

Loons Sound Alarm on Mercury Contamination

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For many North Americans, loons are a much-beloved bird, symbolizing the solitude of the deep-woods wilderness with their distinctive, haunting wail that echoes over the northern lakes where they breed in summertime.

But about 30 years ago, people noticed shrinking numbers of the common loon—a stately black-headed, black-and-white checkered bird—in parts of Northeastern North America. Researchers began capturing loons on their breeding lakes in Southeast Canada in the mid-1990s to study them and monitor reproduction—and discovered high levels of mercury in the birds' blood and feathers.

Additional research showed that birds born in New York State and New England also were being exposed to large quantities of methylmercury, the form of mercury toxic to living things. After winter migration, loons return each year to their birthplace to nest—and these lakes were poisoned.

"The mercury levels in common loons in that part of North America are probably some of the highest levels in living animals anywhere in the world," said Mark Pokras, a veterinarian who runs the wildlife clinic at Tufts University Veterinary School in North Grafton, Massachusetts.

Mercury Alarm

This discovery raised an alarm: pollution in northern lakes posed a significant threat to fish-eating animals—and to people. It also added another dimension to the responsibility of U.S. and Canadian government regulatory agencies.

Now common loons, one of five loon species, are helping scientists better understand the impact of environmental mercury contamination on waterbirds, fish, and other aquatic wildlife. The birds are particularly vulnerable to environmental poisoning for many reasons. They are long-lived—up to 30 years—and they spend their lives in the water, feeding mostly on fish.

"Loons are at the top of the food chain, so they are an excellent indicator of environmental quality," said Nina Schoch, program coordinator for the Adirondack Cooperative Loon Program (ACLP) in Ray Brook, New York. "They are also an extremely charismatic species: people care deeply about them and are

concerned about [their welfare]," she said.

These studies have also led to widespread warning for anglers about eating fish from affected regions.

Mercury on the Wind

Most of the mercury pollution that reaches northern lakes is spewed into the atmosphere by large coal-burning power plants and municipal waste incinerators in the Midwest and central Canada.

Wind currents carry mercury hundreds of miles eastward, along with compounds that create acid rain. The pollutants fall to earth in snow, rain, and dust particles, eventually washing into the many lakes and ponds that dot the region.

Few if any fish survive in acid lakes, so loons have less food for their young. Acid rain also increases mercury levels in wildlife: in acidic environments, mercury converts faster to toxic methylmercury.

Mercury's Toll

The dangers of mercury have been well documented in humans, but are less known in wildlife. Lab studies with other birds show that mercury damages the central nervous system, says Neil Burgess, a wildlife toxicologist with the Canadian Wildlife Service. "It tends to disrupt vision and muscle coordination, and is quite toxic to developing embryos," he said. It also seems to weaken immunity, making the birds susceptible to other diseases.

Biologists noticed that on acid lakes, adults outnumbered chicks and young birds. "We started looking at reproduction rates in loons in relation to blood mercury levels," said Burgess. "The higher the level, the lower the reproduction."

Field studies revealed that loon pairs suffering from mercury poisoning rarely nested or laid eggs. When they did, they incubated the eggs poorly. Few chicks hatched, chicks didn't feed well, and parents had a hard time feeding them. Scientists wonder whether vision problems from mercury poisoning may be affecting the birds' ability to catch fish.

Now, researchers are determining exactly how high mercury levels need to be before reproduction decreases or stops altogether.

In a recent study by the U.S. Fish and Wildlife Service (USFWS) in the Adirondacks, about one-fifth of the loons they caught and tested had mercury levels high enough to endanger breeding success.

Evaluating Environmental Impact

Researchers affiliated with the ACLP are creating a "wildlife criterion value," tracking how mercury moves up the food chain, from water and sediment into plankton, crayfish, fish and higher predators.

This will show where exposure is highest and how it accumulates. It will also allow scientists to sample water or lake mud and forecast the concentrations in pike and other big fish—or on loons and other species high in the food web, says Schoch.

"It's significant for people, too. We're also eating the fish," she said.

Soon the BioDiversity Research Institute, from Falmouth, Maine, will deliver a report to the USFWS detailing the status of loons, the threats they face—and will present a conservation plan. The Institute is one of ACLP's five partners, which also include the Wildlife Conservation Society, Natural History Museum of the Adirondacks, New York State Department of Environmental Conservation, and the Audubon Society of New York state.

Controlling Air Pollution

Changes to the Clean Air Act (CAA) in 1990 limited sulfur emissions from power plants, regulations which have improved air quality. But research shows that the standards remain too lax—and mercury continues to be unregulated.

Even with an additional 80 percent reduction in emissions beyond those required by law, it will take waters a quarter-century to become non-acidic, according to a 2001 report by the Hubbard Brook Research Foundation in Hanover, New Hampshire.

In December 2000, the Environmental Protection Agency announced that it will regulate mercury emissions from power plants. The EPA proposal is due in December, with final regulations to be issued in 2004.

In April, New York State's environmental board approved the toughest acid rain law in the nation, far surpassing federal regulations. "Scores of lakes and ponds in Adirondack Park are dead and remain the culprit of air pollution from power plants," said Eliot Spitzer, New York State Attorney General. "This problem can only be tackled by a federal and state effort to enforce the Clean Air Act."

"We know the dangers of methylmercury," says Pokras. "We need to dramatically change our regulatory and industrial practices to eliminate the mercury in our environment."

Otherwise the wail of the loons is at risk in the northern wilderness.