

## Mercury Levels in Local Loon Population

by Joe Kaplan

In 2010, Common Coast Research & Conservation initiated a loon research program on Intermediate, Bellaire, and Clam Lake within the Elk River Chain of Lakes Watershed, a focus area of the Three Lakes Association. These research efforts were aimed at understanding how events, such as the Deepwater Horizon Oil Spill in the Gulf of Mexico, recent botulism outbreaks on the Great Lakes, and mercury in fish eaten by loons may negatively impact the viability of Michigan's breeding loon population. During the summer a total of 15 adult and juvenile loons were safely captured, color-banded, and sampled for contaminants through collection of blood and feathers.

Among the known threats to loon viability, one of the most detrimental is methylmercury, a powerful neurotoxin that biomagnifies and accumulates in the biota of aquatic systems, especially fish and fish-eating birds. Reduced productivity has been documented in loons exposed to elevated Hg levels. While Hg is an element that occurs in nature, studies indicate that most Hg in mid-western lakes originates from human activities with the leading source linked to coal burning power plants that discharge Hg to the atmosphere during the generation of electricity.

In order for Hg deposited in the environment to be available to biota it has to be converted by anaerobic organisms from the elemental form to the organic form methylmercury. As these organisms appear to thrive in acidic conditions, a lake's pH is often a good indicator of the bioavailability of Hg in aquatic ecosystems. With an abundance of calcium in the Chain of Lakes and corresponding pH levels in the range of 8.0 to 8.2, it was suspected that Hg levels in loons would be relatively low. In fact, this was the case as adult females that showed a mean of 0.96 ppm (parts per million) Hg in blood and 7.00 ppm in feathers. The mean Hg for male loons was 1.66 ppm in blood and 12.5 ppm in feathers. A total of four juvenile loons were captured during banding activities in July and August with younger loons (approximately 5 weeks) showing blood Hg levels of 0.09 ppm and older chicks of 0.18 ppm. To gain perspective, the average blood Hg levels for adult Great Lakes loons is 1.41 ppm for females, 1.78 ppm for males, and 0.14 ppm for juveniles prior to 9 weeks of age. Mean feather Hg values adult loons breeding in the Great Lakes are 9.6 ppm for females and 13.0 ppm for males.

In loons, the level of Hg in blood and feather provides different information about mercury exposure. In general, blood Hg represents recent dietary uptake and feather mercury represent overall body burdens. However, juvenile feather Hg, like blood, reflects exposure on the natal lake.

While overall Hg levels for loons on the Chain of Lakes are at an encouraging level for a breeding population there are a few observations worth noting. One large male loon nesting in the southern part of Intermediate Lake contained 19.8 ppm in his feathers, which puts him in the upper 10% for adult loon feather Hg levels. Another 19-year old male from the southern arm of Lake Bellaire contained 15.1 ppm Hg in his feathers and this places him in the top 20% of adults sampled. The loon from the southern arm of Lake Bellaire, hatched on Clam Lake in 1991, was one of five loons banded with a tiny archival tag to determine his migration routes and wintering areas, and hopefully this migration data will provide some insight of why his feather Hg was elevated.