

Lead bullets poison ravens, maybe people

Study: Bullet fragments spread toxic metal in area.

By Cory Hatch

High-powered rifle bullets that shatter inside deer, elk and moose could cause toxic levels of lead in scavengers that feed on gut piles during hunting season, researchers say.

Scientists from Kelly-based Beringia South tested more than 300 ravens in and around Grand Teton National Park in 2004 and 2005 and found that blood-lead levels increased dramatically from mid-September to mid-December, roughly five times higher than the rest of the year. Researchers theorize that the dangerous metal may also find its way into humans.

The contamination likely comes from lead bullet fragments left behind in gut piles (the inner organs of elk, deer and moose that are scooped out and left behind after the animals are killed), say researchers Derek Craighead and Bryan Bedrosian.

Other scavengers probably ingest the lead, as well. Bald eagles, bears, coyotes and wolves all feed on gut piles during hunting season. Further, Bedrosian and Craighead think the bits of lead could also poison people who eat meat from game animals killed by lead bullets.

Throughout 15 months, Bedrosian and Craighead captured 302 ravens, drawing blood samples from each and testing their blood-lead levels with an electronic test kit. The researchers captured 43 birds during the 2004 hunting season, 93 during the 2005 hunting season and 147 during non-hunting seasons. They also captured

19 nestlings, which are unlikely to eat lead-infused gut piles, as a control.

During the nonhunting season, the average blood-lead level measured 2.6 parts per million. But during hunting season, it increased to 12.8 parts per million.

Ten parts per million is considered the acute lead exposure threshold for ravens, according to the Beringia study.

"Lead only stays in the blood for about two weeks," Bedrosian said. "After that, it gets deposited in the brain, bone marrow ... really all the internal organs."

What makes Craighead and Bedrosian's study stand out is the timing; these substantial increases in blood-lead levels correspond almost exactly with the open and close of hunting season. Just after the start of hunting season, blood-lead levels begin to rise, and shortly after the end of hunting season, they return to normal. Bedrosian said blood-lead levels showed a spike again in the late spring, when melting snow uncovers gut piles left from the previous hunting season.

Earlier studies have demonstrated that lead bullets, on average, shatter into 160 fragments when fired from a high-powered rifle. Bedrosian and Craighead replicated this experiment on an elk carcass, shooting the animal with a .30-06 rifle. In an X-ray of the results, lead fragments appear as white shards spread throughout a large area in the elk's body.

Researchers in California found that these fragments don't just stay in the internal organs but can move into the meat that humans eat. X-rays of meat from butchered game animals showed bullet fragments in the steaks

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packaged for human consumption.

The increased popularity of rifles with high muzzle velocities along with bullets that spread on impact has caused this problem, Craighead said. "These X-rays are showing that, especially when it [the bullet] hits a bone, you can have fairly large lead fragments that are traveling several feet [within the animal]."

But even small bullet fragments can make birds sick. What makes even low levels of lead dangerous is that, over a long period, the toxic metal accumulates in the body's tissues. "The bottom line is: Lead is really toxic," Craighead said.

In ravens, high lead levels impair neurological development, result in loss of motor control, lower red cell production, and cause lethargy and decreased reaction time.

Even birds that don't die because of lead's toxic effects can die from lead in their blood. "Some of these things [symptoms] may lead the birds to being more susceptible to predation," Bedrosian said.

In human adults, lead toxicity can cause reproductive problems, including difficulties during pregnancy, high blood pressure, nausea, sluggishness, vomiting, painful gastrointestinal irritation, diarrhea, loss of appetite, weakness and dehydration, nerve disorders, memory and concentration problems, muscle and joint pain, and death.

Lead poisoning in juvenile birds and human children is even more pronounced because the lead is absorbed

faster and disrupts development, causing slow growth and damaging the brain and nervous system. "The younger you are, the more susceptible you are to some of these toxic effects," Bedrosian said.

Scientists have known for years that lead pellets from shotguns can poison waterfowl; using lead shot to hunt ducks and geese is prohibited on most public land. Researchers in California have also studied severe poisoning in endangered condors and concluded that lead bullet fragments caused the illness.

But, Craighead says all of these problems have an easy solution: Use different bullets. "We really aren't against hunting," Craighead said. "Both Bryan and I hunt. It's really a matter of making a choice of whether to use lead or not."

Bullets made from copper and several different types of alloys make good substitutes for lead without the toxic effects to wildlife and even people. Further, these different bullets cost roughly the same and require only minor adjustments to a rifle's sights.

Bedrosian and Craighead estimate that 468,000 lead fragments contaminate their study site near Jackson every year. "My guess is that 100 percent [of ravens], at some point throughout the hunting season, are feeding on gut piles and getting exposed to lead," Craighead said.

For their next study, Bedrosian and Craighead plan to measure lead in other scavengers, including bald eagles, golden eagles and magpies this winter. Other planned studies include grizzly bears, black bears, coyotes and wolves.