

*Soaring  
Ahead*



BIODIVERSITY RESEARCH INSTITUTE 2011

# BRI RESEARCH SITES

Other sites not shown on map are located in Brazil, Russia, South Africa, and Switzerland.

**KEY**

- BIOSTATIONS
- ▲ RESEARCH PROJECTS

1. Wetland Program
2. Mammal Program
3. Raptor Program
4. Waterfowl Program
5. Migratory Bird Program
6. Tropical Program
7. Wildlife & Renewable Energy Program
8. Marine Bird Program
9. Coastal Bird Program
10. International Ctr for Loon Conservation
11. Wildlife Health Program
12. Fish Program



**IN ESSENCE, BRI STARTED** with the capture of a common loon at Seney National Wildlife Refuge in Michigan—a telling event that serves as the basis for our mission: to conduct scientific investigations to better understand ecological health through the lens of animals. If wildlife are healthy, the air, water, and landscape share in that vitality.

Over the years, BRI has grown in response to pressing ecological issues. Now we are a full-time staff of more than 50, a doubling that resulted from a request by the federal government to assist with the Deepwater Horizon oil spill. This unfortunate event has given us a broader capacity to undertake looming new issues that threaten healthy ecosystems across the U.S. and beyond.

I believe that BRI has tremendous potential to answer questions critical for maintaining a healthy earth. We now have a diverse team of experienced field biologists, yet we have retained our original intent and spirit—a dedication to the principles of conservation biology infuses our daily work and long-term vision. Such purpose is both powerful and refreshing.

The challenges ahead will require a paradigm shift in how scientific data are

### **BRI's Mission**

To assess emerging threats to wildlife and ecosystems through collaborative research and to use scientific findings to advance environmental awareness and inform decision makers.

gathered for regulators and other decision-makers. I believe we can incorporate both traditional and innovative approaches toward solving ecological issues. BRI is fortunate to be part of that change and in some arenas, championing it. Incorporating the kind of complexity now expected by a more perceptive society requires a thoughtful process. Count on BRI to respond to that need wholeheartedly and with conviction.



David Evers, Ph.D.  
*Founder and Executive Director*



Lee Attix  
*Chief Operating Officer*



Wing Goodale  
*Deputy Director*

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BIODIVERSITY RESEARCH INSTITUTE  
innovative wildlife science

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# A Light in the Dark



Photo Courtesy EarthWarch

DAVID EVERS (AT THE BOW OF THE CANOE ABOVE), FOLLOWED A HUNCH AND WAS ABLE TO CATCH LOONS WITH THE GOAL OF PRESERVING THESE MAGNIFICENT CREATURES. RIGHT: COMMON LOON IN BREEDING PLUMAGE.



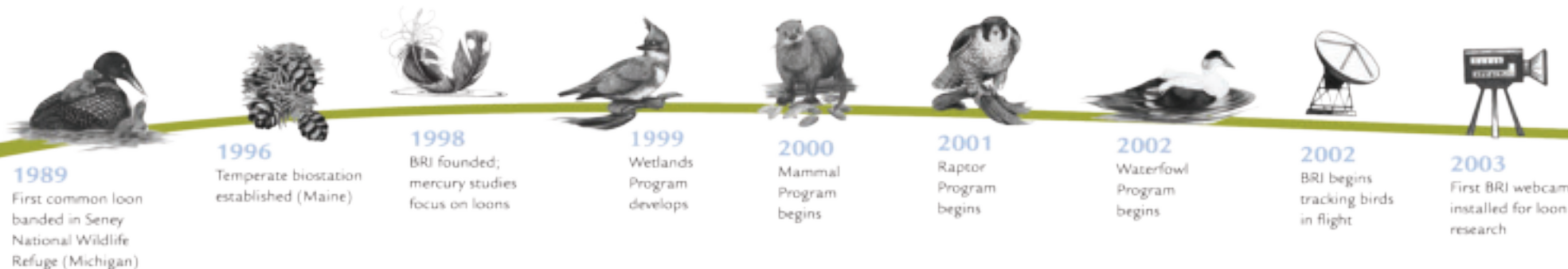
Photo Credit: Dan & Ginger Poleschook

IN THAT FATEFUL SUMMER of 1989, after 12 nights canoeing on the still lakewaters of Michigan's Seney National Wildlife Refuge, BRI's founder, then graduate student David Evers, was about to give up his quest to catch common loons. Wrapped in darkness, his crew trained a searchlight along the shoreline, the bright beam slowly scanning the water for the rare birds. Swift and intelligent, these deep divers eluded them, until Evers spotted a female with its young. The fragile "peenting" cry of the chick triggered an idea—Evers began mimicking the sound. Immediately, the adult loon swam toward his voice, right up to the boat. That moment changed everything about how wildlife biologists have come to study, and help protect, the mysterious bird that naturalist Sigurd Olsen described as a "symbol of wildness."

Important indicators of water quality and overall health of aquatic environments, loons had long been a high profile species. The ability to capture and band individual birds in a reliable and replicable manner opened opportunities to conduct demographic, behavioral, and contaminant studies. Evers' research on loons focused on mercury. He spent most of the next decade capturing, sampling, and color-marking loons across the country, always with a high respect for the individual animal, teaching his methods to others along the way.

Loon capture not only provided a way to assess contaminant levels in our lakes and waterways, it later served as a means to determine how mercury pollution affects behavior and reproduction. The common loon is now considered the flagship wildlife species for national mercury monitoring and policymaking.

## BRI: A Timeline





*“More than eeriness now, I hear survival.  
More than wildness, I hear triumph.”*

— Jeff Fair, Wildlife Biologist

**A DECADE** before Evers captured his first loon in Michigan, wildlife biologist Jeff Fair began his career canoeing the lakes of New England—wide-angled binoculars, notebook, and knife-sharpened pencil his primary tools. A naturalist, he learned about loons by simply watching them, noting their behavior, while referring to his makeshift field guide: a copy of Dr. Judith McIntyre’s 1975 doctorate dissertation, *Biology and Behavior of the Common Loon*.

In 1992, a long-time collaboration began when Evers enlisted Fair, who knew the loons and lakes in the Northeast, to help him band birds in this region. Fair recognized Evers’ method of capturing loons as a major breakthrough in contaminant research, yet he wasn’t quite ready for “plucking them out of their innocent careers, likely scaring the hell out of them, and then releasing them to be forever outed.” The need for scientific data, however, outweighed his reservations,

and before long he came to respect how Evers and his field crews handled the birds. When he witnessed first-hand how the capturing technique saved a loon that snagged a fishing lure in its bill, Fair knew that capture was a necessary approach.

Four years later, Evers and Fair established a research station in Rangely, Maine, where field crews have since been monitoring local loon populations.



IN 1995, BIOLOGIST JEFF FAIR COLLABORATED WITH DAVE EVERS TO BAND LOONS IN MAINE, PICTURED LEFT ON AZISCOHOS LAKE. BELOW, EVERS (ON RIGHT) AND CREW WORK ON A LOON.



Photo Credit: Dan & Ginger Poleschook



**2004**  
Migratory Bird Program develops



**2004**  
BRI testifies on Capitol Hill for mercury monitoring



**2007**  
Tropical Program & biostation (Belize) established



**2009**  
Arctic biostation (Alaska) established



**2009**  
Center for Mercury Studies established



**2009**  
Migration studies trigger Windpower Program



**2010**  
BRI field crews deployed to Gulf of Mexico



**2010**  
Marine and Coastal Bird Programs begin



**2011**  
International Center for Loon Conservation established

## Mercury: A Pervasive and Invisible Risk

An inorganic element found in the earth's crust, mercury is naturally released into the environment through geological events such as volcanic eruptions. Elemental mercury (abbreviated Hg, from the Greek *hydrargyrum*, meaning watery silver) is the recognizable silvery liquid metal that was historically used in thermometers and industrial processes like mining gold and milling textiles.

Presently, coal-fired power plants release mercury into the environment through their emissions. Since this concentrated mercury has global reach and can remain in the atmosphere for many months, it may become a significant environmental contaminant.

The elemental form of mercury is not as toxic to humans and wildlife as the organic form of mercury, methylmercury, which can accumulate in blood, feathers, and fur.

Methylmercury is formed by bacteria that thrive in low-oxygen environments such as lake bottoms, moist soil, or even within a leaf. Organisms that feed in these wet environments ingest the methylmercury, which accumulates and concentrates up through the food web—the higher up in the web, the more potentially harmful the mercury is. Because methylmercury can accumulate over time, older individual animals may have more mercury than young animals.

While mercury was once thought to be limited to fish-eating birds that live on or near water, scientists now know that insect-eating birds are also at risk. Invisible and insidious, methylmercury has been shown to adversely affect the nervous, reproductive, and endocrine systems of both humans and wildlife.



*“Catching loons and studying mercury contamination were at the core of BRI’s early work. It is our responsibility to continue to expand this work to encompass other at-risk wildlife.”*

— David Evers, Ph.D., *Executive Director*

ONCE THE SCIENTIFIC COMMUNITY learned there was a reliable method for capturing loons, requests for blood samples began to arrive at Evers’ door. Dr. James Sikarski, a veterinarian at Michigan State University, taught Evers how to draw blood from loons, which began the researcher’s studies on mercury contamination.

Common loons are considered reliable indicators of mercury pollution in lakes. As large, long-lived birds that feed nearly

exclusively on fish and tend to nest on nutrient-poor lakes, loons have been identified as one of the most important indicators of the health of an aquatic environment.

BRI’s mercury studies began with loons, however, scientists soon realized that any wildlife feeding on the same lakes could be at risk for contamination. As BRI found ways to expand its work to include a variety of species, the programs began to build.

### Quicksilver Clouds: How Mercury Enters, Cycles, and Impacts Ecosystems

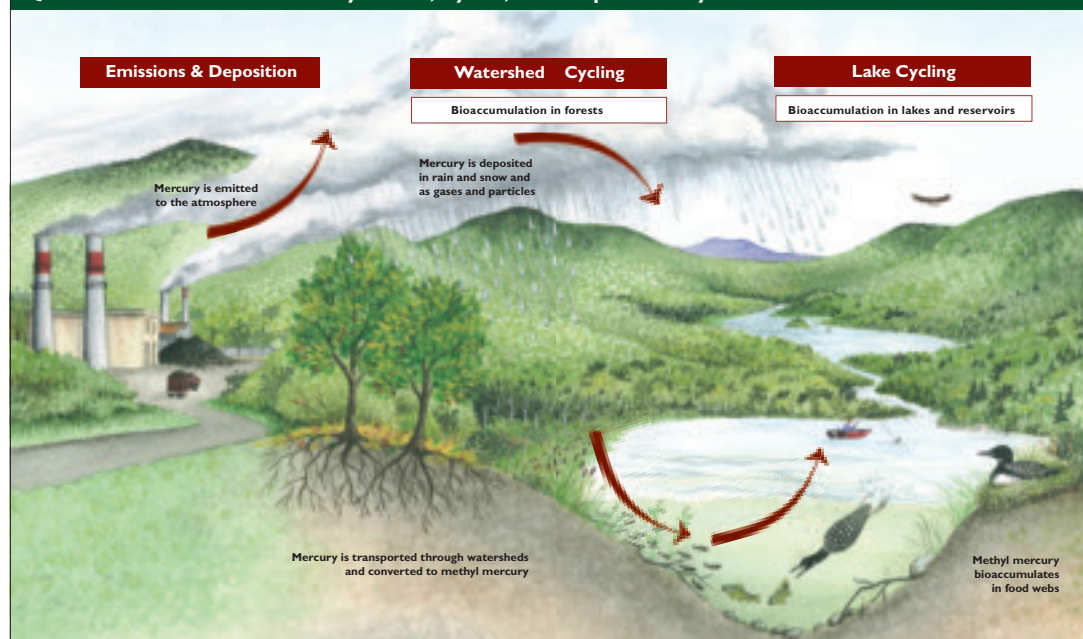


Illustration courtesy of Hubbard Brook Research Foundation.

# 1998 – Mercury Studies



*“Birds are excellent indicators of the health of freshwater, tidal, and coastal wetlands.”*

— Oksana Lane, Program Director

ABOVE: OKSANA LANE HOLDS A VIRGINIA RAIL. TOP RIGHT: A NELSON’S SPARROW IN THE HAND. BOTTOM RIGHT: BRI FIELD CREW WORKS IN A SALT MARSH IN MAINE.



WETLAND BIRDS FROM TOP LEFT: SALTMARSH SPARROW, BELTED KINGFISHER, AMERICAN PYGMY KINGFISHER.



**BELTED KINGFISHERS EXCAVATE** tunnels, burrowing deep into sandy riverbanks to nest. Rusty blackbirds breed in boggy forested marshes. Saltmarsh sparrows spend their entire life cycle in the transitional areas between land and sea, synchronizing egg laying with the ebb and flow of the tides.

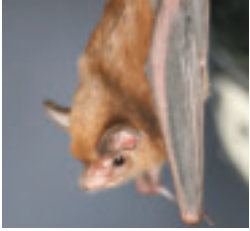
Freshwater and coastal wetlands are highly productive ecosystems. These environments also promote the conversion of inorganic mercury to the highly toxic organic methylmercury. Birds that live in wetland habitats may be particularly vulnerable to exposure to methylmercury—high concentrations can impair behavior, physiology, survival, and reproductive success.

In addition to mercury exposure, wetland bird populations are threatened by the loss of habitat associated with human development, sea level rise due to climate change, invasive species, and pollution. BRI’s wetland scientists conduct research with local, state, and federal agencies as well as other conservation organizations to examine the impact of these and other stressors on wetland bird populations. BRI has also begun new studies on shorebirds, such as the willet. Researchers will affix geolocators (tracking devices) to willets to help determine migration patterns and understand what stressors they face along their migratory routes and on wintering grounds.

The program is also expanding efforts into mangroves and other tropical wetlands through collaborations with scientists in Peru, Costa Rica, and Puerto Rico.



# Wetlands Program – 1999



FROM TOP: LITTLE BROWN BAT, A NEOTROPICAL BAT SPECIES LESSER DOG-LIKE, NORTH AMERICAN RIVER OTTER.

*“The first time I worked with bats, I was amazed at how small and delicate they are.”*

— David Yates, Program Director

**OTTER, MINK, MUSKRAT**—these mammals skillfully straddle the boundary between land and water. Aquatic mammals consume large quantities of fish and are important species within the forest ecosystems of the Northeast.

In 2000, Maine’s Department of Environmental Protection commissioned BRI to study mercury levels in the fur of mink and river otter caught by local trappers. Dave Yates and his team correlated levels of the contaminant in blood and fur to levels in the liver and brains of these fish-eating mammals. The mercury studies expanded throughout the state to include other aquatic-dwelling mammals.

Following this initial work, the mammal program quickly expanded to incorporate studies with bats. There are over 1,105 known species of bats, comprising nearly a quarter of all mammal species. In the U.S., more than half of the bat species forage adjacent to waterways. Bats are also

long-lived (up to 30 years for some) and have the potential to accumulate high levels of toxins over time. These unique and mysterious creatures are at the center of some of today’s most pressing ecological issues, such as white-nose syndrome, a deadly fungus, and mortality associated with wind turbines.

BRI biologists, collaborating across other programs in the Institute, are conducting studies to address these issues.



ABOVE: DAVE YATES (CENTER), JONATHAN MAYS OF MAINE INLAND FISHERIES AND WILDLIFE (LEFT), AND BRI BIOLOGIST PEDRO ARDAPPLE (RIGHT) INSPECT A CAVE FOR BATS. LEFT: TIM DIVOLL AND DAVID TZUL FROM BIRDS WITHOUT BORDERS WORK TO IDENTIFY A SPECIES OF BAT THEY HAVE FOUND IN BELIZE. BELOW: YATES HOLDS A PINE MARTIN TO BE TESTED FOR MERCURY.



# 2000 – Mammal Program





Dan & Ginger Poleschok

*“Raptors embody a finesse, wisdom, and agility that leave even the most unlikely naturalist yearning to see through their eyes for just one day.”*

— Christopher DeSorbo  
Program Director

**ON THE SHORES** of a remote lake in western Maine, a giant white pine leaned out over the water, an osprey nest tangled in its uppermost boughs. Wildlife biologist Bill Hanson, of NextEra Energy Resources, scurried up the tree and lowered a nestling to BRI’s field crew on the ground. The young bird was tagged, sampled, and returned to its nest.

Wildlife biologist Chris DeSorbo sees that moment as the spark that ignited BRI’s raptor program. DeSorbo, Hanson, and state eagle biologist Charlie Todd soon began a study to determine if mercury, known for its insidious effects on common loons, might be slowing the growth of Maine’s bald eagle population. That study resulted



Photo Credit: Chris Persico

in one of the most extensive bald eagle research efforts in New England, but more importantly, it set the stage for BRI’s raptor program to broaden its view to other species, and other issues.

Raptors, or birds of prey, perch at the top of the food web, and are considered “sentinels” for the health of the ecosystems in which they live. For this reason, the lives of many raptors are intertwined with some of the most important environmental policies in U.S. history, such as the banning of DDT and the Endangered Species Act.

Today, several raptor species, including the bald eagle, have escaped near extinction; they continue to help us monitor our environment. Other species are still in danger. BRI’s raptor program will continue to respond to the needs of these birds. They have much to teach us.



**TOP GALLERY FROM LEFT:** PEREGRINE FALCON, NORTHERN SAW-WHET OWL, BALD EAGLE AND CHICK. **LEFT:** CHRIS DESORBO WITH AN OSPREY. **TOP:** DESORBO AND RICK GRAY CLIMB TO AN EAGLE’S NEST. **BOTTOM:** MEASURING AN EAGLE’S BILL.



# Raptor Program – 2001

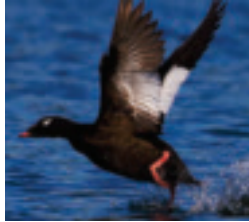


Photo Credit: Dan & Ginger Poleschook

SEA DUCKS FROM LEFT:  
COMMON MERGANSER,  
SURF SCOTER, WHITE-  
WINGED SCOTER.



TOP INSET: FIELD CREW RECORDS VITAL  
STATISTICS ABOUT EACH BIRD  
INCLUDING WING MEASUREMENTS,  
LEG MEASUREMENTS, AND WEIGHT.  
BOTTOM: DUSTIN MEATTEY AND  
LUCAS SAVOY PREPARE DECOYS  
FOR MIST NETS. RIGHT:  
SAVOY BANDS A FEMALE EIDER.



*“Each bird is handled with great care and respect—  
they deserve no less.”*

— Lucas Savoy, Program Director

**THE RISING SUN** casts a pink glow on the gray winter morning, illuminating flapping wings on the horizon off Casco Bay. After a long night on the open ocean, a flock of sea ducks, hungry for a breakfast of clams, mussels, and crab, flies low toward shore—straight into the mist nets.

In preparation for this arrival, BRI biologists had set up floating decoyed nets hours before dawn, then waited patiently in boats nearby. When birds fly into the net, researchers respond quickly to untangle them; the birds are then measured, banded, and sampled before released back into the water.

Little is known about most sea duck species; many breed in remote northern latitudes and winter on the ocean. Some species have been experiencing rapid population decreases in recent years.

BRI researchers have been investigating mercury contamination and tracking flight patterns of these birds in order to help conservationists protect them in the face of climate change, marine wind power development, habitat loss, and other pressing ecological issues.



# 2002 – Waterfowl Program



MAP SHOWS ACTUAL FLIGHT PATHS OF TWO PEREGRINE FALCONS BANDED BY BRI. PEREGRINE FALCON ABOVE CARRIES A SATELLITE TRANSMITTER BACKPACK.



*“The application of advanced technologies is a hallmark of BRI’s innovative field studies.”*

— Wing Goodale, Deputy Director

**SCIENTISTS HAD KNOWN** that peregrine falcons migrate great distances. Exactly what routes and how far were still in question. Satellite transmitters, harnessed to the birds like backpacks, provide valuable, and often surprising, answers.

To effectively protect wildlife populations, biologists must first link breeding areas with wintering areas and important stopover habitats used during migration. This task presents real challenges when studying a species like the peregrine falcon, that can breed in the Arctic, and migrate thousands of miles over the ocean to winter as far as Central or South America.

Other rapidly developing technologies such as geolocators, which utilize ambient light levels to map latitude and longitude coordinates, and geologgers, which employ GPS technology, provide conservation biologists with exciting opportunities to gather information critical to understanding migration patterns and habitat needs.

Data gathered from tracking technologies allow BRI biologists to relay

the most accurate information to policymakers, enhancing their ability to prioritize conservation actions.



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook

FAR LEFT: BRI RESEARCHER USES RADIO TELEMETRY TO MONITOR SEASIDE SPARROWS IN THE GULF OF MEXICO; MIDDLE: JENNIFER GOYETTE FITS A BLACK SKIMMER WITH A SATELLITE TRANSMITTER BACKPACK; ABOVE: A CLAPPER RAIL, HOODED TO KEEP IT CALM, IS BEING FITTED WITH A RADIO TRANSMITTER HARNESS.



# Tracking Wildlife



ABOVE: WILDLIFE BIOLOGIST BILL HANSON, OF NEXTERA ENERGY RESOURCES, WORKS WITH BRI'S RAPTOR SPECIALIST RICK GRAY TO INSTALL A CAMERA AT THE TOP OF THIS EASTERN WHITE PINE WHERE A PAIR OF BALD EAGLES NEST.



TOP: LEE ATTIX, OF BRI, HELPS INSTALL A WEBCAM TO MONITOR A LOON NEST. BELOW: PATRICK KEENAN, COORDINATOR OF BRI'S WEBCAM PROGRAM, MANEUVERS AROUND THE SITE WHERE A LOONCAM IS SET UP.



#### EXCERPTS FROM BRI'S WEBCAM ONLINE COMMUNITY:

April 24, 2011 — We do have an eyas! Mom is doing a very good job keeping it all under cover!

May 3, 2011 — If that's not the cutest pile of peregrines I've ever seen, I don't know cute!!! Good grief, they're adorable!

May 31, 2011 — All three are sitting on the pole, then next refresh two are gone - they must be having a great time flying around...must be working hard learning to capture their own food.

June 3, 2011 — 7:10 a.m. This one alone in the scrape & I'm assuming the youngest is really working those wings! He's holding on tight to the box edge while beating his wings so hard I thought he'd take off.

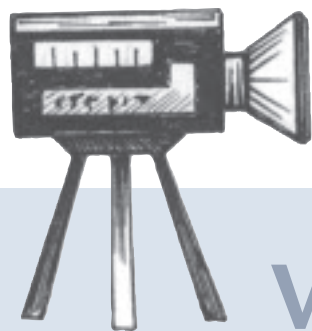
BRI's wildlife webcam program began in 2003, when biologists installed a camera as a research tool to monitor a common loon nest. Since then, they have installed additional webcams to monitor the nesting activities of ospreys and falcons. BRI researchers also work with Bill Hanson, of NextEra Energy Resources, on two NextEra Maine Eaglecams.

Installing webcam equipment requires cooperation between wildlife biologists and state and federal wildlife agencies, including the Maine Department of Inland Fisheries and Wildlife, the U.S. Fish and Wildlife Service, local utility companies, and private land owners.

Beyond the value to wildlife studies, webcams are an important tool to help engage the general public in science and ecology. Millions of people have logged onto BRI's website [www.briloon.org](http://www.briloon.org) to watch wildlife.

*“Webcams are effective tools for research and education; they offer a unique glimpse of nesting birds.”*

— Patrick Keenan, Outreach Director



# Watching Wildlife

*“Migration is a fascinating phenomenon—songbirds travel thousands of miles with no food or rest, and I want to understand how they do it.”*

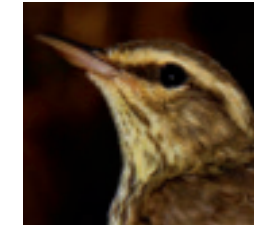
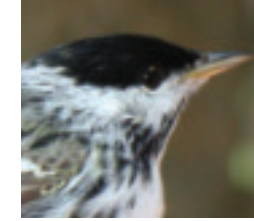
— Evan Adams, *Program Director*

LEFT: A FLOCK OF SNOW GEESE MIGRATING. BELOW: EVAN ADAMS HOLDS A WARBLER IN KEY BISCAIYNE, FLORIDA, WHERE HE NETTED AND BANDED A VARIETY OF MIGRATORY BIRDS. HARDWOOD FORESTS ON THE KEY REPRESENT AN OASIS TO MIGRANTS IN MIAMI’S URBAN LANDSCAPE.

Photo Credit: Dan & Ginger Poleschhook



Photo Credit: Dan & Ginger Poleschhook



THREE OF THE MANY SONGBIRDS THAT MIGRATE, CLOCKWISE FROM BOTTOM: NORTHERN WATER-THRUSH, BLACKPOLL WARBLER, GOLDEN-WINGED WARBLER.

**HAWKS RELY ON AIR CURRENTS** during their daytime migration; songbirds migrate at night to avoid predators. Albatrosses ride the wind over open water while Arctic terns track the Atlantic coast from pole to pole. There are about as many types of migration as there are migratory birds.

BRI’s migratory bird program evolved from its songbird research. Many mysteries about migratory birds exist; one of the most pressing is why these birds are experiencing large population declines.

Contaminants like mercury have been identified as threats for many migrants, yet their effects are poorly understood. Some species, like the northern waterthrush, are exposed to mercury at their breeding grounds, wintering grounds, and over migration, which could explain some of the population declines that scientists have observed.

Through a study in Key Biscayne, Florida, BRI researchers are trying to determine how mercury exposure affects the hormonal function and physiology of migrating songbirds. The results of these data, and other data collected at TERRA sites (BRI’s Terrestrial Ecosystem Research Assessment Network across the U.S., Central and South America, and the Caribbean islands), will help inform decisions about the conservation of migratory birds.



# Informing Change

The Biodiversity Research Institute is dedicated to providing sound scientific information to policymakers, helping to inform critical decisions regarding environmental health and integrity.

BRI's approach is based on the principles of conservation biology—an interdisciplinary subject that links scientific findings with policymakers, land and resource managers, and the general public. In that spirit, BRI's executive director David Evers has conducted numerous briefings for staffers at the U.S. Senate and House of Representatives and at state legislative hearings. A chronology of these activities is depicted here.

**April 2007**

David Evers and Charles Driscoll (Syracuse Univ.) publish OpEd piece in the *New York Times* challenging the EPA's Clean Air Mercury Rule.

**April 2005**

BRI invited to Maine legislature's Natural Resource Commission to present on mercury findings for the Northeast



**April 2005**

BRI presents at public hearings on mercury for Vermont and New Hampshire legislators

**March 2005**

David Evers appears on National Public Radio's *Science Friday* to discuss synthesis of mercury findings in the Northeast



**March 2005**

BRI presents at the U.S. Senate and House joint briefing on mercury

*“As a conservation responsibility to protect with scientific findings viewpoint.”*

**December 2004**

BRI presents at the U.S. Senate Environment Public Works Committee briefing



**March 2004**

BRI presents at the Maine public hearing on mercury regulations sponsored by Congressman Tom Allen

### August 2008

Senator Susan Collins (ME) speaks at Laudholm Farm in Maine on behalf of BRI and the National Mercury Monitoring legislation



### December 2009

Senator Collins introduces legislation that will create a new program, called MercNet, to measure mercury levels across the U.S.

### November 2010

BRI invited to participate and consult on the elements of the UNEP International Mercury Treaty

### March 2011

BRI requested to review the U.S. Environmental Pollution Agency Toxics Rule for the Commission for Environmental Cooperation

### June 2011

Senator Collins re-introduces legislation to measure mercury levels across the U.S.



## BRI Joins United Nations Environmental Programme

In partnership with the United Nations Environment Programme (UNEP), BRI is contributing in multiple ways toward the first international treaty of a globally binding instrument on mercury. The goal is for the intergovernmental negotiating committee (INC) to complete a document for the Governing Council by 2013.

On March 25, 2010, UNEP agreed to include BRI as an official member of the Mercury Air Transport and Fate Research Partnership Area. On November 30, 2010, BRI participated at the North American NGO Mercury Consultation in Washington, D.C. that was hosted by the Center for International Environmental Law with the UNEP Regional Office of North America. At that meeting, BRI contributed comments toward a document on elements of the treaty.

In response to concerns brought forward by UNEP, BRI will be developing a Global Mercury Data System. A report on the findings will be presented for the INC3 meeting in Nairobi, Kenya in November of 2011. This BRI project will determine global distribution of biotic mercury concentrations that affect human and ecological health. Parts of this project will be shared at the International Council of Mercury as a Global Pollutant conference in Halifax, Nova Scotia in July of 2011.

*biologist, I see it as my  
provide decision-makers  
ings from an unbiased*

—David Evers, Ph.D.  
BRI Executive Director

*“Our field work is like a crash course in tropical ecology that includes an up-close and personal look at the challenges of biodiversity conservation.”*

— Dave Buck, Program Director



TOP: EARLY MORNING ON THE TEMASH RIVER, BELIZE; FAR RIGHT: DAVE BUCK AND TIM DIVOLL MEASURE A BAT; NEAR RIGHT: TIM DIVOLL PROCESSES SAMPLES AT A REMOTE FIELD CAMP.



**TROPICAL ECOSYSTEMS** are synonymous with biodiversity. Nearly two-thirds of all known species inhabit these dense rain forests, tropical savannas, coastal mangroves, and rich coral reefs.

BRI's tropical program utilizes the Institute's unique scientific and outreach capacities to expand its understanding of the threats that environmental contaminants present to ecosystems and human health in tropical regions. Interdisciplinary in nature, these initiatives span multiple BRI programs (such as the migratory bird, mammal, and wetland programs) and build upon a strong network of collaborating researchers from across the region, ranging from Mexico to Honduras to Brazil.

Whether capturing bats in a remote tropical forest of Belize, sampling fish in a lake surrounded by extinct volcanoes in Honduras, or mist-netting birds within the flooded Caribbean forests of Costa Rica, conducting field work in the tropics provides numerous opportunities to become intimately familiar with the biodiversity of the region.

The future conservation of these habitats must balance the needs of the rapidly-growing, predominantly rural population of tropical countries with the intrinsic value of maintaining tropical biodiversity and recognition of the role these ecosystems play in globally important issues such as climate change.

BRI's tropical program focuses on:

1. Neotropical migratory bird habitat conservation
2. TERRA Network
3. Mercury in freshwater and marine ecosystems
4. Tropical bat behavior, ecology, and conservation
5. Climate change and Hg biogeochemistry

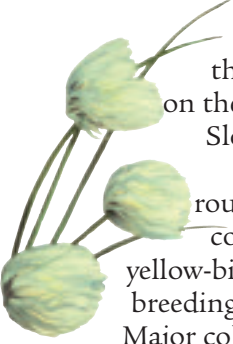


FROM TOP: FRESHWATER FISHES FROM LAGO YOJOA, HONDURAS; OLIVE-BACKED EUPHONIA; HELLER'S BROAD-NOSED BAT.





## Arctic Biostation North Slope, Alaska

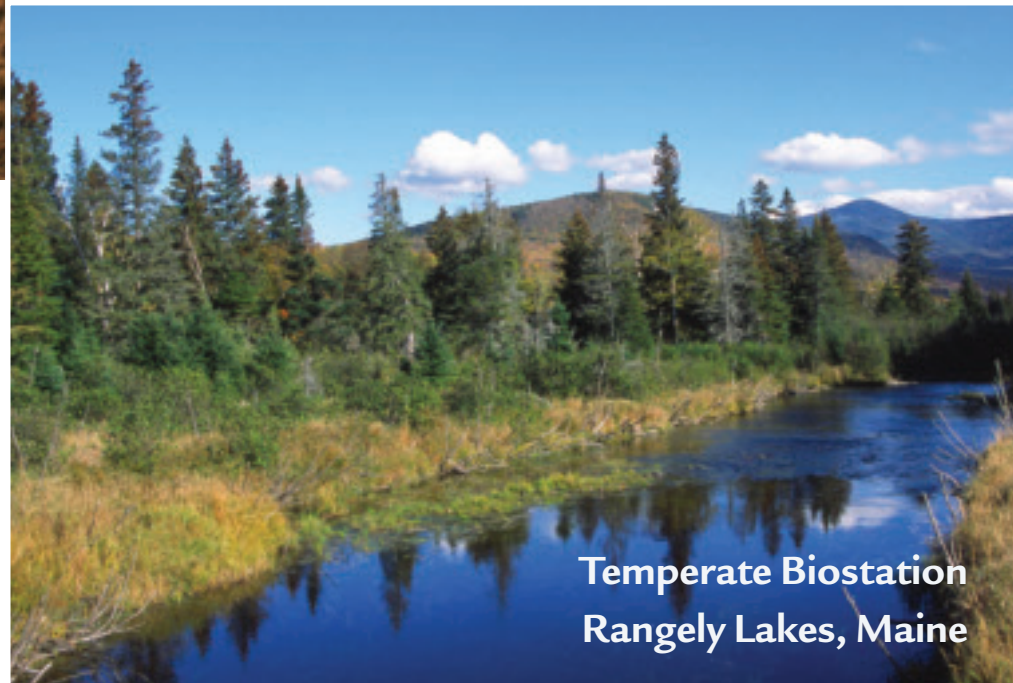


Since 2007, BRI's work at the Arctic biostation, located on the open tundra of the North Slope, Alaska, has focused on the breeding ecology, year-round movements, and risk of contaminant exposure in the yellow-billed loon—one of the rarest breeding birds in the United States. Major collaborators include the U.S. Geological Society and the U.S. Fish and Wildlife Service.


**BRI HAS ESTABLISHED BIOSTATIONS IN ARCTIC, TEMPERATE, AND TROPICAL ECOSYSTEMS. INITIAL EFFORTS EMPHASIZE LOCAL CONSERVATION ISSUES. ONE PRIMARY LONG-TERM GOAL IS TO MONITOR CLIMATE CHANGE AND ITS IMPACT ON MERCURY METHYLATION ON ECOSYSTEM, HEMISPHERIC, AND GLOBAL SCALES.**

*“Life celebrates itself upon the land.”*

— Jeff Fair, *Wildlife Biologist*



**Temperate Biostation  
Rangely Lakes, Maine**



The temperate biostation is the site of the longest and largest ongoing study to understand the demographics and mercury levels of the common loon in North America. BRI collaborates with NextEra Energy Resources and the Maine Department of Environmental Protection to monitor more than 200 territorial pairs of loons on the Rangely Lakes while also monitoring other species including the bald eagle, common merganser, river otter, and mink.

The tropical biostation, located adjacent to the Bladen Nature Reserve, is operated in collaboration with the Belize Foundation for Research and Environmental Education. Studies examine heavy metal cycling in terrestrial and aquatic ecosystems of the tropics and the long-term effects of climate change on mercury bioavailability.



**Tropical Biostation  
Bladen Nature Reserve, Belize**

*“BRI’s assessment of mercury exposure spans our research programs. There is a critical need to continue to monitor mercury in the environment.”*

—David Evers, Executive Director

**MERCURY POLLUTION IS WIDESPREAD;** this contaminant knows no borders. Since its inception, BRI has been a leader in research designed to understand the fate and impact of mercury in our environment.

Mercury concentrations in fish and wildlife in the U.S. now routinely exceed human and wildlife health thresholds. At present, scientists must rely on limited information to understand and quantify the critical linkages between mercury emissions and environmental response and potential human health concerns. Mercury policy development, implementation, and assessment require substantially improved mercury monitoring.

BRI has been actively working with an expansive network of mercury scientists

around the world to develop plans for an effective national mercury monitoring network.

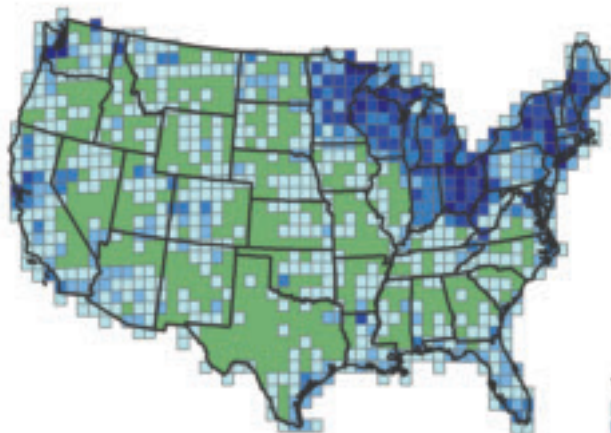
To that end, the Institute has developed several mercury monitoring networks that link research programs and provide an arena for shared methods. BRI is also a storage house for mercury data in North America. The organization currently coordinates four research networks:

**GLMMR** – Global Loon Mercury Monitoring Research Network

**TERRA** – Terrestrial Ecosystem Research Assessment Network

**MercNet** – tracking mercury in air, land, and water

**Global Mercury Data System** – determining mercury hotspots



THE MAP AT LEFT DISPLAYS THE NUMBER OF BIOTIC Hg SAMPLES WITHIN EACH 50 MILE GRID ACROSS THE U.S. DATA INCLUDES FISH, BIRD, MAMMAL, INVERTEBRATE, AMPHIBIAN, AND REPTILE SAMPLES. THERE ARE A TOTAL 190,893 MERCURY SAMPLES ACROSS THE U.S., MAINLY FROM FISH (145,948 SAMPLES). THE DARKER BLUE GRID CELLS REPRESENT LOCATIONS WITH GREATER MERCURY SAMPLES AVAILABLE. AREAS OF THE COUNTRY WITHOUT A GRID CELL (DEPICTED IN GREEN) REFLECT AREAS WHERE BRI HAS NO AVAILABLE MERCURY DATA.

Total Number of Biotic Hg Samples per 50 mile grid

0 - 50	501 - 1000
51 - 200	1001 - 5000
201 - 500	

## Laboratory Capabilities

After a decade researching mercury contamination in wildlife, BRI established its own mercury lab. Samples, analyzed for total mercury, provide mercury concentration (in parts per million) in feathers, fur, blood, muscle biopsies from fish, talon tips, whole mollusks (mussels and snails) and arthropods (insects, spiders, and amphipods).

In addition to its own laboratory capabilities, BRI has established relationships with distinguished labs for specialty work:

### Mercury and Metals

- Texas A&M
- University of Connecticut
- Wright State University
- Dartmouth College

### Stable Isotopes

- Boston University
- University of Florida
- University of Washington
- Northern Arizona State

### Genetics

- Buffalo State University
- University of New Hampshire

### PAH5

- University of Connecticut

### Organics

- Texas A&M
- Wadsworth Center

### SPECIES MOST AT RISK TO MERCURY EXPOSURE

- COMMON LOON\*
- IVORY GULL
- RUSTY BLACKBIRD\*
- SALTMARSH SPARROW\*
- FLORIDA PANTHER
- INDIANA BAT\*
- GREAT HAMMER-HEAD SHARK\*
- WALLEYE
- RIVER OTTER\*
- WOOD STORK

\*BRI research includes these species



KEVIN REGAN MANAGES BRI'S MERCURY LAB.



ABOVE: KATE WILLIAMS WEIGHING A BLACK-THROATED BLUE WARBLER IN THE FIELD. RIGHT CLOCKWISE FROM TOP: A NORTHERN SAW-WHET OWL IN HAND; A BANDED BALD EAGLE DISPLAYING A SATELLITE TRANSMITTER; BIOLOGISTS INSTALL A TINY TRANSMITTER ON A LITTLE BROWN BAT, WHICH ALLOWS RESEARCHERS TO STUDY FLIGHT PATTERNS.

*“There are key information gaps for understanding potential impacts of marine wind power development.”*

— Kate Williams, Program Director

**A COYOTE’S LONE CRY**

punctuated the black night as the two biologists hiked the wooded trail, parkas tightly zipped against the cold October air. They had been trekking this route every hour since dusk, winding their way to the mist nets they had set up earlier in the day. Once at a net, they slowly walked along its 36-foot length. When they discovered a northern saw-whet owl lying passively in one of the net pockets, they worked quickly, expertly untangling, banding, sampling, and measuring the tiny raptor in just minutes.

Since 2009, BRI wildlife biologist Kate Williams and others have studied the migration and movement patterns of birds and bats over the Gulf of Maine and elsewhere on the Atlantic coast. BRI biologists have documented that migratory owls fly over open water, taking advantage of islands as stopover sites, and that migratory falcons will fly hundreds of miles out over the

Atlantic on their way south to the Caribbean and South America.

This information begs a host of questions about how migrating birds and bats might be affected by offshore structures, such as wind turbines. Careful siting of renewable energy development seems to play a key role in minimizing impacts to wildlife,



Photo Credit: Len Medlock



Photo Credit: Tony Oppersdorf



but this requires detailed knowledge of where animals breed, winter, and migrate. To address this need, BRI has established a wildlife and renewable energy program, and has become involved in several areas of wind power research and marine spatial planning in the eastern United States.



*“BRI’s ability to respond quickly to the Deepwater Horizon oil spill is a testament to the organization’s agility and capacity for conducting science.”*

— Catherine Flegel, Ph.D., *NRDAR Projects Director*



*“A fire and explosion occurred at approximately 11:00 pm CDT, April 20, 2010 on the DEEPWATER HORIZON, a semisubmersible drilling platform...located some 50 miles southeast of the Mississippi Delta.”*

*Incident News*  
NOAA’s National Ocean Service

On April 26, 2010, BRI was called upon by the U.S. Fish and Wildlife Service to play a pivotal role in assessing the impact of the oil spill in the Gulf of Mexico. BRI’s long-standing work with the Service’s Natural Resource Damage Assessment and Restoration (NRDAR) program, which includes the assessment of mercury and oil contamination at NRDAR sites in New England and the Midwest, provided the scientific and logistical platform for BRI to rapidly respond with more than 60 biologists in the Gulf.

Under challenging conditions, BRI staff assessed oiling rates, individual survival through telemetry, and avian health.

As Gulf work continues, BRI works cooperatively with federal and state governments to assure that any injury to the natural resource is well documented.

BRI’s Gulf work is part of the first step in the NRDAR process that ultimately seeks to restore natural environments impacted by human activities.



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook



Photo Credit: Dan & Ginger Poleschook

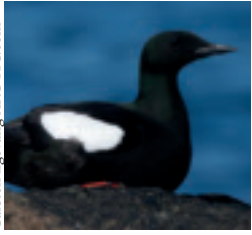
OPPOSITE PAGE: AMERICAN WHITE PELICANS OVERWINTERING IN AREAS IMPACTED BY CRUDE OIL. (PHOTO: DAN POLESCHOOK). THIS PAGE, CLOCKWISE FROM TOP RIGHT: SETH WILE RELEASES A BROWN PELICAN AFTER FITTING IT WITH A TRANSMITTER; LISA EGGERT ASSESSES COLONIAL WATERBIRDS WHILE MELISSA DURON RECORDS DATA; EVAN ADAMS WORKS AT A FIELD SITE; CATHERINE FLEGEL MANAGES BRI’S NRDAR PROJECTS INCLUDING ALL FIELD OPERATIONS IN THE GULF; LIZZIE GODRICK AND JOHN DIENER REVIEW DATA SHEETS IN GULF WATERS.

# Responding to a Crisis

Dan & Ginger Polschook



Carsten Egevang ARC-PIC.com



Samuel Blanc Arkive.org



SEABIRD SPECIES INCLUDE, FROM TOP: NORTHERN GANNET, BLACK GUILLEMOT, AND WILSON'S STORM PETREL.

*“Romantic notions of the sea belie the hardships and challenges facing those who spend most of their lives on the open ocean.”*

— Iain Stenhouse, Ph.D., Program Director

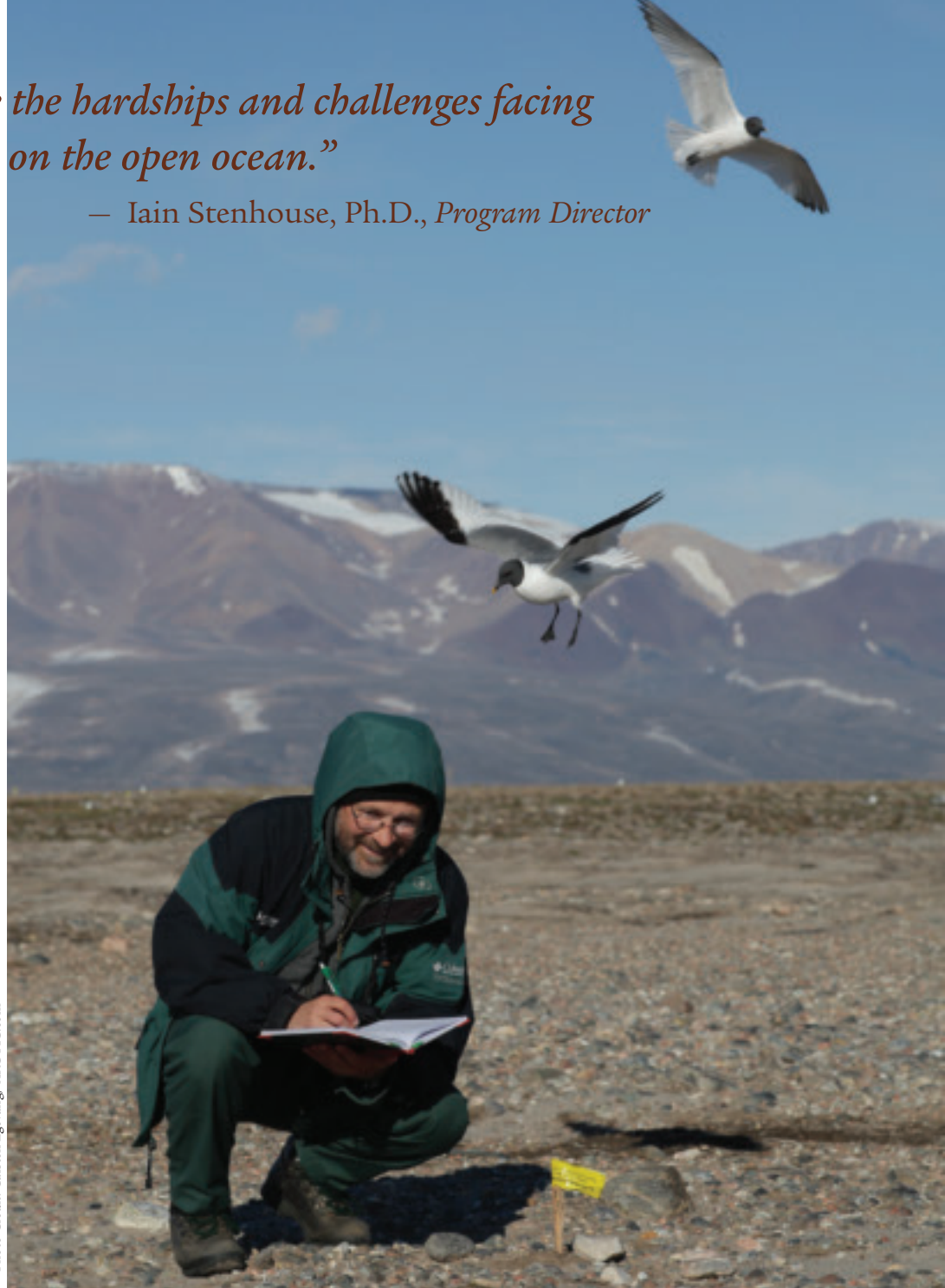
**MARINE BIRD BREEDING COLONIES**, the temporary homes for sometimes hundreds of thousands of individuals, are magical places, where life and death not only sit shoulder to shoulder, they stare you in the face and dare you to remain a detached observer. For Iain Stenhouse, who grew up in the proud seafaring nation of Scotland, spending time in these colonies, with their constant commotion, deafening noises, and pungent odors has become an important part of his own and BRI's story.

Marine birds face enormous challenges on a daily basis; the conservation status of seabirds is deteriorating faster than that of any other bird group. Traditionally, researchers could only study marine birds, particularly pelagic seabirds, at these breeding sites; it was practically impossible to follow birds when they migrated far out to sea. However, advances in tracking technologies have opened windows into the mysterious lives of birds who call the ocean home.

With the development of its marine bird program, BRI is poised to address emerging environmental issues such as the development of offshore energy production and marine spatial planning. Predicting the impacts of these, and how seabirds will fare under cumulative pressures, especially in this age of climate change, is a major focus for the program.

**IAIN STENHOUSE RECORDS DATA ON THE BREEDING SUCCESS OF A PAIR OF SABINE'S GULLS IN NORTHEAST GREENLAND. THESE BIRDS, RECENTLY RETURNED FROM THE BENGUELA UPWELLING REGION OFF THE COAST OF SOUTH AFRICA WHERE THEY SPEND THE WINTER MONTHS, AVERAGE AN ANNUAL MIGRATION OF OVER 19,000 MILES.**

Photo Credit: Carsten Egevang, ARC-PIC.com



# 2010 – Marine Bird Program



Dan & Ginger Poleschhook



Dan & Ginger Poleschhook



COASTAL BIRDS FROM LEFT: BROWN PELICAN, A PAIR OF BLACK SKIMMERS, ROYAL TERN.

*“There is a delicate balance of life played out in coastal habitats. It is a joy to be a part of it.”* — Lisa Eggert, Program Director

**EXPANSIVE MARSHES**, sandy beaches, nearshore islands—areas where land meets sea provide habitat critical for coastal birds throughout the year. Within the dynamic coastal system, terns, gulls, pelicans, skimmers, and shorebirds find the resources needed for breeding and migration. Breeding colonies and foraging areas, where birds can number in the thousands, are an incredible sight to see. But along our coasts, these species are at risk due to natural and human-induced changes to the environment, including habitat loss, pollution, and human disturbance, as well as the wider-ranging impacts of global climate change.

Recently, the vulnerability of coastal birds was on display during the Deepwater Horizon oil spill. Also showcased during the aftermath of the spill was BRI’s ability to lead research on the health, behavior, and movements of coastal birds. Using new techniques and technologies to expand what is possible with their research, BRI biologists will continue to study the conservation challenges faced by coastal birds. Through this program, BRI hopes to better understand and predict how coastal birds respond to changes in their environment and to ultimately contribute to healthier coastal ecosystems.



TOP: RESEARCHERS PROCESS CAPTURED BIRDS DURING A STUDY OF BEACH-NESTING BIRDS. BOTTOM: BRI RESEARCHER JENNIFER GOYETTE, ASSISTED BY KATIE MONTGOMERY, REMOVES A SKIMMER FROM THE MIST NET. LEFT: BEACH NESTERS ARE VULNERABLE TO HUMAN DISTURBANCE. RIGHT: LISA EGGERT OBSERVES SHOREBIRDS AND OTHER COASTAL SPECIES IN THE GULF OF MEXICO.

Photo Credit: Dan & Ginger Poleschhook



# Coastal Bird Program— 2010



**IN A ONE-DAY** marathon, four staff biologists work in a choreographed rhythm, weighing, measuring, recording, and cracking open unhatched loon eggs sent to the BRI lab from around the country. Technicians then analyze the egg contents to determine mercury levels. BRI's pioneering loon research over the past two decades has yielded a wealth of data that have provided conservationists with critical information on how best to protect these birds and the environments they inhabit.

Jim Paruk joined BRI in January 2011 as the first director of the International Center for Loon Conservation to expand BRI's research to include additional species, such as red-throated loons, and to examine emerging threats to loon conservation, such as climate change. The Center also is building collaborations with loon researchers in Europe and Russia. Paruk heads a staff of five to coordinate efforts domestically and internationally. New initiatives include monitoring movements of offshore wintering red-throated loons along the Atlantic seaboard and studying the winter ecology of common loons in the Gulf of Mexico.



Photo Credit: Dan & Ginger Poleschook

*“Loons inspire people to learn more about them, which is a good thing because it leads to an understanding of why conservation is important.”*

— Jim Paruk, Ph.D., *Director*

ABOVE LEFT: UNHATCHED LOON EGGS ARE PROCESSED AT BRI. ABOVE RIGHT: JIM PARUK RELEASES A JUVENILE COMMON LOON. FAR RIGHT: DAN POLESCHOOK AND MIKE CHICKERING BAND A COMMON LOON. NEAR RIGHT: KATE TAYLOR COORDINATES BRI'S LOON INITIATIVES.



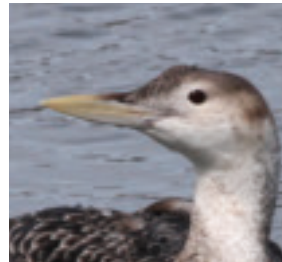
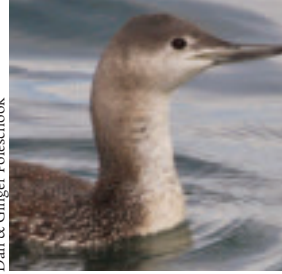
# International Center for Loon Cons



Photo Credit: Dan & Ginger Poleschok



Dan & Ginger Poleschok



LOON SPECIES FROM TOP:  
RED-THROATED LOON,  
YELLOW-BILLED LOON,  
COMMON LOON,  
ALL IN WINTER  
PLUMAGE.

Photo: Dan & Ginger Poleschok



TOP: DARWIN LONG WORKS ON  
A WINTERING COMMON LOON TELEMETRY  
STUDY IN THE GULF OF MEXICO.  
BOTTOM: BRI FIELD CREW TEST A  
DAY CAPTURE TECHNIQUE FOR THE  
ARCTIC. RIGHT: CARRIE OSBORNE  
HOLDS A LOON CHICK.



# Wildlife Health Assessment Program



*“Health of wildlife indicates the health of the ecosystem.”*

— Nina Schoch, DVM  
Program Director

Veterinarian Nina Schoch is BRI’s coordinator for the Adirondack Center for Loon Conservation in New York, and director of BRI’s wildlife health assessment program. Building on health assessments of Adirondack loons and of waterbirds affected by the Deepwater Horizon oil spill, this innovative new program will provide ecotoxicological and conservation medicine expertise, contributing to a comprehensive understanding of the biotic response to environmental pollutants and expanding awareness of the interconnections of human, wildlife, and ecosystem health.

Dr. Schoch and her highly experienced veterinary staff are conducting research and collaborating with wildlife health professionals to develop this exciting new program. Initiatives include developing a wildlife health assessment rapid response team; assessing physiologic effects of possible oil exposure to



loons and gannets that wintered in the Gulf; investigating effects of flame retardants on marine mammals; and conducting raptor health assessment and ecotoxicology studies in South Africa.

# Conservation and Research

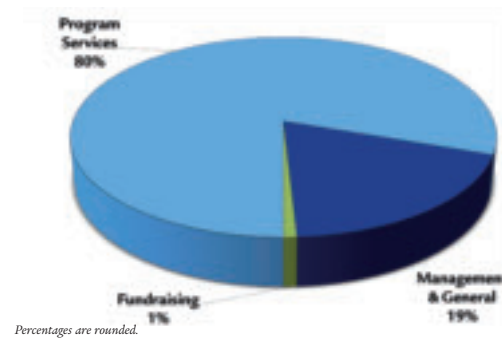
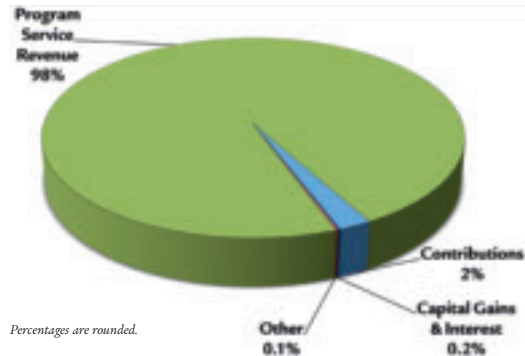
# BRI Financial Statement for Fiscal Year Ending 4/30/10

## TOTAL OPERATING SUPPORT & REVENUE

<b>Total Operating Support &amp; Revenue</b>	<b>\$1,983,161</b>
Program Service Revenue	\$1,932,646
Contributions	\$44,430
Capital Gains & Interest	\$3,235
Other	\$2,850

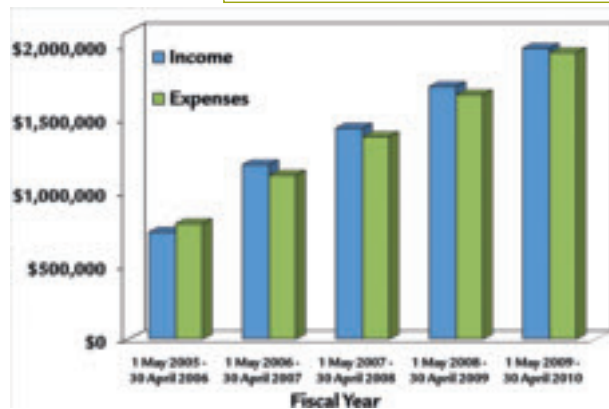
## TOTAL PROGRAM EXPENSES

<b>Total Operating Expenses</b>	<b>\$1,953,798</b>
Program Services	\$1,569,121
Management & General	\$367,558
Fundraising	\$17,119



## FIVE-YEAR FINANCIAL SUMMARY

Fiscal Year	Income	Expenses	YE Assets	YE Liabilities	Equity	% Annual Revenue Growth
5/1/05 - 4/30/06	\$728,211	785,833	621,558	491,222	130,336	
5/1/06 - 4/30/07	\$1,187,591	1,116,966	591,676	390,714	200,962	39
5/1/07 - 4/30/08	\$1,438,669	1,381,052	708,286	449,708	258,578	17
5/1/08 - 4/30/09	\$1,721,696	1,666,760	749,403	450,664	298,739	16
5/1/09 - 4/30/10	\$1,983,161	1,953,798	806,568	478,466	328,102	13



## NOTES REGARDING FINANCIAL ACTIVITIES ENDING 4/30/2011

After a decade of consistent annual revenue growth, BRI witnessed unprecedented growth last fiscal year. Gross revenue grew exponentially to more than \$11 million dollars. Much of this growth was directly related to program revenues generated by the Deepwater Horizon oil spill in the Gulf of Mexico. BRI is playing a key role in efforts to help determine the impacts of the spill on birds in the region. Audited financial statements for this period are not yet completed.

## FOUNDATION SUPPORT

- Bank of America Charitable Foundation
- The Bailey Wildlife Foundation
- Davis Foundation
- Foundation for a Sustainable Future
- Freed Foundation
- The Fuller Foundation, Inc.
- Henry Foundation
- Horizon Foundation
- Hubbard Brook Research Foundation
- Jessie B. Cox Charitable Trust
- Maine Community Foundation
- The Maine Outdoor Heritage Fund
- Munson Foundation
- National Fish and Wildlife Foundation
- New England Forestry Foundation
- Oak Foundation
- The Ocean Foundation
- Oceana, Inc.
- Orchard Foundation
- Seaman-Goes Family Foundation, Inc.

*This list recognizes supporters over the past 10 years of BRI's operation and is not comprehensive.*

## BIODIVERSITY RESEARCH INSTITUTE

WOULD LIKE TO THANK ALL OF ITS SUPPORTERS INCLUDING FEDERAL AND STATE GOVERNMENTS, AS WELL AS PRIVATE, CORPORATE, AND NON-PROFIT GROUPS.



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

*“BRI’s work is vital. It is through high quality, reliable data and analysis that society makes informed decisions. I am a member of the board because I support BRI’s mission, and I want to contribute to a sustainable future.”*

*—Jean Gulliver, Board Chair*

## BOARD OF DIRECTORS



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Unless specified, all photos are from BRI’s archives. We are committed to utilizing environmentally friendly printing processes in the production of our materials whenever possible.

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Dr. Tim Tear, The Nature Conservancy  
Harry Vogel, The Loon Preservation Committee  
Dr. Jim Wiener, University of Wisconsin  
Dr. Mark Woodrey, Mississippi State University

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Lee Attix, Chief Operating Officer  
Wing Goodale, Deputy Director  
Jonathan Atwood, Science Director

### SCIENCE

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Carl Anderson, Field Telemetry Manager  
Pedro Ardapple, Mammal Program Field Coordinator  
Michelle Brown, Field Biologist  
David Buck, Tropical Program Director  
Mike Chickering, Maine Loon Field Coordinator  
Christopher Desorbo, Raptor Program Director  
Timothy Divoll, Tropical Program Field Coordinator  
Melissa Duron, QA/QC Manager  
Samuel Edmonds, Wetland Bird Program Field Coordinator  
Lisa Eggert, Coastal Bird Program Director  
Jonathan Fiely, Field Biologist  
Catherine Flegel, NRDA Projects Director  
Andrew Gilbert, Data Management Director  
Jennifer Goyette, Coastal Bird Field Coordinator  
Richard Gray, Raptor Program Field Coordinator  
Shaylyn Hatch, Permit, Band, Sample Manager  
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Jennifer McKay, Data Assistant

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Chris Persico, Loon/Raptor Field Biologist  
Marie Perkins, Shorebird and Rail Program Manager  
Daniel Poleschook Jr., Chief Photo Manager  
Kevin Regan, Mercury Lab Manager  
Lucas Savoy, Waterfowl Program Director  
Nina Schoch, Wildlife Veterinarian  
Bryan Sigel, Oiling Rate Project Coordinator  
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Madeline Turnquist, Ecological Analyst  
Seth Wile, Field Biologist  
Kathryn Williams, Wildlife and Alternative Energy Program Director  
Dave Yates, Mammal Program Director


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Kristin Hanegan, Accounting Administrator  
Lynn Marchilli, Payroll Administrator  
Deborah McKew, Director of Communications  
Cindy O’Connell, Executive Assistant  
Tina Ouellette, Finance & Accounting Manager  
Coleen Plummer, Finance Administrator  
H. Bruce Rinker, Director of Scientific Advancement and Development  
JoAnne Wood, Office Administrator

### ADJUNCT BIOLOGISTS

Jeff Fair, Al Hinde, Kathy Lambert, Ken Meyer, Ken Wright, Mike Yates

# Staff and Advisors



*“The beauty and genius of a work of art may be reconceived, though its first material expression be destroyed; a vanished harmony may yet again inspire a composer; but when the last individual of a race of living beings breathes no more, another heaven and another earth must pass before such a one can be again.”*

—William Beebe, *The Bird*, 1906