

## 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](http://www.briloon.org/services)

## BRI's RAPTOR PROGRAM

BRI's Raptor Program grew out of our ongoing efforts in the 1990s to investigate mercury exposure in wildlife. Since then, the Program has expanded in scope and capacity, contributing information on raptor ecology and threats important to informing conservation and resource management decisions across the country.

### Research Capabilities

BRI staff are skilled in numerous diverse aspects of raptor research including:

- **Surveys**—Conducting surveys on migrant and breeding raptors 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 raptors. 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 raptor 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.



Peregrine Falcon

### RAPTOR PROGRAM DIRECTOR

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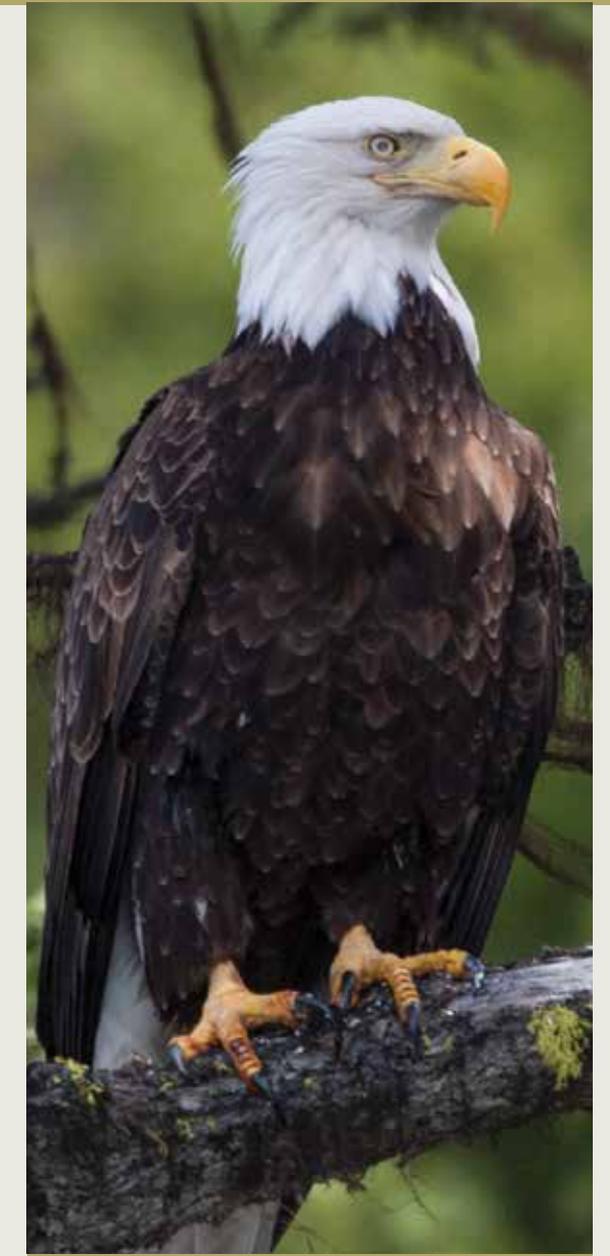
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## BIODIVERSITY RESEARCH INSTITUTE RAPTOR PROGRAM



## WHY STUDY RAPTORS

The term “raptor” broadly refers to birds of prey. While not a taxonomic bird grouping, raptors are characterized by hooked bills and sharp talons. Ospreys, eagles, hawks, falcons, owls, vultures, and kites are all common raptors in North America, but the traits of species within these groups vary widely. For example, some raptors feed exclusively on birds, while others rely upon carrion or even snails.

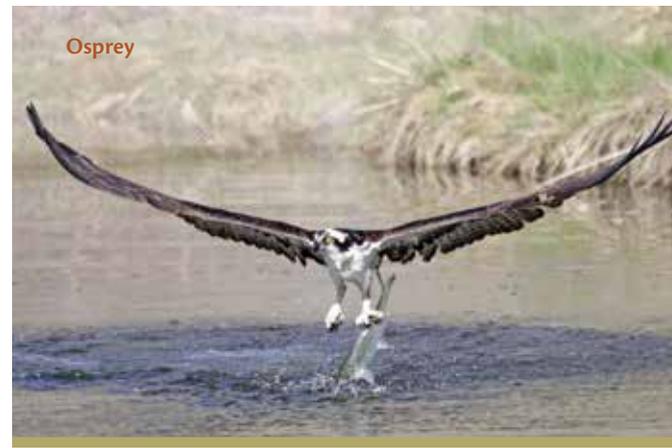


Raptors are commonly used as indicators of environmental health because their numbers, reproductive success measures, habitat use and tissues can reveal important clues about changing ecosystem patterns or threats. For this reason, the natural histories of many raptors such as Bald Eagles, Ospreys, and Peregrine Falcons are closely intertwined with many of the most important environmental policies in history such as the banning of DDT, the Endangered Species Act, and others.

### Raptors We Study

Some species emphasized in BRI's research include:

- Accipiter Hawks
- American Kestrel
- Bald Eagle
- Buteo Hawks
- Merlin
- Northern Harrier
- Northern Saw-whet Owl
- Osprey
- Peregrine Falcon
- Snowy Owl



## SURVEYS AND POPULATION MONITORING

Changes in raptor abundance, distribution, and reproductive success often reflect changes in underlying ecosystems. BRI researchers use a variety of survey methods to collect information on raptor populations, including:

- **Standardized raptor counts**—Experienced observers identify passing migrants by species, age, and sex categories to monitor population trends. Raptor counts are also used to assess collision risks associated with wind energy and other facilities.
- **Ground-based observations and use surveys**—Observers conduct standardized ground-based surveys to quantify raptor use of areas of potential risk or ecological value.
- **Playback and passive recording surveys**—Biologists use playback calls to elicit responses from elusive territorial raptors often overlooked using other methods. Alternatively, passive recorders can be used to detect and locate resident raptors.
- **Aerial surveys**—Trained observers collect information on nest distribution, abundance, and reproductive success from aircraft.



To learn more about our raptor program, visit:

[www.briloon.org/raptors](http://www.briloon.org/raptors)

## TRACKING



With rapid advancements in wildlife tracking technologies, scientists can now gain detailed information on local and long distance movement patterns of birds. Tracking technologies can provide information on locations of individuals as frequently as several times per minute. Such information provides a better understanding of the ecology of raptor species, as well as population threats. For example, tracking data helps researchers establish links between breeding and wintering bird populations. Animal tracking data has become a critical tool in making informed conservation and resource management decisions.

Examples of BRI tracking studies include:

- Characterizing the migration patterns and space use of Peregrine Falcons along the Atlantic Flyway relative to proposed offshore wind energy facilities in the Mid-Atlantic U.S.
- Determining annual movement patterns and areas of importance to subadult Bald Eagles in Maine
- Establishing fall migratory routes and habits of Merlins and Northern Harriers along the Atlantic flyway
- Modeling breeding Bald Eagle movement patterns near current and potential wind energy facilities in Maine
- Characterizing home range and foraging patterns of breeding Peregrine Falcons in New Hampshire



## CONTAMINANT STUDIES

Many raptors sit at the top of the food web, feeding on fish and other birds. In ecosystems polluted with contaminants, these toxic compounds are often magnified up the food web to top predators. As a result, raptors are among the most well-established bioindicators of environmental pollution.

For decades, biologists have sampled birds to evaluate the potential for reproductive or behavioral effects due to contaminant exposure. Blood, feathers, and eggs provide direct insights about short-and long-term dietary exposure of birds to contaminants. Landscape-scale sampling helps identify contaminant “hotspots,” while sampling regularly over time helps in assessing overall contaminant trends over time. Examples of BRI's contaminant projects with raptors include:

- Evaluating spatial and temporal patterns of mercury exposure in Maine and New York Bald Eagles
- Assessing exposure of Maine's coastal and inland Bald Eagles to organic and emerging compounds
- Assessing mercury exposure in Bald Eagles and Ospreys along the Penobscot River, Maine in relation to a historic point source
- Monitoring emerging contaminant patterns in Ospreys of Casco Bay, Maine
- Mercury exposure comparisons in migrant diurnal and nocturnal raptors

