

## 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 13 research programs within four research centers including the **Center for Conservation and Climate Change**, Center for Mercury Studies, **Center for Waterbird Studies**, and the **Center for Research on Offshore Wind and the Environment**. Within the Center for Ecology and Conservation Research, BRI manages the following programs:

### Taxonomic

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

### Ecosystems

- Arctic Program
- Tropical Program
- Wetlands Program



### Environmental Issues

- Climate Change Program
- Wildlife Health Program
- Wildlife and Renewable Energy Program

### Research Labs

- Quantitative Wildlife Ecology Research Lab
- Toxicology and Pathology Labs
- Wildlife Forensics Lab
- Acoustic and Imagery Lab

For more information on our capabilities and services, visit:

[www.brilwildlife.org](http://www.brilwildlife.org)

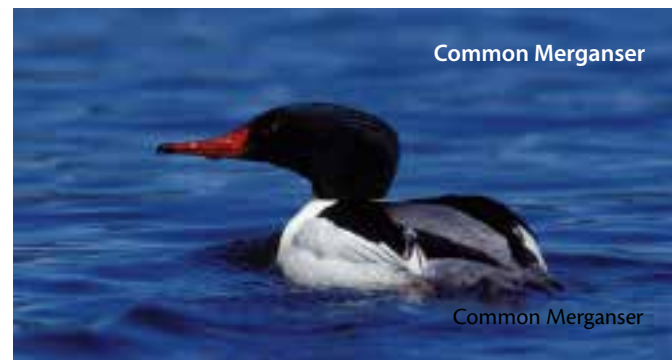
## BRI'S WATERFOWL PROGRAM

BRI's Waterfowl Program primarily focuses its research on conservation needs for waterfowl throughout North America, and has partnered with other conservation focused 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 staff 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 provide important data on waterfowl ecology. BRI staff are skilled in selecting appropriate transmitters and safely fitting them to individuals.
- Laboratory analysis—BRI's Wildlife Mercury Research Lab has the capacity to analyze various tissue samples for mercury concentrations. Necropsies are performed by BRI veterinarians in our Wildlife 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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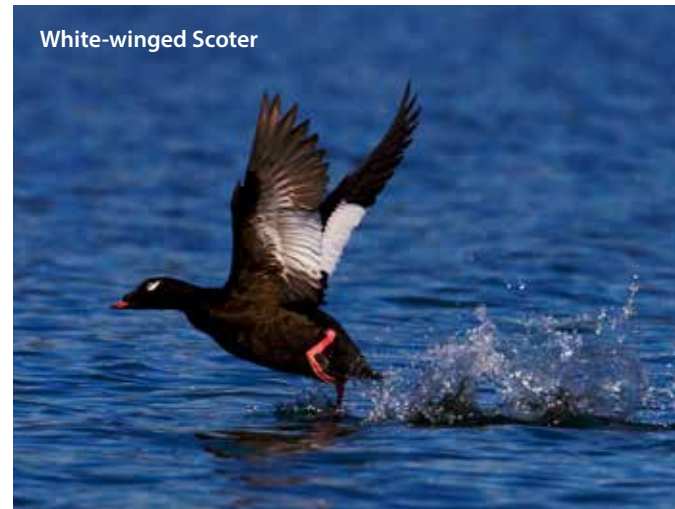
## BIODIVERSITY RESEARCH INSTITUTE WATERFOWL PROGRAM



## WHY STUDY WATERFOWL

In North America and Europe, some waterfowl species have long served as important indicators of ecological health. Waterfowl encompass a vastly diverse ecosystem both between species, and different times throughout their annual cycle among species. Waterfowl can be found most anywhere in North America — from the remote northern reaches of Canada, along the busy marine ports and our coastlines, to the lakes, rivers, and swamps across the continent.

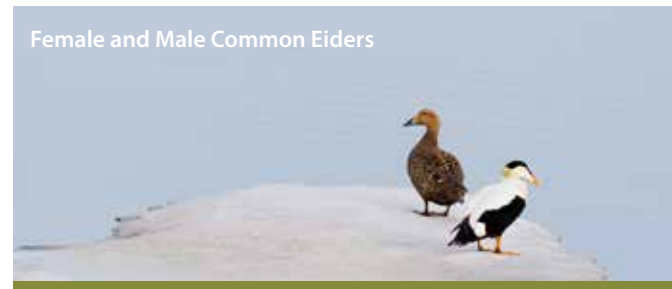
Waterfowl populations face many challenges from an ever-changing environment. The loss or degradation of their habitats through global change, pollution, or development coupled with natural ecological pressures provide emphasis for waterfowl managers and conservationists alike to ensure sustainable populations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



### Waterfowl We Study

Some species emphasized in BRI's research include:

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



### CONTAMINANT STUDIES

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, and then consumed by fish and wildlife from polluted food sources. Certain waterfowl species are susceptible to accumulating harmful levels of contaminants.

Our research projects focus on risk assessments of contaminants and their potential effects on waterfowl health and populations. Field studies involve the capture and collection of blood, feather, egg, and other tissues 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 the environment that wildlife and humans share and rely upon for survival.

BRI has collected and facilitated waterfowl sample collections throughout North America to evaluate what species and what geographic areas are at risk of potentially unhealthy contaminant exposure. Study examples 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 blood tissue
- 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 utilize remote geographic locations at some point of their annual life cycle and are unreachable by biologists studying them. Tracking devices placed on an animal provide important information unattainable through other monitoring techniques.

BRI and collaborators have tagged and tracked several species of waterfowl throughout North America. Tagged individuals active providing detailed locations, movements, habitat requirements, and information on natural history. This information fills knowledge gaps about these species and provides 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 (*Melanitta perspicillata*) 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 their 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



### 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