"Getting the Lead Out of Fishing"

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"Lead poisoning is a problem for wildlife (Lee, 2003) and waterfowl as well as for people. Lead is a naturally occurring metal that is toxic to both humans and wildlife. In humans it can result in irreversible brain and kidney damage, muscle weakness, reproductive dysfunction, gastrointestinal disorders, headache, anemia and other problems. Fetuses and young children are most at risk."

Symptoms of lead poisoning in waterfowl (Lee, 2003) include neurological and gastrointestinal problems, limb paralysis, staggering and difficulty walking on land, inability to fly and escape predators, wings can be mal-positioned or drag on the water or ground, vocal changes, swelling of the face or esophagus and bright green feces. Anemia, muscle wasting and overall emaciation ensue. Lead toxicosis also produces a constant and chronic weight loss and often a bird will expire after ingesting one or two lead pellets or sinkers.

Common loons expire quickly (within two weeks) after ingesting lead, mostly from fishing lines, hooks, lead sinkers and jigs. They can also ingest lead when they collect small pebbles from lake bottoms and inadvertently swallow lead sinkers.

Ingestion of lead fishing gear is the single largest cause of mortality for adult common loons in New England (Mass. Wildlife, 2004). Veterinarians at Tufts University-School of Veterinary Medicine examined over 180 dead adult loons from fresh water over the past 10 years and determined that more than half of those birds died as the result of lead poisoning from the ingestion of lead fishing gear. Their ongoing research has documented that ingestion of lead sinkers (including split shot) accounted for approximately 70% of the dead adult loons from fresh water. Just a single lead sinker can poison a loon (Pokras and Chafel, 1992).

Every year, loons, swans, and other waterbirds die needlessly of lead poisoning after swallowing lead sinkers and jigs. Dabbling ducks, loons and grebes, sea ducks, cranes, herons, swans, geese, birds of prey and scavengers die of lead toxicosis because of the food they eat or the way they get their food. Duck species, swans and geese that use aquatic plants as a primary food source, will also eat large amounts of marshland sediment and are exposed to both lead shot and lead sinkers in the process. They also search the lake bottom to ingest gravel that is used in the gizzard to help grind food for digestion and can mistakenly ingest lead at that time. The species that are most commonly documented (Canadian Wildlife Service, 2005) to be poisoned by lead shot and sinkers are mallards, black ducks, northern pintails, canvasbacks, Canada geese, snow geese, tundra and trumpeter swans, and the common loon.

Species that are known to have ingested lead sinkers and jigs in the United States are:
common loon, great egret, American white pelican, trumpeter swan, tundra swan, Canada goose, American black duck, laughing gull, red-breasted merganser, snowy egret, double-crested cormorant, mute swan, wood duck, redhead, herring gull, canvasback, great blue heron, brown pelican, royal tern, whistling swan, mallard, sandhill crane, and white ibis, common merganser, greater scaup, lesser scaup, white-winged scoter, white-fronted goose, and bald eagle (Environment Canada, 2005).

Lead in the environment can create a serious problem as lead shot and sinkers can break down transferring lead to the soil and water. Lead breaks down most quickly where the soil and water are acidic and oxygenated. When lead is in soil, it can be moved to new places by erosion. Lead that is dissolved in water can run off into nearby water or move down through the soil into the groundwater. It can also be taken up from the water or soil by plants (Canadian Wildlife Services, 2005).

Lead, once dispersed into lakes, may persist for up to 300 years, though degradation can be more rapid depending upon soil conditions and other factors. The U.S. banned the use of lead shot for hunting migratory waterfowl in l991. Non-toxic shot is the standard. Great Britain in 1987 has banned lead sinkers after a voluntary effort there did not produce results. New Zealand has recognized the problem also (Educational Brochure for Michigan's Fishermen, 2005).

Water birds can be poisoned long after the shot or sinkers first fall to the ground or into the water. This is because lead shot and sinkers generally take decades to break down into the environment. Lead poisoning of wildlife can happen at any time of the year, but is usually greatest during and after the fall hunting season. Waterfowl hunters often hunt along migratory paths, where large flocks of ducks and geese gather in the fall. As a result, lead shot often builds up in the very areas that water birds use for resting and feeding locations during their migration.

Lead sinkers can be found in areas that are fished, like along shorelines, rocky places and piers of lakes, ponds, and streams. These areas often overlap with the breeding and feeding grounds of waterbirds including the common loon. Waterbirds can swallow lead sinkers or jigs any time that the water is open (not frozen.) Depending on the location, poisoning from swallowed lead sinkers or jigs accounts for up to half or more of all common loons found dead in eastern Canada and the United States (Canadian Wildlife Services, 2005).
Lead sinker ingestion with lead toxicosis is the leading cause of death of the common loon and it may be an important factor limiting loon populations in some areas by increasing the mortality of breeding adults. With nearly 700 loons studied, the research suggested that about 54% of adult loons are dying from lead poisoning from ingesting fishing gear, and in areas of heavy fishing, 84% (Pokras and Chafel, 1992).

In Washington State, there have been several known common loon deaths and suspected deaths of lead toxicosis due to fishing tackle ingestion during migration and nesting (Poleschook and Gumm, 2005). Most of the lakes that the common loon uses for migration and nesting are highly utilized by fishermen. With only a small population of territorial/breeding loons, Washington State has already been stated as being "The State that is the closest to having its common loon population extirpated," states David Evers (pers. comm.), at BioDiversity Research Institute in Gorham, Maine. **Lead in fishing is placing Washington's population of common loons at risk.**

There were 8-10 territorial/breeding pairs of common loons in Washington State in 2004. From this low population, four established territorial/breeding loons were involved in life-threatening situations involving fishing tackle and lead. They had either swallowed jigs, fish with broken and trailing fishing line with lead sinkers attached, or ingested lead sinkers from lake bottoms. The three lakes (Ferry, Swan, and Lost) that these loons use for their breeding territories are highly used by fishermen; and there is much discarded fishing tackle and line, including lead sinkers, seen along the shoreline and in the water (Poleschook and Gumm, 2004).

The territorial male loon from Lost Lake expired from suspected lead toxicosis, although his carcass was most likely taken by predators and no autopsy was performed. His behavior, described by an individual during the last stages of his life, indicates symptoms of lead toxicosis. The bird had beached itself on the shoreline, was unable to hold up its head which had flopped over onto its back, and had great difficulty with balance and movement. Since this was the male and the defender of the territory, the newly hatched chick was easily taken after the male's death by a bald eagle. The chick's death could be considered a secondary death contributed to lead toxicosis and demise of the adult male.

A second healthy-appearing adult common loon was found beached and expired at Omak Lake during the spring migration of 2004. It was autopsied by Darwin Long, IV, assistant biologist, BRI, and found to have one triangular-shaped lead sinker in its gizzard. Lead toxicosis was the diagnosis (Poleschook and Gumm, 2005).

In the spring of 2003, two common loons were found beached and one had expired at Chelan Lake near a popular fishing area. The other was retrieved and expired shortly afterwards. It was autopsied by BRI, (see figure #1 below) and it was found to have two large lead sinkers and two smaller-sized rounded and eroded sinkers in the gizzard. The diagnosis was due to lead toxicosis (Long, 2003).

In 2005, another Common Loon was found beached and expired in the Puget Sound area of La Conner, WA. The loon appeared to be healthy and have adequate stores of fat over the keel, although it showed some predation in areas of the neck and legs. Lead toxicosis is suspect due to the position of the head and posturing of the expired loon. An autopsy is currently being done on this loon, who was color-marked and banded by BioDiversity Research Institute in Gorham, Maine and the Montana Loon Society in 2004. It was the female

territorial loon from the platform on the Lower Stillwater Reservoir (Poleschook and Gumm, 2005).

In the U.S., concern over the effect lead fishing tackle is having on the common loon led Massachusetts, Maine, New Hampshire, and Vermont to regulate its use. New York, Wisconsin, and Minnesota are also discussing similar actions or have begun educational campaigns regarding lead tackle. In 2000, the U.S. F&WS banned the use of lead tackle in three national refuges, in Montana, Wyoming, and Michigan. Overseas, Great Britain in 1987, and Denmark have banned the use of lead in fishing tackle. Canada banned the use of lead fishing sinkers and jigs weighing less than 50 grams in National Wildlife areas and parks in 1997 (Ellis, 2005).

"Lead poisoning of wildlife does not have to happen (CWS, 2005). Sinkers and jigs do not have to be made of lead. There are now many substitutes made out of other non-toxic materials such as bismuth, clay, steel, iron, rock, and ceramic that are not poisonous to birds and wildlife. Tin and zinc substitutes are not recommended as they can also be toxic to the birds and to the environment."

The USEPA has estimated that replacement of lead is an additional cost of $10 or less per angler per year, a trivial cost in comparison to that spent overall. Lead exchanges have been implemented in other states with some success (U.S. Environmental Protection Agency, 1994).

A Nebraska company, Bullet Weights, makes an "Ultra Steel" sinker that costs only 10 to 20 cents more than a lead pack of comparable size. According to the owner, Crumrine, steel sinkers have advantages beyond being safe for loons and waterfowl. "They hold their shape better than lead, which is malleable, and they are more sensitive and one can feel what is going on at the end of the line. Many anglers say that they catch more fish with these steel sinkers than they do with lead." (National Wildlife Magazine, 2001)

"Simply switching from toxic to non-toxic fishing tackle can offer a straightforward solution to the problem. It is black and white! One hundred percent of the animals that ingest lead fishing gear, die of lead poisoning; while those lucky enough to avoid this stuff, do not," says Marcus Pokras, DVM at Tufts University School of Veterinary Medicine. Adds Miconi; "We've taken the lead out of gasoline and paint, so why can't we keep it out of our waterways?" (Nadis, 2001)

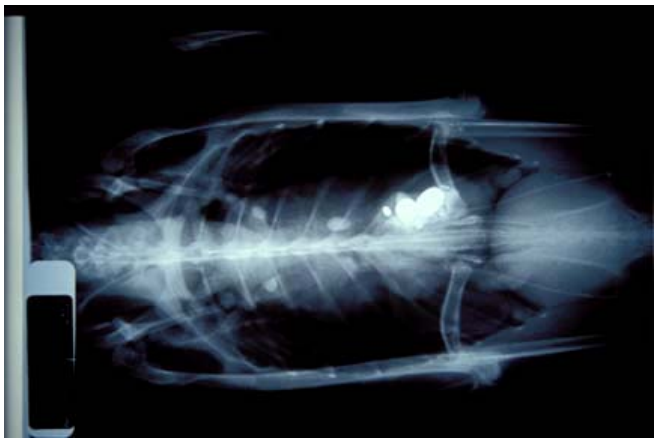

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Figure 1. X-Ray image of common loon recovered at Lake Chelan, Washington, 3/27/03 with four lead sinkers in the gizzard. Note the small size and irregular shape of two of the lead sinkers (diameters = 0.38 cm, 0.15 in.), indicating they were abraded and dissolved causing lead toxicosis. The other two lead sinkers were a round 1.0 cm (0.4 in.) diameter, weighing 10 g, and an oval 1.8 cm (0.7 in., oval) in large diameter, weighing 12 g, and also showed some abrasion. Two small remnants of fishing line, one with a knot at the end, were also found in the gizzard. 20 small rocks were also found in the gizzard ranging in size from 0.5 cm (0.2 in.) to 1.3 cm (0.5 in.) in diameter, weighing 18 g, consisting of:

7 of 0.5 cm (0.2 in.),
8 of 0.8 cm (0.3 in.),
3 of 1.0 cm (0.4 in.), and
2 of 1.3 cm (0.5 in.) largest diameters.

Recommendations

1. Use lead-free fishing tackle, especially on waters inhabited by loons, trumpeter swans and other waterbirds. Or, eliminate all lead use in fishing due to the immediate toxic nature of lead when ingested by waterfowl, and the long-lasting risk factors of toxicity to the environment, people and waterways.

2. Promote the use of non-lead (and no zinc or tin) fishing weights and tackle by anglers and the proper disposal of lead fishing tackle until lead-free

legislation can be implemented. (New York implemented a plan that took effect in 2004 of banning the sale of small lead sinkers weighing less than ½ ounce.)

3. Develop lead-sinker exchange sites where lead can be properly contained for disposal.

4. Develop brochures, similar to ACLP's "Get the Lead Out" brochure to encourage fishermen to learn more about lead toxicity and how it affects waterfowl and the environment.

5. Plastic gloves should be used, especially by children and pregnant women, when handling lead sinkers or lead fishing tackle. Washing of hands is then recommended.

6. Promote responsible fishing practices such as more persistent retrieval and disposal of lost monofilament line and tackle.

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