

Wetlands Program

ON THIS PAGE [Introduction](#) | [What We Found](#) | [Mean Blood Mercury Levels \(MA and ME\)](#) | [Mean Blood Mercury Levels \(NY\)](#) | [Significance to Policy](#) | [Publication](#) | [Collaborators and Contributors](#)

[Download the new brochure about BRI's Wetlands Program here](#)

[GSA Contract](#)

RECENT BRI PUBLICATIONS

A green wave of saltmarsh productivity predicts the timing of the annual cycle in a long-distance migratory shorebird (2020)

Ecological insights from three decades of animal movement tracking across a changing Arctic (2020)

Plasma Biochemistry and Protein Electrophoresis Reference Intervals of the Common Loon (*Gavia immer*) (2020)

Contaminants Monitoring

Long-term Mercury Monitoring in the Species of Special Concern, the Saltmarsh Sparrow (*Ammodramus caudacutus*) in Maine, Massachusetts, and New York, 2004-present

Rachel Carson and Parker River National Wildlife Refuges (NWR) are our long term Saltmarsh Sparrow (*Ammodramus caudacutus*) monitoring sites (2004-present), the longest running songbird mercury (Hg) monitoring project in the country and possibly the world. In addition, in 2008 we have begun non-lethally collecting blood and feather samples from Saltmarsh and Seaside Sparrows nesting on Long Island, New York.

Our Rachel Carson NWR study location is in Wells, Maine, and Parker River NWR is the salt pannes of Plum Island. Two locations are approximately 40-50 miles apart. The New York site is North Cinder Island in the town of Hempstead, Long Island.



What We Found

We found that blood mercury concentrations are alarmingly high at Parker River NWR, Massachusetts, and on the islands off Hempstead, New York, where the majority of birds are at risk to reduced reproductive success (i.e., blood Hg exceeds 0.7 ppm, the level at which there is a 10% decline in probability that at least one young will fledge, at 1.2 ppm there is a 20% decline [Jackson et al. 2011]). Fig. 1. The trend in blood mercury concentrations at Parker River appears to be on the increase from 2004 to 2009 and fluctuating after that (Fig. 1). At Rachel Carson NWR, blood mercury levels were similar from 2004 to 2011 demonstrating a potential decline after that (Fig. 1).

The Saltmarsh Sparrow is a species of high conservation concern because of its limited breeding range and the loss of coastal habitat associated with human development and sea level rise. Results from these studies suggest that Hg exposure represents an additional stressor to this already vulnerable species and may also impact other bird populations breeding in the Northeast. The Saltmarsh Sparrow can serve as an important bioindicator of the long-term health of coastal and estuarine ecosystems across the region.

Mean Blood Mercury Levels (MA and ME)

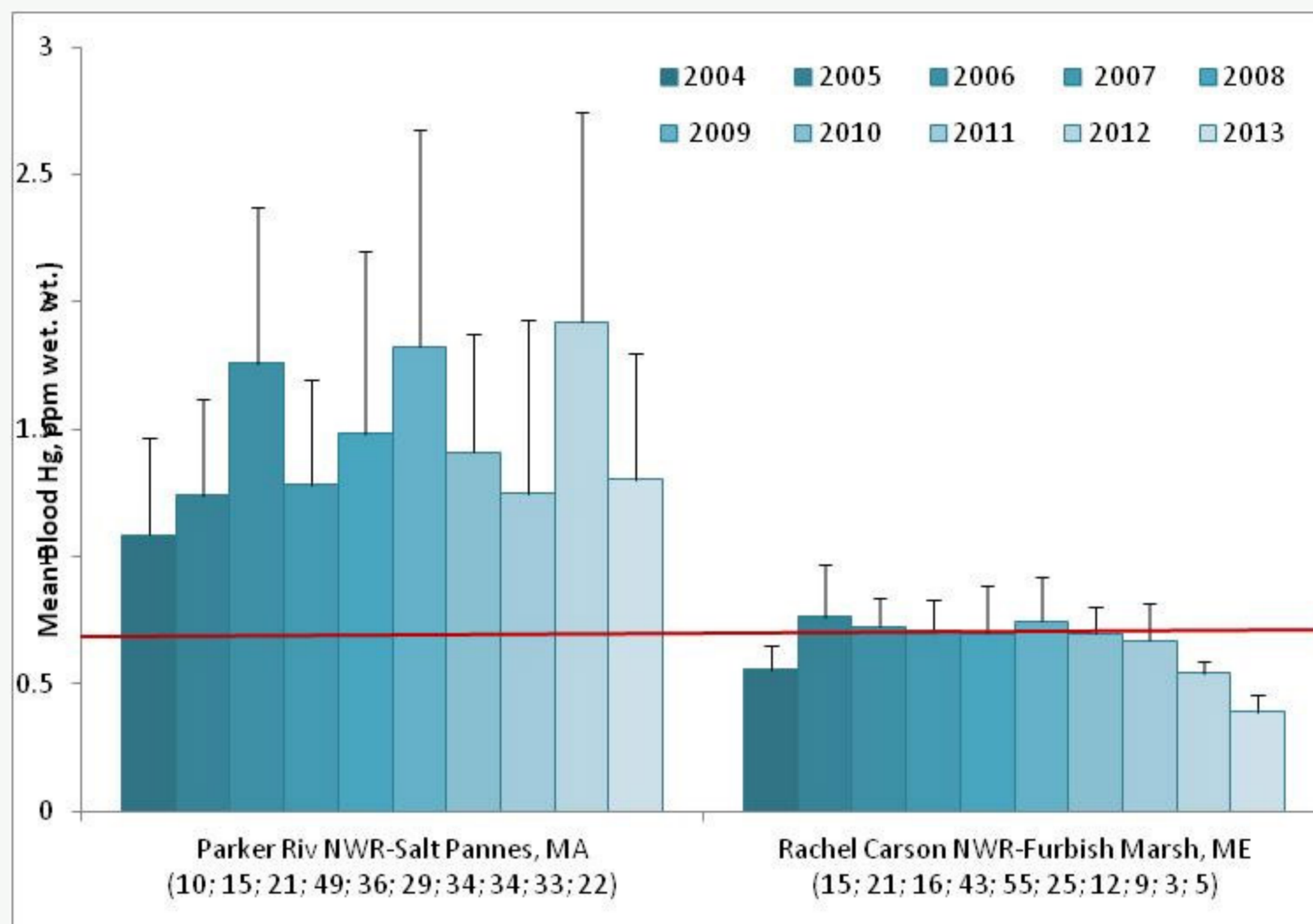


Figure 1. Mean blood mercury concentrations in adult Saltmarsh Sparrows breeding in Maine and Massachusetts, 2004-2013 (ppm=parts per million, number in () is sample size). Red line represents lowest calculated reproductive effect blood Hg concentration of 0.7 ppm when probability of fledging at least 1 young is reduced by 10%.

We discovered that mercury exposure is elevated for populations of breeding birds on Long Island salt marshes including The Nature Conservancy (TNC) Preserves.

The concentrations from most of the sampled Long Island salt marshes (Pine Neck Preserve, Accabonac Harbor, and the three islands off Hempstead; Fig. 2) are amongst the highest concentrations observed in Saltmarsh Sparrows from across the Northeast.

One hundred percent of Saltmarsh and Seaside Sparrows from Crow and North Cinder Islands in Hempstead and 59% of Saltmarsh Sparrows sampled from Pine Neck TNC Preserve in East Quogue exceeded the 1.2 µg/g blood Hg songbird effect level considered to cause a 20% reduction in the probability that at least one nestling fledges (flying from the nest) based on Jackson et al. 2011. Higher methylmercury concentrations in spiders corresponded with high blood Hg concentrations in sparrows.

Mean Blood Mercury Levels (NY)

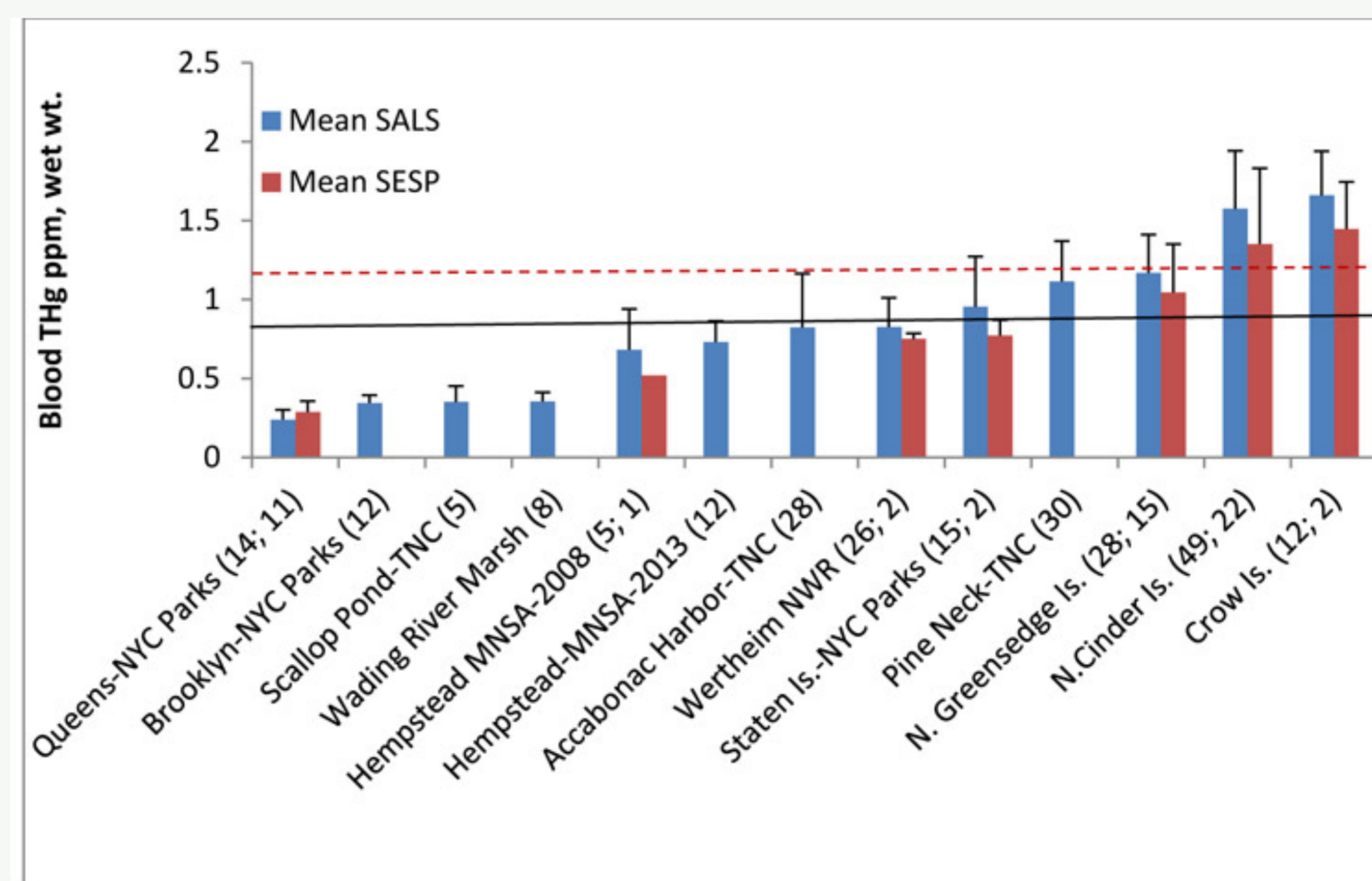


Figure 2. Mean blood mercury concentrations in adult Saltmarsh (SALS) and Seaside Sparrows (SESP) in New York State, 2008-2013 (ppm=parts per million, MNSA=Marine Nature Study Area in Oceanside, Long Is.). Black solid line represents lowest calculated reproductive effect blood Hg concentration of 0.7 ppm when probability of fledging at least 1 young is reduced by 10% and dashed red line represents blood Hg =1.2 ppm 20% reduction. Blood samples from NYC marshes were provided by Alison Kocek, SUNY-ESF, Syracuse, NY.

Significance to Policy

As a result of this and multiple other studies, mercury emissions have been already reduced in the United States.

For example, in Hempstead one of the potential sources of mercury is the municipal incinerator that used to burn mercury containing waste, such as old thermostats. In part, because of our findings in Hempstead, the New York law-makers passed legislation and the governor signed the Mercury Thermostat Collection Act of 2013 into law. It provides for the mandatory collection and environmentally sound management of mercury thermostats. Homeowners will now have more convenient opportunities for the safe drop-off and recycling of out-of-service mercury thermostats, thereby diverting them from being improperly disposed of in the trash, ultimately ending up at municipal waste combustion facilities.

Publication

Lane, Oksana P., Kathleen M. O'Brien, David C. Evers, Thomas P. Hodgman, Andrew Major, Nancy Pau, Mark J. Ducey, Robert Taylor and Deborah Perry. 2011. [Mercury in breeding saltmarsh sparrows \(*Ammodramus caudacutus caudacutus*\)](#). *Ecotoxicology* 20:1984-1991

Collaborators and Contributors

This work is a collaboration between BRI, USFWS, TNC, and the Town of Hempstead, NY.

- Maine: Kate O'Brien, Rachel Carson NWR
- Massachusetts: Nancy Pau, Parker River NWR
- Long Island, New York: Joe Jemsen, Nicole Maher, Derek Rogers and Mike Scheibel of the Long Island chapter of The Nature Conservancy
- Town of Hempstead: Mike Farina, Tara Schneider, and John Z.
- New York City: Alison Kocek and Jonathan Cohen of SUNY College of Environmental Science and Forestry, Syracuse, NY

Funding provided by NYSEERDA and USFWS.

CENTER FOR ECOLOGY & CONSERVATION RESEARCH IN THE NEWS

[BRI Climate Change Program in the News](#)

April 21, 2021

[BRI Launches BRI Environmental](#)

April 12, 2021

[BRI Researcher Cited in The Economist](#)

March 31, 2021

[BRI Research Featured in Scientific American Magazine](#)

March 16, 2021

[BRI's Research Published in the Journal Science](#)

November 10, 2020

NEWSLETTER SIGNUP

[Click here to sign up!](#)

ADDRESS

Biodiversity Research Institute
276 Canco Road, Portland, ME 04103
Phone: 207-839-7600 Fax: 207-887-7164
Email: brl@briloon.org

ABOUT BRI

