 659, and oppose any effort to attach any of these to another bill. This legislation is bad for public lands and water resources, bad for fish and wildlife, and bad for the American people.

Thank you.

• The American Society for the Prevention of Cruelty to Animals • Adirondack Wildlife Refuge and Rehabilitation Center • Alliance for the Wild Rockies • Animal Legal Defense Fund • Animal Protection League of New Jersey • Animal Welfare Institute • Animals Are Sentient Beings, Inc. • Audubon Society of Corvallis • Audubon Society of Kalamazoo • Blue Ridge Wildlife Center • Born Free USA • Cascades



Raptor Center • Center for Biological Diversity • Center for Food Safety • Center for Public Environmental Oversight • Center for Wildlife Ethics, Inc. • Citizens for the Preservation of Wildlife, Inc. • Connecticut Council for Humane Education • Conowingo Bald Eagles • Conservation Congress • Conservation Northwest • Cornell Laboratory of Ornithology • Coyote Coexistence • Coyote Watch Canada • Earth Island Institute • Endangered Habitats League • Endangered Species Coalition • Environmental Action Committee of West Marin • Environmental Protection Information Center • Footloose Montana • Four Harbors Audubon Society • Freedom Center for Wildlife • Friends of Georgia • Friends of the Bitterroot • Friends of the Clearwater • GooseWatch NYC • Great Old Broads for Wilderness • Gulf Restoration Network • Hawk Mountain Sanctuary Headwater • Heartwood • The Humane Society of the United States • Humane Society Legislative Fund • The Humane Society Wildlife Land Trust • Humane Society Veterinary Medical Association • In Defense of Animals • International Fund for Animal Welfare • The International Wildlife Rehabilitation Council • Jayhawk Audubon Society • Justice for Wolves • Kittitas Audubon Society • Klamath Forest Alliance • Laramie Audubon Society • League of Humane Voters, Alabama • League of Humane Voters, Florida • League of Humane Voters, Georgia • League of Humane Voters, Indiana • League of Humane Voters, Nevada • League of Humane Voters, New Jersey • League of Humane Voters, New York • League of Humane Voters, Ohio • League of Humane Voters, Pennsylvania • League of Humane Voters, Virginia • Long Island Orchestrating for Nature • LoonWatch • Los Padres ForestWatch • Madrone Audubon Society • Maricopa Audubon Society • MOMS Advocating Sustainability • National Urban Wildlife Coalition • New Hampshire Audubon • North County Watch Northcoast Environmental Center • Northeast Oregon Ecosystems • Prairie Dog Pals • Predator Defense • Preserve Our Wildlife • Project Coyote Rainforest Relief • Raptor Education Group, Inc. • Raptors Are The Solution • Raptor Rehabilitation of Kentucky Inc. • RESTORE: The North Woods • Rocky Mountain Wild • Save America's Forests • Save Our Sky Blue Waters • SAVE THE FROGS! • Sequoia ForestKeeper • Speak Up for Wildlife Foundation • Sky Island Alliance • South Florida Wildlands Association • Southern Utah Wilderness Alliance • Tamarack Wildlife Rehabilitation Center • TEDX, The Endocrine Disruption Exchange • Tennessee Ornithological Society • Tri-City Ecology Center • Walden's Puddle Wildlife Rehabilitation and Education Center • Western Lands Project • White Mountain Conservation League • Wild Wings Raptor Rehabilitation, Sisters, OR • WildEarth Guardians • Wilderness Watch • The Wildlands Network • Wildlife Rehabilitation Center of Northern Utah • WildWest Institute • Yellowstone to Uintas Connection • Zumbro Valley Audubon Society

