

ABOUT BRI

Biodiversity Research Institute (BRI), headquartered in Portland, Maine, is a nonprofit ecological research group whose mission is to assess emerging threats to wildlife and ecosystems through collaborative research, and to use scientific findings to advance environmental awareness and inform decision makers.

BRI supports 10 research programs within three research centers including the **Center for Ecology and Conservation Research**, the **Center for Mercury Studies**, and the **Center for Loon Conservation**. Within the Center for Ecology and Conservation Research, BRI manages the following programs:

Taxonomic

- Mammal Program
- Marine Bird Program
- Raptor Program
- Songbird Program
- Waterfowl Program



Ecosystems

- Arctic Program
- Tropical Program
- Wetlands Program

Environmental Issues

- Wildlife Health Program
- Wildlife and Renewable Energy Program

BRI has been conducting scientific inquiries for private sector and government clients nationwide and globally since 1998. Using both traditional and innovative approaches, our researchers collect, analyze, and interpret scientific results on how ecological stressors impact living systems.

By incorporating regional data and developing strategies for collecting additional data, BRI has effectively modeled such stressors on species and community distributions, phenology, adaptive strategies and population viability across tropical, temperate, and arctic biomes.

BRI's Wildlife Toxicology Lab has the capacity to analyze various tissue samples for mercury concentrations.

For more information on our capabilities and services, visit: www.briloon.org/services

BRI's WATERFOWL PROGRAM

BRI's Waterfowl Program primarily focuses its research on conservation needs for waterfowl throughout North America, and has partnered with other organizations, as well as state and federal agencies interested in waterfowl conservation goals. BRI is actively conducting research within three broad areas: (1) contaminants monitoring; (2) movement studies; and (3) avian health.

Research Capabilities

BRI biologists are skilled in numerous diverse aspects of waterfowl research including:

- **Surveys**—Conducting surveys on migrant and breeding waterfowl to estimate abundance, reproductive success, feeding habits, and space use.
- **Capture and banding**—BRI researchers are experts in the safe and efficient capture and banding of waterfowl. Techniques vary by species, season, and geographic region; all methods are approved by required permitting agencies.
- **Transmitter selection and fitting**—Tracking technologies are critical for acquiring important data on waterfowl ecology. BRI staff are skilled in selecting appropriate transmitters and safely fitting them to individuals.
- **Laboratory analysis**—BRI's Wildlife Toxicology Lab has the capacity to analyze various tissue samples for mercury concentrations. Necropsies are performed by BRI veterinarians in our Wildlife Health and Pathology Lab.
- **Ecological analysis and modeling**—BRI staff have expertise in managing and analyzing large and complex multivariate datasets comprised of animal movement, contaminant, or other data.



WATERFOWL PROGRAM DIRECTOR

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BIODIVERSITY RESEARCH INSTITUTE WATERFOWL PROGRAM



WHY STUDY WATERFOWL

The term waterfowl encompasses a group of birds that include ducks, geese, and swans; the list of waterfowl species is extensive. Some waterfowl species have long served as important indicators of ecological health. Waterfowl utilize diverse ecosystems throughout North America—from the remote northern reaches of the Arctic, along busy marine ports and coastlines, to inland lakes, rivers, and wetlands across the continent.

Waterfowl populations face many challenges from an ever-changing environment. The loss or degradation of their habitats due to climate change, pollution, or development, coupled with natural ecological pressures, create an urgency for waterfowl managers and conservationists alike to ensure sustainable populations of waterfowl in North America. BRI actively conducts collaborative waterfowl field studies aimed to provide data needed to implement waterfowl conservation efforts.



White-winged Scoter

Waterfowl We Study

Some species emphasized in BRI's research include:

- Common Eider
- Common Merganser
- Harlequin Duck
- Hooded Merganser
- Long-tailed Duck
- Mallard Duck
- Surf Scoter
- White-winged Scoter



Common Eiders

CONTAMINANT STUDIES

The varied habitats of waterfowl are sometimes exposed to potentially harmful types and levels of contaminants. The sources of contamination deposited among these habitats are produced through certain domestic industry practices, as well as transported from other countries from afar through atmospheric deposition. Contaminants are deposited into the environment, then consumed by fish and wildlife from polluted food sources. Certain waterfowl species are susceptible to accumulating harmful levels of contaminants.

BRI's research projects primarily focus on risk assessments of contaminants and their potential effects on waterfowl health and populations. Our field studies involve collection of blood, feather, egg and other tissues from waterfowl in known polluted areas as well as investigative contaminant screening and temporal monitoring across North America. These studies provide important information on the overall health of an individual bird, a population, or the health of our continent's environment that wildlife and humans share and rely upon for survival.

BRI has collected and facilitated waterfowl samples throughout North America to evaluate which species and geographic areas are at risk of potentially unhealthy contaminant exposure.

Examples of contaminant studies include:

- Examining mercury concentrations in Common Eiders and their food items in the northeastern United States
- Exposure profile of contaminants in North American sea ducks
- Mercury in Harlequin Duck tissues
- Determining heavy metal concentrations in the endangered Scaly-sided Merganser of Russia
- Evaluating mercury accumulation in the Mallard Duck from a polluted river in Virginia

MOVEMENT STUDIES

The movements of waterfowl throughout their annual life cycle are complex. Many species of waterfowl utilize remote geographic locations at some point of their annual life cycle and are unreachable by biologists studying them. The use of tracking devices provides important information otherwise unattainable through other monitoring techniques.

BRI and our research collaborators have tagged and tracked several species of waterfowl throughout North America. Tagged individuals actively provide detailed locations, movements, habitat requirements, and information on natural history. This information is filling knowledge gaps about these species and providing biologists important information for waterfowl management, conservation, and legislative decisions.

The following are representative research projects with a focus on waterfowl movements:

- Determining offshore use of diving bird species in federal waters of the mid-Atlantic United States using satellite tracking: Surf Scoter component
- Atlantic and Great Lakes sea duck telemetry study
- Boston Harbor Common Eider tracking study
- Maine Common Eider satellite telemetry study
- Connecting Wyoming's breeding Harlequin Duck population to important wintering and molting areas, and identifying migration routes
- Annual movements and habitat use of White-winged Scoters and Long-tailed Ducks in southern New England
- Radio tracking Common Eider broods in Casco Bay, Maine



Harlequin Duck



Common Eider

AVIAN HEALTH

Birds can be susceptible to various diseases and viruses, such as the West Nile virus, avian influenza, and avian cholera. Federal agencies have established wildlife disease monitoring programs in order to detect individuals, species of birds, or geographic locations that are of concern in transporting infectious diseases.

Avian influenza is widely endemic in wild populations of waterfowl, as well as many other species of birds. The emergence and spread of a highly pathogenic strain of avian influenza (HPAI within the H5N1 subtype) in Asia and its subsequent spread to Europe and Africa has elevated concerns about potential transport of this virus to North America. Migratory birds have been identified as a potential source for introduction of Asian H5N1 into North America. In response, the U.S. Fish and Wildlife Service has conducted a surveillance effort to detect Asian HPAI H5N1 in the Atlantic and Mississippi Flyways.

BRI assisted in disease surveillance programs by live-capture and tissue sampling of waterfowl species in the Atlantic Flyway:

- Avian influenza surveillance in migratory shorebirds and wintering waterfowl at Parker River National Wildlife Refuge, Massachusetts
- Investigating the Wellfleet Bay virus in Common Eiders

To learn more about our waterfowl program, visit:

www.briloon.org/waterfowl