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**Contact:**

Deborah McKew  
Communications Director  
Biodiversity Research Institute  
[deborah.mckew@briloon.org](mailto:deborah.mckew@briloon.org)

**The Impact of Mercury on North American Songbirds**  
*41 Percent of Sampled Species Show Effects from Mercury*

*Portland, ME* – The scope and intensity of mercury contamination in North American songbirds is more widespread than previously reported. Fifteen new scientific papers have recently been published in a special issue of the journal *Ecotoxicology*. Studies find that at least 58 songbird species show demonstrated effects from mercury. The journal’s October issue entitled, *The Impact of Mercury on North American Songbirds: Effects, Trends, and Predictive Factors*, presents results of field, laboratory, and museum studies—from Alaska to Maine to Puerto Rico.

“This collection of studies shows that songbirds represent a powerful tool for the study, monitoring, and risk assessment of environmental mercury,” says David Evers, Ph.D., BRI executive director and co-editor of this special issue.

Since 1970, 3 billion North American birds have vanished, as revealed in September 2019 in the journal *Science*, and nearly 30 percent of species are in decline. To inform policy efforts and advance public understanding, a group of 61 scientists collaborated on producing 15 papers that describe the impacts of mercury on songbirds across the United States and Canada. These papers reflect five general categories of research on mercury in songbirds: (1) effects on health and physiology; (2) temporal trends; (3) landscape variations; (4) bioindicators; and (5) migration.

“Two decades ago, the idea that mercury was a threat to songbirds was not on the table because research was focused on big birds that get mercury from fish. These new studies reveal that the threat is real and at least some species of insect-eating songbirds are in trouble from mercury,” says Daniel Cristol, Professor of Biology at William & Mary and co-editor of the special issue.

Of the 286 songbird species that breed in North America, 141 were sampled by BRI since 2005; 41 percent of those species sampled showed adverse effects from mercury contamination.

“It’s clear that mercury is adversely affecting a large percentage of the bird species we studied,” says Evers. “This research is important in helping comply with the requirements of the Minamata Convention on Mercury for which mercury monitoring in wildlife is a key component.”

## Major Findings—*Ecotoxicology* Special Issue

- Avian Health and Physiology – Laboratory Studies on Zebra Finches
  - Methylmercury (the toxic organic form of mercury) exposure can adversely affect chick development and eventually reproduction
  - Mercury delays brain development
  - Sexually-selected traits, such as bill color, are sensitive to mercury contamination
- Temporal Trends
  - Historical trends showed large increases of mercury exposure over the past century in six of the seven species examined. Samples collected post-2000 ranged between 2 and 17 times greater than historic specimens
  - The Saltmarsh Sparrow, which spends its entire life cycle in estuaries, exhibits elevated levels across much of its breeding range that has not declined in recent decades.
- Landscape and Management Factors
  - Riparian wetlands were found to be important habitats in Oregon for enhancing methylmercury concentrations in songbirds; point sources demonstrated an ability to stretch well downstream
  - Tropical freshwater wetlands in Puerto Rico did not have an expected ability to enhance methylmercury availability in songbirds, perhaps because of local abilities to demethylate mercury
- Migration
  - Mercury has the potential to disrupt many physiological processes and interfere with navigation, flight endurance, oxidative balance, and stopover refueling that make long-distance migration possible.
  - Spring and fall migrants may have different responses to mercury exposure.
- The Use of Songbirds as Bioindicators
  - Understanding the factors that contribute risk of mercury exposure in songbirds is vital to selecting the most appropriate songbird species as bioindicators of methylmercury availability. Selecting the right species, the right biological materials (e.g., blood or feathers), the right time of year, (e.g., breeding, migration, or winter), and the habitat to assess future changes in the threat to songbirds from mercury will require careful attention to recent research and standardization among researchers.

“Forty lab and field studies completed to date show adverse effects from mercury on immune, endocrine, neurological, and reproductive functions in songbirds, and we’ve just added several more. It’s great to see this mix of basic and applied research addressing a conservation problem head on.” says Cristol.

A more complete summary of these results can be found in the BRI publication, *The Impact of Mercury on North American Songbirds*, which can be downloaded at: [www.briloon.org/songbirds](http://www.briloon.org/songbirds).

The *Ecotoxicology* special issue (Vol. 29, Issue 8, October 2020)  
is now online and can be found at:

<https://link.springer.com/journal/10646/volumes-and-issues/29-8>

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