

Contaminants & Ecotoxicology Support Services

Ecotoxicological Assessment and Monitoring Services

Pollutants, both natural and anthropogenic, are pervasive across the globe, impacting the health of wildlife, fish, and their habitats. These same issues directly affect human health, such as consumption of fish or game meat with elevated contaminant concentrations, or use of skin-lightening products high in mercury.

Assessing contaminants provides critical data to inform human health risks, environmental health, and conservation. Such data provide a baseline towards remediation and restoration efforts to remove threats. In New England, mercury and PFAS are ongoing, ubiquitous stressors requiring close monitoring and mitigation efforts.

Overview of BRI's Contaminants Work and Lab Services

Mercury:

- ✓ In-house analytical capacity with Direct Mercury Analyzer for ultratrace quantification of total mercury
- ✓ Collaborator labs for methylmercury analysis
- ✓ Global leader in environmental mercury research

PFAS:

- ✓ Analysis of PFAS through collaborator labs
- ✓ In-house expertise on PFAS chemistry, environmental sampling, movement through food webs, fate and transport

Otoliths:

- ✓ In-house lab capacity to collect otoliths
- ✓ Collaborator labs for aging and isotopic chemistry analyses



Biological samples are processed in BRI's Toxicology Lab, supporting research on mercury, PFAS, and other contaminants across ecosystems in Maine and beyond.

Global Reach

- BRI is a global leader in studying and monitoring mercury exposure and sources, working with the United Nations Environment Program to assess exposure to mercury in skin-lightening products that may cause acute and chronic mercury poisoning. BRI works in over 50 countries as part of our role in enacting the UN's Minamata Convention on Mercury.
- BRI's global reach and extensive datasets allow for assessment of long-term trends in contaminant concentrations.
- BRI's Toxicology Lab has developed sampling protocols for birds, bats, fish, human hair, and environmental sampling of contaminants. These protocols are freely available on our website and are used globally to standardize sampling practices. For international audiences, these are available in English, French, and Spanish.



Skills and Expertise

Sample Collection:

- ✓ Fish
- ✓ Birds
- ✓ Mammals
- ✓ Water
- ✓ Sediment
- ✓ Air

Analysis and Interpretation Of:

- ✓ Mercury, lead, and other heavy metals
- ✓ PFAS (per- and polyfluoroalkyl substances)
- ✓ PCBs (polychlorinated biphenyls)
- ✓ PAHs (polycyclic aromatic hydrocarbons)
- ✓ PBDEs (polybrominated diphenyl ethers)

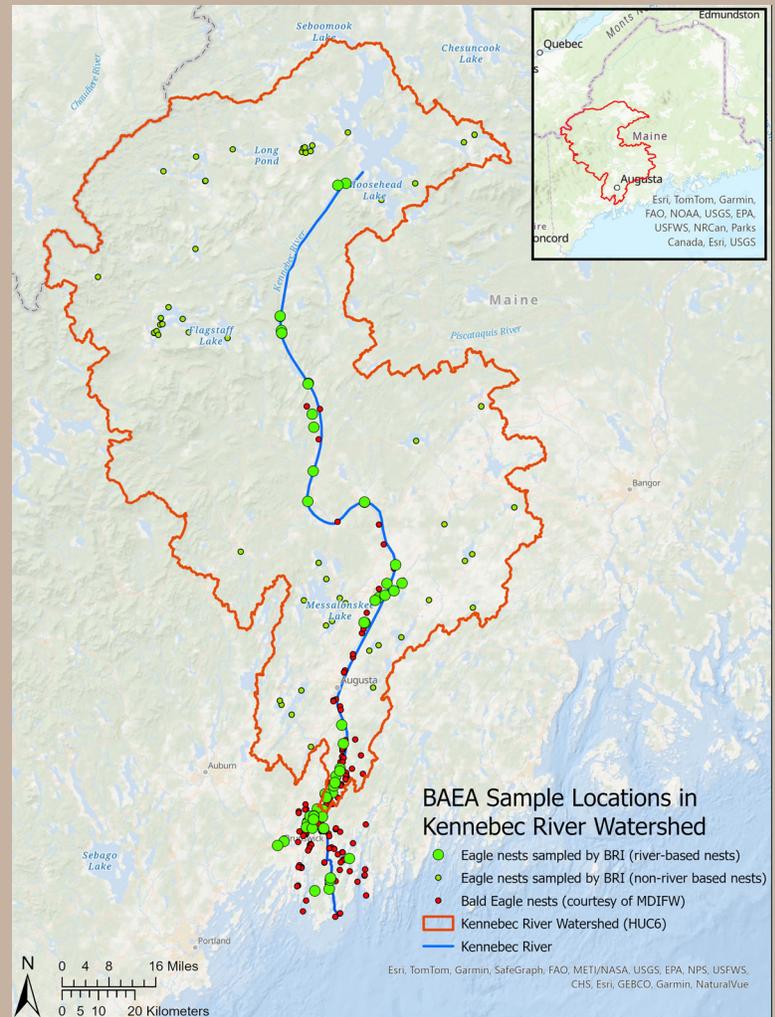
Collaborations with:

- ✓ Maine Department of Environmental Protection
- ✓ Maine Department of Inland Fisheries and Wildlife
- ✓ Maine Department of Marine Resources
- ✓ U.S. Environmental Protection Agency
- ✓ U.S. Department of Energy, Federal Energy Regulatory Commission
- ✓ U.S. Geological Survey
- ✓ U.S. Fish and Wildlife Service
- ✓ National Park Service
- ✓ National Oceanic and Atmospheric Administration

Kennebec River Contaminants Monitoring: Bald Eagles and Osprey

Contaminants often biomagnify as they move up the food web, reaching peak levels in the nestlings of predatory birds. By consuming locally sourced prey, bald eagle and osprey nestlings act as bioindicators across space and time, providing a snapshot of recent dietary exposure and habitat-specific environmental levels.

From 2001 to present, BRI has captured and sampled eagles at 297 nests across the Kennebec River watershed in central Maine. Mercury analyzed in blood and feathers from these birds provides key data into understanding wildlife and human exposure to mercury and to identify point- and non-point mercury sources.



BRI's Raptor Program has a longstanding history of monitoring bald eagles in the state of Maine, with a focus on biomonitoring along the Kennebec River watershed. Efforts include sampling and banding eagle nestlings as well as adults.

Mercury Monitoring in Fish: Human Health Assessment

Consumption of fish can be a significant exposure source for contaminants like mercury or PFAS.

BRI's Toxicology lab works closely with tribes, state, and federal partners to assess contaminants in fish and to provide current data on mercury exposure to anglers and sustenance consumers of fish. These findings help inform fish consumption guidelines, supporting safe, informed decisions that protect human health.



Fish at the top of the food web, such as Northern pike (right), typically have higher levels of mercury in their tissues than fish that feed at the bottom of the food web (e.g., brook trout, river herring).

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