

Open Burning Dumps and moose teeth

By Ron Eckoff

A news item the other day mentioned there are still hot spots in the Iowa City landfill which had the major fire earlier this year. That took me back to April 10, 1970. That was the date that open burning dumps were outlawed in Iowa. Until that time, it was very common for towns to have dumps which burned. After April 10, 1970, those of us who traveled Iowa for the Iowa Department of Public Health were asked to watch for burning town dumps and report them to Environmental Health. All environmental health programs were in the health department until January 1, 1973, when a separate agency was established.

The environmental movement was very active in the early 1970s. A "Governor's Conference on Local Action for Environmental Health" was held in April 1970 with 400 in attendance. The purpose was to promote local interest in environmental health. Very few local boards of health had any environmental health programs at that time. The Iowa Water Pollution Control Commission had been established in 1965 and the Iowa Air Pollution Commission in 1967. In a short period of time, environmental health had major increases in funding and activities. The number of positions increased from 30 to 68 by June 30, 1972.

Nationally the Clean Air Act was passed in 1970 and lead was banned from gasoline in 1975.

So what about moose teeth?

As some of you know, for the past 24 years I have participated as a volunteer in the Wolf/Moose Study

on Isle Royale. Isle Royale is a large island in Lake Superior. Moose have been present since about 1905 and wolves since about 1948. For the past 54 years scientists have been studying the predator/prey relationship. As a part of the study, moose skulls and mandibles are collected. Moose teeth have growth rings in them, so if you know when a moose died, you can calculate when it was born and what years it lived.

Isle Royale is an ideal place to observe declines in mercury or lead because there are no local point sources and Lake Superior has a large airshed. That is, about 90% of the mercury that is deposited in Lake Superior comes from more than 200 kilometers from the shoreline. This means that any decline would represent declines in pollution over a large region, not just changes in a single point source of pollution. Although Isle Royale would be an ideal place to monitor mercury and lead pollution, no one monitored these pollutants before or after the enactment of anti-pollution regulations.

Nevertheless, the concentrations of mercury and lead in the Isle Royale ecosystem have been recorded each year in the teeth of the Isle Royale moose that have been collected over the past five decades. Once mercury or lead is deposited from the atmosphere onto vegetation, it was consumed by the moose. Then, by a complex set of physiological processes, some of it was incorporated, permanently, into the teeth of moose.



Open Burning Dumps cont...

The researchers analyzed the teeth of moose that had lived in different years between 1952 and 2002. What they found was that mercury concentration dropped suddenly by about 65% in the early 1980s and has remained constant for the following two decades. Lead began declining in the early 1980s and continued declining throughout the next two decades. By 2002 lead concentrations in adult moose were 80% lower than they had been prior to the early 1980s. The box plots below present data for adults and calves pre 1983 and post 1983 for lead and mercury.

Note: If anyone is interested in the technical details of the research, please contact me and I can direct you to research paper.

