

ABOUT BRI

Biodiversity Research Institute (BRI), headquartered in Portland, Maine, U.S.A., 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 and lead concentrations.

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

BRI's ARCTIC PROGRAM

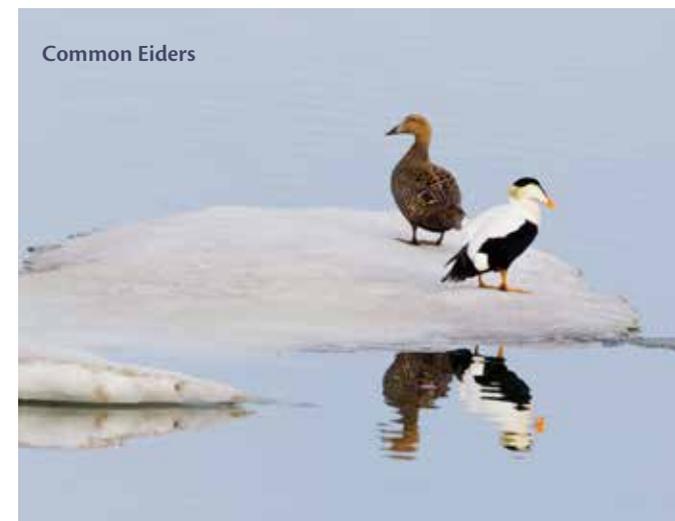
The Arctic region extends from the Arctic Ocean (surrounding the North Pole) to the tundra and northern boreal forests of North America and Eurasia. It is a harsh and challenging environment at the best of times, and home to rare ecosystems, abundant wildlife, and unique cultures, all adapted to extreme conditions.



Arctic Warbler

BRI's Arctic Program is involved in a range of research and conservation initiatives designed to identify new and emerging stressors and to inform stakeholders and policymakers about our science. Our research projects are generally interdisciplinary in nature and include collaborators from national agencies within Arctic countries, as well as local and international conservation organizations.

Staff from across BRI's three research centers (Ecology and Conservation Research, Loon Conservation, and Mercury Studies) contribute to these broad efforts in the Arctic.



Common Eiders



Sabine's Gulls

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BIODIVERSITY RESEARCH INSTITUTE

ARCTIC PROGRAM



WHY STUDY THE ARCTIC ENVIRONMENT

The conservation of Arctic ecosystems is one of the greatest ecological and political challenges of our time. Due to the direct and diverse effects of climate change, the Arctic is warming faster than the rest of the globe and changes are already underway. The rise in sea level, loss of multiyear sea ice, and rapid warming trend seen in recent decades are changing the face of the Arctic faster than predicted. As a result, species that live there year-round, or are reliant on the Arctic for much of their life cycle, are at serious risk.

Ecosystem Health

The health of the Arctic is affected by a range of anthropogenic stressors, from the overharvesting of some species, and the prevalence of environmental contaminants, to the general degradation of critical habitats.

Air temperatures are increasing in the Arctic twice as fast as the rest of the world, driving many serious ecological changes across the region. The extent of annual sea ice is also rapidly diminishing each year as the ice-free season lengthens. With this reduction in sea ice comes greater use of Arctic waterways for shipping increasing the risk of shipwrecks, oils spills, and the introduction of invasive species.

The Arctic also holds some of the largest untapped reserves of oil, gas, and minerals in the world, and the region is under constant pressure from resource extraction industries to increase exploration and development.



SURVEYS AND POPULATION MONITORING

Many bird species are considered good indicators of overall ecosystem health. Evaluating the conservation status of bird populations can be difficult, but gathering reliable data on the trends in the abundance and distribution of birds breeding in remote Arctic regions is enormously challenging. BRI's Arctic monitoring studies include:

- Capturing and color-banding Yellow-billed Loons on Alaska's North Slope to monitor their reproductive success, survival, and breeding distribution (in collaboration with Dr. Joel Schmutz, U.S. Geological Survey)
- Collaborating with Russian scientists in the Chukotka region of Siberia to develop on-site field methods for monitoring loons (Yellow-billed, Pacific, and Arctic), and on publications related to the ecology of waterbirds, shorebirds, songbirds, and other Arctic wildlife (with Dr. Diana Solovyeva, Russian Academy of Sciences)

TRACKING

Many species that rely on the Arctic for a critical part of their life cycle migrate to other regions of the globe. In doing so, these species are often exposed to a series of threats along their migratory routes and on their wintering grounds. Conserving these species requires a detailed understanding of their annual movements.

With the advent of new and miniaturized technologies, we have the ability to track even small birds across the face of the globe, from their Arctic breeding grounds to distant wintering areas. The Arctic Tern, for example, migrates from the Arctic to the Antarctic and back again over the course of an annual cycle.



A Red-throated Loon, shown here in winter plumage, has been fitted with a satellite transmitter.

BRI tracking projects in the Arctic include:

- Determining the year-round movements of migratory birds that nest in Denali National Park, Alaska, and identifying migration routes, stopover sites, and wintering areas (in collaboration with the National Park Service)
- Identifying the Asian wintering areas of Yellow-billed Loons breeding on Alaska's North Slope (in collaboration with Dr. Joel Schmutz, U.S. Geological Survey)
- Identifying the Arctic breeding areas of Red-throated Loons wintering in the mid-Atlantic coastal region (in collaboration with the Bureau of Ocean Energy Management and U.S. Fish and Wildlife Service)
- Assessing the year-round association between Arctic-breeding Black Guillemots and sea ice (in collaboration with Dr. George Divoky, Friends of Cooper Island)



CONTAMINANT STUDIES

Even without large-scale development in the region, Arctic species are increasingly exposed to environmental contaminants, such as mercury, due to long-range atmospheric transportation, which tends to deposit more in the Arctic than elsewhere.

Climate change can further exacerbate the risks of mercury contamination to Arctic wildlife. As temperatures rise, mercury previously sequestered in permafrost is released, and the rate of mercury methylation is increased, making it more bioavailable for uptake by Arctic species.

Since its inception, BRI has studied the exposure and effects of mercury in many species of fish and wildlife around the world.

BRI contaminant projects in the Arctic include:

- Investigating mercury levels in the feathers and blood of a broad suite of shorebirds breeding across North America, from Alaska to Nunavut (in collaboration with the Arctic Shorebird Demographics Network)
- Evaluating mercury exposure in a number of seabirds and waterbirds breeding in Alaska and Russia, including the Kittlitz's Murrelet, Yellow-billed Loon, Pacific Loon, and Arctic Loon (in collaboration with researchers at the U.S. Geological Survey, and at the Russian Academy of Sciences)

Many marine birds breed in the Arctic region. Learn more about BRI's Marine Bird Program at:
www.briloon.org/marinebirds