

## 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 14 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

- Fisheries Program
- 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.briwildlife.org](http://www.briwildlife.org)

## BRI'S FISHERIES PROGRAM

BRI staff biologists are experienced in the implementation and execution of field and analytical fisheries projects.

Field projects include the capture, tagging, inventory, sampling, or collection of fish and/or their tissues. Analytical projects include designing and implementing biomonitoring programs and analyzing and interpreting data for the implications for human health and environment.

BRI's fisheries program focuses on:

- Contaminants monitoring and analyses
- Mapping fish movements and habitat utilizations
- Tributary surveys
- Spawning surveys
- Fish inventories
- Biotelemetry
- FERC compliance studies
- eDNA sampling
- Electrofishing
- Fish passage studies
- Toxicology analysis and interpretation

Staff routinely work collaboratively with state and federal agencies, Ministries of the Environment and Health, nongovernmental organizations, and other stakeholders on fisheries projects.



### FISHERIES PROGRAM DIRECTOR

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## BIODIVERSITY RESEARCH INSTITUTE FISHERIES PROGRAM



## SPECIES OF INTEREST

A core component of BRI's mission is to assess emerging threats to wildlife and ecosystems. Our surveys are a critical tool in helping to identify and monitor threats to at-risk species and implications for human health.

Some focal species include:

- Atlantic salmon
- Landlocked Atlantic salmon
- Barracuda
- Brook trout
- Brown trout
- Largemouth bass
- Mahi mahi
- Red Snapper
- Yellowfin tuna
- Yellow perch



Red snapper are abundant and widespread. They have relatively low mercury levels and are regularly used for local consumption.



While the barracuda is a common species, its popularity as a local food item is dictated by the incidence of ciguatera fish poisoning. Barracuda regularly have elevated mercury levels.



## MOVEMENT STUDIES

BRI biologists have the expertise to design and conduct fish tagging and tracking projects using the latest tracking technology. Project objectives often involve mapping the seasonal movements of fish to identify watershed specific habitat utilization and identify the timing of spawning activity. BRI fisheries staff are adept at utilizing numerous netting or angling methods, backpack electroshocking, implanting radio transmitters, and tracking individual fish year-round.

Representative projects with a focus on movement studies:

- Brassua Lake/Misery Stream fish project
- Western Maine fish tracking and habitat utilization project



Tracking fish movements help us assess wildlife health issues; estimate population sizes or trends; describe distributions; and identify responses to climate change.

## CONTAMINANT STUDIES

Fish and other aquatic invertebrates are commonly used to assess contaminant exposure to both humans and wildlife among aquatic systems. Fish mercury concentrations provide important information on the potential for human exposure through their consumption from freshwater, estuarine, and marine ecosystems. This is of particular importance to vulnerable populations including children, pregnant women, and indigenous communities that rely on fish as a major protein source.

Young fish (<1 year) can reflect rapid changes of environmental mercury loads, while long-lived predatory fish, commonly consumed by humans, are of greater significance for human health. These bioindicators can also be used to assess impacts to piscivorous wildlife.



Sampling techniques are constantly improving and BRI biologists are at the forefront of developing novel methods for nonlethal capture. For example, to determine contaminant levels in fish,

BRI biologists now regularly take muscle biopsies (shown here), and then release individuals back into the water.

The presence of specific fish species can also be confirmed by analyzing water samples for Environmental DNA (eDNA) markers for specific fish species.

As part of the Federal Energy Regulatory Commission (FERC) compliance process, BRI routinely conducts projects requiring the sampling, contaminant analyses, and assessment of fish in hydroelectric reservoirs.

Representative projects with a focus on monitoring contaminants in fish:

- FERC mercury monitoring among the Upper and Middle Dam Project, Maine (FERC #11834)
- FERC mercury monitoring among the Flagstaff Storage Project, Maine (FERC #2612)
- FERC Fifteen Mile Falls Project (FERC #2077), New Hampshire/Vermont
- Androscoggin Lake Mercury Study

## INTERNATIONAL FISH MERCURY STUDIES

BRI has developed a Global Biotic Mercury Synthesis (GBMS) database, the first of its kind, that is a compilation and synthesis of published fish, sea turtle, bird, and marine mammal mercury data collected from around the world.

BRI's work with the U.S. Department of State and the United Nation's Minamata Convention on Mercury has led to mercury monitoring projects around the world in the global effort to reduce mercury emissions and releases that harm wildlife and their environments, and which may negatively affect human health.

In collaboration with international governments and nongovernment organizations, BRI conducts monitoring in the following regions:

- Caribbean: Antigua and Barbuda; Belize; Trinidad and Tobago
- South America: Colombia; Ecuador; Guyana; Peru; Suriname
- South Pacific: Indonesia
- West Africa: Gabon



Sampling fish in the Caribbean.



A pelagic fish, tuna travel across oceans may have elevated mercury levels. Yellowfin tuna is one of the tuna species of global importance.