



# A Case for Copper

by Jan Lucciola

## Case #1

November 26, 2011 – An adult female bald eagle was found in the woods near a lake in Greentown, PA. The bird was turned in to DVRC that same day and was found to be under weight with labored breathing. The bird was treated with antibiotics, injectable and oral vitamins and iron to address the starvation, fluid therapy for rehydration, and an intravenous chelating drug as lead poisoning was suspected (chelation is done to prevent any lead still in the system from doing any more damage). A blood sample was taken to test for lead concentration.

November 27 – The eagle could stand, but was found, at times, leaning to one side with its wing outstretched to the ground as a prop for balance. The chelation therapy and fluid therapy were continued and she was force fed.

November 28 – She was eating on her own as IV injections were continued.

November 30 – Results of the blood tests came in and, as is often indicative of lead poisoning, she was slightly anemic and her uric acid was high. More conclusive evidence—her blood lead level was greater than 65 µg/dl, (over 15 is suspicious of lead poisoning and symptoms may or may not be seen and over 20 indicates definite toxicity). Such was the case with this bird. While she continued to eat until December 2 and seemed to improve, it was probably the supportive care that made her feel better, but the irreparable damage was already too extensive. By December 3, she was standing on the floor of her building rather than perching, and died on December 4.

## Cases #2 & #3<sup>1</sup>

December 31, 2011 – An adult bald eagle was found in Chesapeake, VA thin, weak, and hanging its head. It was turned in to the Wildlife Center of Virginia. The article online from WAVY-TV 10 on WAVY.com was published on January 2 and, at that time, the bird was undergoing treatment. The online video of their newscast also reported on another bald eagle in a different part of Virginia that was found on December 30 suffering from lead poisoning that had died on January 1.

## Case #4<sup>2</sup>

January 3, 2012 – CBS Minnesota News reported on a bald eagle brought in to the University of Minnesota's raptor rehab center that eventually died as a result of lead poisoning.

## Case #5<sup>3</sup>

January 11, 2012 – An adult bald eagle was rescued from Prince William County, VA. It was found to be thin and showing signs of lead poisoning which a subsequent blood test confirmed. This was the third case of lead poisoning in two weeks for the Wildlife Center of Virginia.

## Case #6

February 7, 2011 – DVRC admitted an adult male bald eagle, born in 2002 at the Neversink Reservoir according to information available as a result of him being banded as an

eaglet. The bird had been found near Roscoe, NY on the ice of a lake, having been there since the day before. Rescuers found the bird unable to fly away from them, having trouble balancing just trying to stand. He would throw his head around and had a vacant stare. He was underweight, but not emaciated. He had green staining on his tail feathers from green feces (sometimes caused by lead poisoning). He was given vitamins and iron, fluid therapy and IV chelation therapy was started. That evening, the eagle was breathing very fast and heavily. A towel had to be used to prop his head up as he would or could not hold it up off of the floor. February 8 – The eagle was standing and breathing normally, no neurological symptoms were evident. He was still very weak. Fluid and chelation therapy were continued and he was fed small amounts of food. A blood sample was taken and the results showed that he was anemic, his total serum protein was low and (remembering that greater than 20 is considered toxic) his blood lead level was 555 µg/dl. Enzymes that indicate muscle wasting were also high.

February 9 – The eagle had regurgitated the previous day's food. He was stronger and more alert. Later in the day he was fed a high calorie slurry and given an injection that prevents nausea and vomiting.

February 10 – He kept the slurry down. The therapies were continued and he was placed in an outdoor enclosure for the warmest part of the afternoon. He could not be left outside as he was in critical condition and did not have the energy to burn keeping himself warm.

February 11 – He regurgitated the slurry so another form of nutrition was tried, which he kept down as of that night. Otherwise, there was no change.

February 12 – We continued his chelation therapy and liquid food, but, by 2:30 that afternoon, he was lying down. I picked him up to try and prop him up. He started throwing his head back, vocalizing and, before I could do anything else, he died in my arms.

A reporter had found out about this eagle, called DVRC, and reported the story in the local newspaper. The article stated that the eagle had died of lead poisoning, possibly from scavenging on a carcass that contained lead from a hunter's ammo. After the newspaper was published, I came home to a message on DVRC's answering machine. The message was from an area woman who was upset about the *misinformation* we were spreading and was surprised that we knew so little about eagle behavior. She said, "First of all, eagles do not eat dead things, they only eat live things. They're predators...I'm wondering where you got the information and what kind of testing did you do to come to the conclusion that an eagle died of lead poisoning. I just find that very interesting 'cause eagles, like I said, always eat live things and I think you should know that." She went on to tell me what bald eagles do eat and then finished saying, "but they would never, ever eat anything that was already

dead" (drawing out the never and adding emphasis to the ever). I returned her call to offer answers to her questions about what kind of testing we did to claim that the eagle had lead poisoning and how the eagle could have gotten it into his system. It was a friendly conversation; I think we both learned from it, at least, I know I did. I hope she did too. I found out that she is an avid hunter who was not aware that lead had been banned federally for use in hunting waterfowl (that came into effect in 1991). I suggested she google "bald eagles, lead poisoning" and she said she would look into it, but she was going to write a letter to the editor because she was very unhappy that we had put out what she thought was obviously an anti-hunting article.

My "first of all" would have been that we did not put out any article, the reporter came to us. The article was about the bald eagle, where he was found, what was done for him and, yes, there was a sentence stating that he had lead poisoning which happens when eagles ingest lead. The article suggested a carcass was a likely origin and went on. It did not dwell on hunting at all. DVRC has never been anti-hunting, but we do believe that eagles eat dead things and that, due to the use of lead in ammunition, they are suffering as a result.

A researcher in Iowa, Kay Neuman who is the executive director of Saving Our Avian Resources, has been tracking bald eagles brought in to rehabbers in Iowa since 2004. She found that of the 82 balds brought in for treatment from January 1, 2004 to April 30, 2008, 62 were tested for blood lead levels. Of those 62, 7 showed obvious exposure and 39 had lethal levels. Of these 46 birds that had levels above what is considered "safe," 38 of them died. Four others remained in captivity due to injuries secondary to their poisoned, weak and uncoordinated state. Four of the 62 tested were releasable.<sup>4</sup>

Dr. Pat Redig, DVM, co-founder of The Raptor Center at the University of Minnesota, said 2011 saw 29 bald eagles admitted to that center with toxic lead levels, only one of which survived to be released. Dr. Redig reports that 25% of the bald eagles coming into the University rehab center show blood lead levels in the toxic range. He says the greatest number are admitted during hunting season.<sup>3</sup>

Lead poisoning occurs when lead is ingested and gets into the blood stream, affecting the brain, nervous system, respiratory system, digestive system, and the blood's ability to supply oxygen. When birds eat lead, it can be dissolved



Lead poisoning from the ingestion of a lead fishing sinker was the cause of this loon's death. Had the bird not been found, bald eagles, turkey vultures, and other birds could have scavenged on it and died from lead poisoning as well.

by their stomach acid and delivered to their blood stream or the shot may be passed or regurgitated with the pellet of fur they cast up after eating. Passing or regurgitating the lead does not guarantee that some of it wasn't absorbed. Why do they ingest lead to begin with? Before the ban on lead for use in hunting waterfowl, bald eagles would ingest ducks that had shot in them but were not collected by the hunter. Beyond that, there is all the shot fired that missed its target and was left in the environment. Bottom feeding ducks would ingest the lead shot as they fed and would become poisoned themselves. In either case, eagles would find the injured or weak targets and take the easy kill. More than that, however, they would eat them if they found them dead.

Of many responses following the articles I found online<sup>1,2</sup>, one respondent wrote:

*Eagles eat parts of animals [meaning from a carcass] - Prove it! What a pile of cow chips, obviously city dwelling progressives that would starve to death if the power was out for a week. Just another special interest, enviro anti rural article . . . void of proof and any aspect of rational thought or reality.*

In the book *The Bald Eagle, Haunts and Habits of a Wilderness Monarch*, Jon M. Gerrard and Gary R. Bortolotti describe the foraging habits of bald eagles in various parts of North America. In his observations, Jon Gerrard found that balds fishing lakeside would often pick a spot to perch that also had the greatest chance of the wind direction causing waves to carry dead fish to that shoreline. Personal experience bears out that they eat dead things. Benson, my program eagle, was rescued from a river when the man who rescued him unintentionally frightened him off of a deer carcass and into the water. Eleanor, the eagle Kathy Michele, my husband, and I rescued in NY State could be located easily, because Kathy, a reptile rehabber and NY State DEC volunteer had put a road kill deer carcass out for the eagle until a rescue could be arranged and the eagle had been observed feeding on it. Eagle watching one day along the Tow Path near Greeley, PA, I saw an eagle on the bank eating one dead fish after another, fish that had been stranded there as a result of quickly changing water levels from the dam upstream. Raptors are seen on road kill routinely. The book *Birds of Prey*, edited by Dr. Ian Newton, speaks to the scavenging nature of birds of prey:

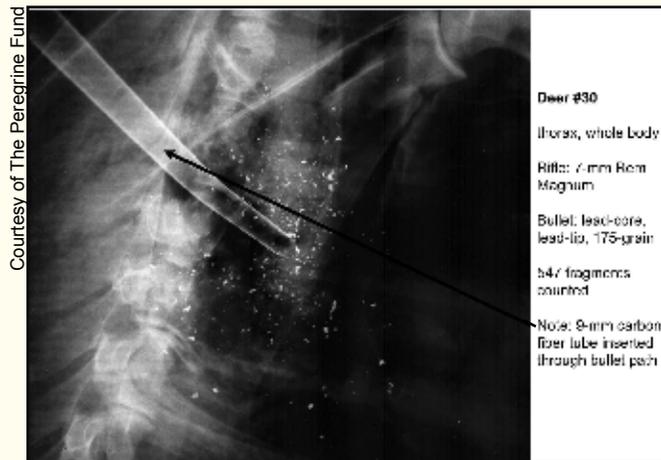
*Many of the more predatory raptors take carrion if they have the opportunity. Most eagles come into this category, especially from the genus *Haliaeetus*. The so-called Bald Eagle (*Haliaeetus leucocephalus*), the United States' avian emblem . . . is a frequent scavenger of salmon kelts along the Pacific Coast and of shot waterfowl in inland areas. Even the Northern Goshawk (*Accipiter gentilis*), a killing machine par excellence, takes carrion if it is readily available.*

Eagles eat dead things. So how does that affect eagles now, 20 years after the ban on lead shot in duck hunting? Besides all of the misspent lead shot from duck hunting from years ago, there is still plenty of lead being added to the environment and being consumed by wildlife. The most commonly referred to is the lead shot used in large game hunting, i.e. deer. And, as far as deer go, the most commonly mentioned reason that deer poison wildlife is their gut piles left in the woods when hunters field dress them. In 1997, the Raptor Center of the University of Minnesota started a study

Tufts Veterinary School Wildlife Clinic

to find if the 1991 lead ban for waterfowl had changed the number of eagles suffering from lead poisoning. The results showed that the number had not changed and suggested another source of lead. After a 13 year retrospective study (1996-2009) checking the time of year, the identity of the metals (matching isotopes of common lead ammo and isotopes of lead found in the birds' stomachs as well as the blood), and the location of the birds in relation to hunting areas, they concluded that a significant amount of the poisoned eagles were getting their lead from carcasses and gut piles of deer.<sup>5</sup>

Another respondent to the online discussion forums felt that the argument for eagles ingesting lead from gut piles left in the woods was questionable as hunters don't shoot the deer in the gut. True. Hunters don't aim to shoot them in the gut, but the lead gets there regardless. X-rays of lead poisoned eagles routinely show pellets or pellet fragments in their digestive tracts. In the magazine *Audubon*<sup>6</sup>, columnist Ted Williams visited Tufts University Wildlife Clinic at the university's veterinary college. There he spoke with Dr. Mark Pokras, who is described as "one of the world's top authorities on plumbism" (the Latin for lead is plumbum) and Dr. Pokras showed the author a carcass of an eagle whose x-rays showed 12 lead fragments in its gut. In fact, there are x-rays of deer carcasses showing fragments of lead shot throughout the body. When lead hits the deer, it shatters "impregnating swaths of soft tissues as wide as three feet."<sup>6</sup> The shattered fragments that ricochet off can end up in the abdomen of the deer and are then removed and left in



**This deer was part of a study by Hunt et al reported by the Peregrine Fund in 2005. 38 lead shot deer were x-rayed and the fragments (snowflake appearance above) were counted. this particular deer had 547 pieces of lead scattered through it.**

the woods with the rest of the unwanted parts. Eagles will scavenge on these gut piles. In *The Bald Eagle, Haunts and Habits of a Wilderness Monarch*, the author states, "During the hunting season, hunters frequently eviscerate deer in the field. Eagles can be found feasting on such gut piles." A piece of lead as small as a grain of rice can prove to be fatal.

A hunter that Mr. Williams spoke with who hunts big game in California and Montana realized long ago the damaging effects of hunting with lead and started burying his gut piles, although he knew that wasn't a fool-proof preventative to poisoning as other scavengers could dig up the piles. Nevertheless he pursued his commitment to the point he started an organization to inform and encourage other hunters to do the same—Project Gutpile. His organization broadened its goal when copper shot became available, giving hunters feasible, effective non-toxic options for ammo.

There are, unfortunately, many more ways that lead becomes available to bald eagles. Back in the day of waterfowl hunting with lead, it was observed, according to Jon Gerrard, "As the lakes freeze on the Canadian prairies, hunter-crippled waterfowl become trapped in small openings in the ice and fall easy prey to eagles." And so it is today that hunters do not always have the accuracy in their shot to drop deer where they stand. The deer may get away and die later. The same holds true for other prey species like pheasants, doves, rabbits, etc. Farmers shooting at "varmints" aren't looking for a meal or a trophy and don't necessarily make any attempt to recover the lead laden bodies. Unrecovered quarry are then fed on by bald eagles.

Sometimes, the eagles are scavenging on birds not shot by lead, but poisoned themselves—and more than just bottom feeding ducks. Mr. Williams of *Audubon* found that "a study at the James A. Reed Memorial wildlife Area in Missouri revealed that 728 dove hunters had deposited 348,037 lead pellets per acre." He also learned from the USGS that 80,000 tons of lead "accumulate each year on the nation's trap, skeet, and target ranges, most of which would meet federal criteria for Superfund sites." The waterways are still receiving more shot as hunters aim at and miss terrestrial species like pheasant, woodcock, quail, etc. Dr. Pokras reports that "Swans pick up lead shotgun pellets when they forage in water, but they do a lot of foraging on land, too."<sup>6</sup> Swans and other waterfowl species as well as doves mistake the pieces of lead for seeds as they search for food. A study in Arizona showed 19.9% of mourning doves checked had lead in their digestive tracts. Even vultures and condors mistake lead for pieces of bones that they would normally collect to feed to their young as a source of calcium.

Another online respondent asked why the birds are so stupid. Why don't they just not eat the lead? I'm sure emergency rooms everywhere could tell you stories of things humans ate, applied, or inhaled that were toxic, be it meat not completely cooked or cleaning fluids mixed to do a better job. And we have warning labels. They don't. It's not a buffet out there that the birds are picking at what they want. They're often HUNGRY and eat anything they think is food, just like the birds that mistake the helium balloons kids so innocently release as a berry, once they deflate and come back to earth in the woods. Or the sea mammals that eat floating plastic grocery bags and other trash. When an eagle sees a dying or dead animal, it does not first postulate if eating the convulsing duck (that ate the seed-like pellet) could cause the same thing to happen to him/her.

Anglers add to the available lead also. Lead sinkers attached to hooks caught in fish that snapped a line can be eaten as an eagle scavenges on the fish. Lead sinkers that, like lead shot, are picked up by bottom feeders get into the food chain. Lead poisoning in swans and loons from fishing gear is well documented. There are other options available to fishermen as well.

Besides the effect lead poisoning is having on swans, loons, doves, and bald eagles to name a few, condors, whose very existence is precarious, are dying as a result of lead poisoning. The *Daily Hampshire Gazette*<sup>7</sup> last month reported that one half of the 130 condors released along the Arizona/Utah border since 1996 have died, lead being the main problem. Steve Spangle of the US Fish and Wildlife Service said that without lead in the environment, the reintroduction program "would have been wildly successful." Spangle went on to say that, "Most biologists believe we'll never have a sustaining population unless we remove lead

from the environment.”

Since it is out there and eagles do ingest it, what happens? The birds become weak and lose coordination. They may even fly into something causing traumatic injuries that kill them. If they don't die from these injuries and are rescued, they may be treated for the trauma alone without the original cause being uncovered. If the bird, though lacking coordination to fly at high speeds with great accuracy, can perch and get around fine in a rehab facility, it may never be checked for lead. In the wild, if they don't fly into something or sustain any other trauma, they may pass that lead pellet, only to ingest another down the line and the process can take a long time, slowly losing condition, losing weight, and becoming too weak to survive as a predator. In other cases,



**An immature bald eagle treated at DVRC for confirmed lead poisoning. The bird is showing classic symptoms of the poisoning - lethargy, weakness, and uncoordination.**

they are more acutely poisoned as one pellet or several at a time have a chance to dissolve in the digestive tract. The bird becomes weak, uncoordinated, and unable to fly. It may suffer from tremors and respiratory difficulties. Those that make it to a rehab center before they die will, at the very least, get supportive care. They will be rehydrated, kept warm, free from attack themselves by scavengers or predators, treated with medication to address the poison, nausea, and malnutrition. But many, whether rescued or not, ultimately succumb to the poison, losing the ability to stand or even to hold their head up, becoming disoriented, throwing their heads, and convulsing before losing their battle with a tiny piece of metal that didn't have to be there.

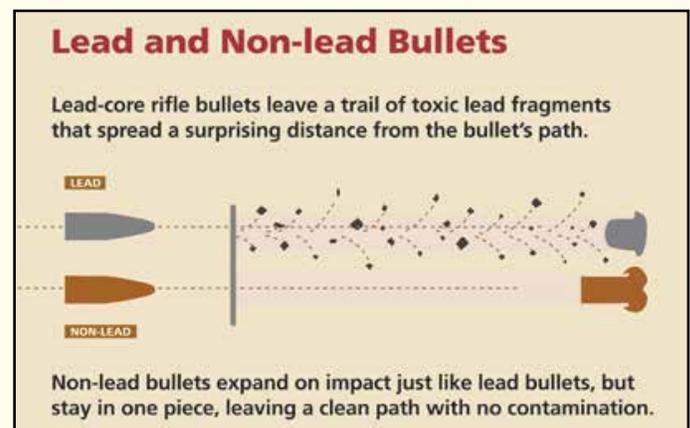
So why is it? That's hard to say. It is much easier to find consistent arguments for why not to use lead than why it is imperative that we not ban lead for use in hunting. In Arizona, many hunters have voluntarily avoided lead, helping to increase the chances of success for the California condor. Some hunters prefer copper, which expands rather than shatters. Copper was not designed to keep lead from the environment, but for its own characteristics as effective ammo. The research that was done in Iowa also involved a survey of hunters. Of 151 respondents to the survey, 43% had used solid copper and, of those, 87.7% liked its performance for big game. Some form of non-lead ammo had been used by 58.3% of the respondents for upland game and 93.2% of those were satisfied with lead free ammo. However, lead is still the ammo of choice in most areas. The reasons vary: less expensive, performance (heavier, flies straighter), steel

shot, and possibly copper shot, can be dangerous if used in old guns. Most of the online comments did not make any reference to why lead shot is a better choice; rather, most comments did not see the justification for taking away the traditional ammo they are accustomed to, or simply seemed to resent the idea as though it is a conspiracy to end all hunting or to take away the 2<sup>nd</sup> Amendment right to bear arms. One person wrote that the poisoning is coming from lead in air pollution, like with leaded gasoline fumes. Many, like the phone call and the respondent above, just don't believe that eagles would be ingesting lead shot and, therefore, see no reason to change. For others, banning lead . . . well them's fightin' words. "You [expletive] liberals and government control idiots . . ." was offered by someone who went on to say about having lead taken away from them, "Before I go down, you and many others will also."

Others persevere. George Allen of the US Fish and Wildlife Service is in charge of migratory bird permits and, in his work updating the regulations concerning nuisance blackbird control permits which protect certain species of blackbirds and require the use of non-toxic ammo for others, he has gotten grief from hunters especially because he is a hunter and a lifelong member of the NRA. He sticks to his guns about the regulations because the increasing evidence about lead warrants it.

The same cannot be said for the National Park Service (NPS). In March of 2009, it announced a ban on lead by the end of 2010 wherever hunting is allowed on NPS land; but, by that time, the NRA lobby had the NPS backing down so that the ban applied only to park personnel. In Iowa, a recently enacted ban on lead for dove hunting is threatened. The Iowa Radio News Network reported on January 27, 2012 that the House Natural Resources Committee had met the 26<sup>th</sup> before a room packed with hunters. The committee voted to overturn a vote last summer by the State's Natural Resources Commission that required steel shot.<sup>8</sup>

It was a step backwards for wildlife and for people. What about the quarry that is recovered, and eaten by humans? Lead shatters in those carcasses too. Although it might not outright kill us, there is cause for concern. Studies showing the effects lead can have on the developing brains of fetuses and children have brought about warnings on meat shot with lead. The gun lobby prompted hunters to donate food



**From: The Redwood National and State Parks - Lead Bullet Risks**  
For more information about non-lead ammunition visit [www.huntingwithnonlead.org](http://www.huntingwithnonlead.org).

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to the underprivileged. The North Dakota Department of Health and a professor from the University of ND School of medicine (a hunter himself) looked into this practice. They found that, of 100 packages of venison x-rayed from various food pantries, 58 of them had lead fragments.

I hope that those suffering from lead poisoning are doing so for more than just the consistent mantra that those wanting a ban are just bleeding heart liberals who want to take away everyone's guns. I just want to see an end to the indiscriminate poisoning caused by lead. In September of 2010, Rep. Paul Brown (R-GA) introduced the bill HR 6284 entitled "To prohibit the Administrator of the Environmental Protection Agency from regulating, based on material composition, any type of firearm ammunition or fishing tackle." The bill had 36 sponsors, one of them being Rep Joseph Pitts of Pennsylvania, and was referred to the House Committee on Energy and Commerce, and there it sits.

A hunter posted, "We as hunters will do what is required and ethical to protect the wildlife and the environment around us." I believe there are a great many hunters that feel the same way. I also hope they accept the fact that eagles do eat dead things and those dead things can and often do contain lead and that lead kills more than its intended target. Ammunition manufactures including Federal Cartridge, Remington, Winchester, and Hornady all offer options other than lead. I hope they continue in the development of ammo

that is both as effective and affordable as lead and yet non-toxic. All one has to do is visit You Tube and put in "Helping America's Bird" for a video by the University of Minnesota or "Toxic Harvest" by the Peregrine Fund to see a case for something other than lead.

References:

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- 2 "Bald Eagles Dying of Lead Poisoning" – Bill Hudson – *minnesota.cbslocal.com* 1/3/12
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- 4 "Bald Eagle Dies of Lead Poisoning in Black Hawk County" – Mary Stegmeir – *WFCCourier.com* 1/12/20105
- 5 "Lead Poisoning" – The Raptor Center at the University of Minnesota – *raptor.cvm.umn.edu* 2/1/11
- 6 "Bad Shot" – Ted Williams - "Insite" Column of *Audubon* magazine May/June 2011
- 7 "Condors Dying from Remnant Bullet Lead" – Salt Lake City (AP) – *Daily Hampshire Gazette* 12/5/11
- 8 "Ban on Lead Shot During Dove Season Moves Closer to Repeal" – O. Kay Henderson – *radioiowa.com* 1/27/12