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The Effect of Lead Sinkers on Waterfowl

Lead has been recognized as a detrimental substance to waterfowl because it is known to cause toxicosis. Lead sinkers and jigs are the main cause of lead toxicosis in loons, especially when lead accumulates in heavy fishing areas (Vermont Fish and Wildlife Non-game and Natural Heritage).

Lead toxicosis occurs "when liver lead concentration was 5.00 ppm or above" (Pokras 24). A study conducted between April 1987 and June 1998 from loon carcasses collected from New England found 103 of 396 loons had ingested lead objects and tested positive for lead poisoning (Caldwell 4). "Each of the 103 loons was found to have ingested at least one lead object (Caldwell 5)."

Experimentation has demonstrated that .3 grams of lead will result in bird death. Lead sinkers and jigs generally weigh between .5 and 15 grams, hence the ingestion of even one sinker could prove fatal to the loon (Twiss, 1998).

In North America, the Common Loon is most frequently reported as dying from this cause, although at least 23 other species are vulnerable to lead poisoning. 22% of 202 Common Loons found dead in New England had ingested lead objects, principally sinkers and jigs (Twiss, 1998). Bans on the use of lead fishing weights have been imposed in many states and national parks.

Why do lead sinkers and jigs present such a problem?

Research on loons from six New England states has shown that on the majority of lakes where dead adult breeding loons were found between 1987 and 2002, about 26% of these loons died from lead poisoning. Some lakes were identified as hot spots with lead causing over 50% of documented causes of death (Bird Studies Canada). In Michigan, another 15-year study examined 186 dead loons and revealed that lead poisoning—primarily from lead jigs—was the number one cause of death at 24% (44/186) of overall mortality (Bird Studies Canada). Limited research in Minnesota has also documented lead poisoning of loons (Minnesota Department of Natural Resources). A study conducted by the Minnesota Pollution Control Agency concluded that lead poisoning accounted for 12 percent of the dead adult loons with known causes of death in 2002.

Loons have no teeth and must ingest their food whole. Consequently, they must swallow small pebbles to help grind up the food in their stomachs. Lead sinkers and jigs can be mistaken for small pebbles and eaten by the loons. As the lead sinker or jig is exposed to the acids of the stomach and to other pebbles, lead enters birds' systems and slowly poisons them as the lead is absorbed into blood and tissues. Loons may also die from eating fish that have lead fishing gear attached (Birds Studies Canada).

What are the alternatives to lead sinkers and jigs?

Many non-toxic alternative sinkers and jigs are available. Densified plastic, tungsten, bismuth, tin, pewter, ceramic and even hand-blown glass, are a few of the non-lead, cost competitive options (Minnesota Office of Environmental Assistance). "The cost of the non-toxic alternatives is slightly more expensive then current lead materials, adding between two and five extra dollars a year to the cost of tackle for anglers, but amounting to less than 1% of total expenses associated with fishing over the course of the year" (Maine Audubon Society). Comparatively, the US Environmental Protection Agency in 1994 calculated that additional costs to a shift to non-toxic alternative would be $.31 per year. (Twiss, 1998)

Material	**Relative Toxicity to Waterfowl**	**North American Availability**
Lead	High	Excellent
Steel	Low	Good
Bismuth/tin	Low	Moderate
Tungsten/bismuth/tin	Low	NA
Zinc	Moderate	NA
Molybdenum/polymer	Moderate(?) *	NA
Tungsten/polymer	Low (?) *	NA
* Probable toxicity of molybdenum and tungsten polymers is indicated as moderate or low, based on the known toxicology of these metals. Source: http://www.ec.gc.ca/cws-scf/pub/ops/op88/table7.html		

Figure 1: Comparison of Lead and Alternatives

What is the status of loons in Vermont?

In Vermont, the Common Loon, *Gavia immer,* is considered an endangered species. In part this is due to relatively few breeding pairs (estimated at less than 40 pairs), which is perpetuated by the loons' extreme sensitivity to disturbances to their environment, especially during breeding season. Such disturbances tend to come from sources such as predation by animals like raccoons and predatory birds. Humans are also thought to negatively affect Vermont's breeding loon population through activities like fishing, water skiing, boating, as well as shoreline development of lakes and deep ponds (Vermont Fish and Wildlife Non-game and Natural Heritage).

What are other states doing about this problem?

Maine:

Sally Stockwell, a wildlife ecologist and Director of Conservation for the Maine Audubon Society, led a study that discovered the leading cause of death among adult loons from 1989 to 1997 was lead poisoning

from the ingestion of lead and zinc fishing sinkers and jigs. The study, done in conjunction with Tufts University, found that 47% of all dead adult loons collected from Maine freshwater lakes died from lead poisoning.

As of January 1, 2002 it is illegal for a person to *sell* a lead sinker weighing one half ounce or less to another person for the taking of fish. A lead sinker includes any device that may be attached to a fishing line and is intended to sink the line. Artificial lures, weighted line, weighted flies and jig heads do not constitute a lead sinker within the meaning of this statute (Title 12, Chapter 711, Subchapter 3, Section 7608-A). Although it is illegal to sell a lead sinker, it is still legal to use lead sinkers for the taking of fish in the state of Maine. (Office of the Revisor of Statutes, Maine)

Massachusetts:

The Massachusetts Division of Fisheries and Wildlife banned the use of lead sinkers for the taking of fish in the Quabbin and Wachusett Reservoirs. The Quabbin and Wachusett Reservoir were particularly selected because these two water sites are home to the majority of Massachusetts' loon population. Note that lead sinkers do not include lead-fishing related items including, but not limited to, artificial lures, jigs, lead-core line, keel trolling weights, or weighted flies (Mass Department of Fisheries, Wildlife and Environmental Law Enforcement).

Minnesota:

During the 2002-03 session in Minnesota, the state Legislature considered banning the sale and use of lead tackle. But after a series of stakeholder discussions, the groups involved agreed, instead, to educate anglers about the alternatives to lead tackle and to offer opportunities to try out non-lead sinkers and jigs in other counties. This effort is supported by the cooperation of tackle manufacturers, retailers, lake associations, conservation organizations, sports enthusiasts, and government. (Minnesota Office of Environmental Assistance)

New Hampshire:

The state law in New Hampshire prohibits the use of lead sinkers and jigs in freshwater lakes and ponds. The ban prohibits the use of lead sinkers weighing 1 ounce or less and lead jigs less than 1 inch long along its longest axis. The New Hampshire Fish and Game Department recently stated that loons and other waterbirds can die from lead poisoning after swallowing lead fishing sinkers and jigs lost by anglers

The law states that no person shall use any lead sinker or lead jig for the taking of fish in any fresh water lake or pond in the state, except as otherwise specifically permitted in this title. Further, a person using any such lead sinker or jig shall be guilty of a violation not exceeding $250. The prohibition under this section shall apply to interstate lakes and ponds pursuant to RSA 211:14. The state of New Hampshire defines a "lead sinker" as any sinker made from lead, the lead portion of which has a mass of one ounce or less, and "lead jig" means a lead weighted hook that measures less than one inch along its longest axis. Lead sinkers and lead jigs shall not include lead fishing related items including but not limited to fishing line, flies, lures, or spoons." (New Hampshire Fish and Game Department)

New York:

In 2002, New York State signed into law a measure that bans the sale of lead fish sinkers in New York State, helping to prevent waterbirds from being injured or killed from exposure to these potentially toxic materials. New York's Governor, George Pataki, stated that "The toxic effects of lead sinkers are a threat to waterfowl, especially loons, and these new restrictions will help protect birds and other wildlife.

Fishing is a popular sport in all areas of New York and this law will promote responsible fishing through the use of non-toxic sinkers." (The State of New York)

The law bans retail sales of lead fishing sinkers weighing one-half ounce or less. In addition, the State Department of Environmental Conservation (DEC) is required to provide notice of this new ban in the annual State Fishing Guide. For the past several years, DEC has notified anglers of the potential threat to waterfowl from the use of lead sinkers and the availability of non-lead alternatives (State of New York).

State Comparison:

State	Ban on Sales	Ban on Use	Educational Programs	Date Effective
Maine	Yes	No	Yes	January 1, 2002
Massachusetts	No	In certain areas	No	2001
Minnesota	No	No	Yes	2002
New Hampshire	No	Yes	No	January 1, 2000
New York	Yes	No	Yes	2002

Additional Information:

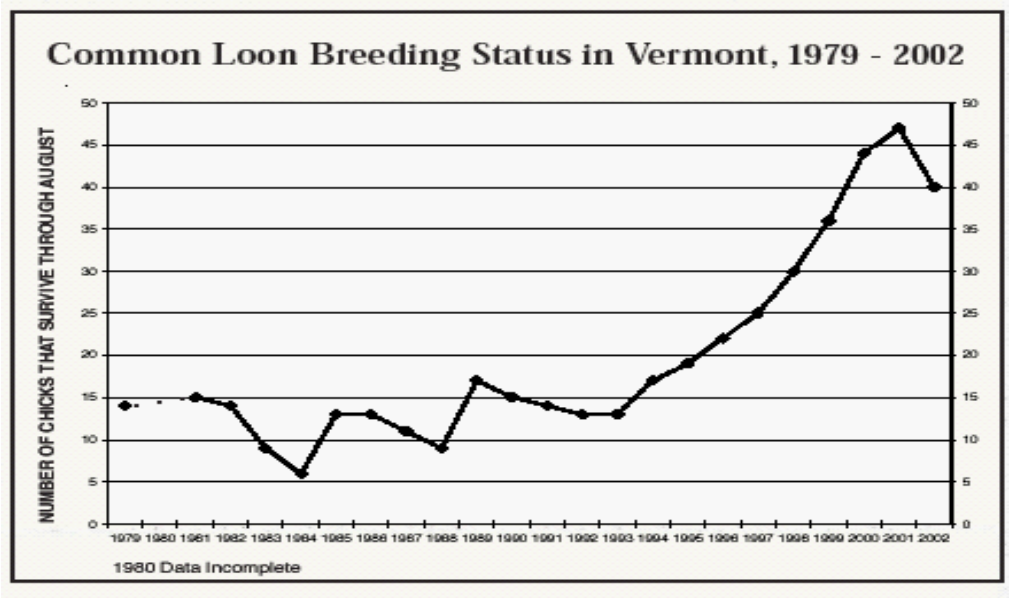

Figure 1

Source: Nongame and Natural Heritage Program, a division of the Vermont Fish and Wildlife Department, "Fact Sheet: Common Loon" www.vtfishandwildlife.com/wildlife_nongame.cfm File name: "loon_factsheet.pdf"

Figure 2

Source: Nongame and Natural Heritage Program, a division of the Vermont Fish and Wildlife Department, "Fact Sheet: Common Loon" www.vtfishandwildlife.com/wildlife_nongame.cfm File name: "loon_factsheet.pdf"

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