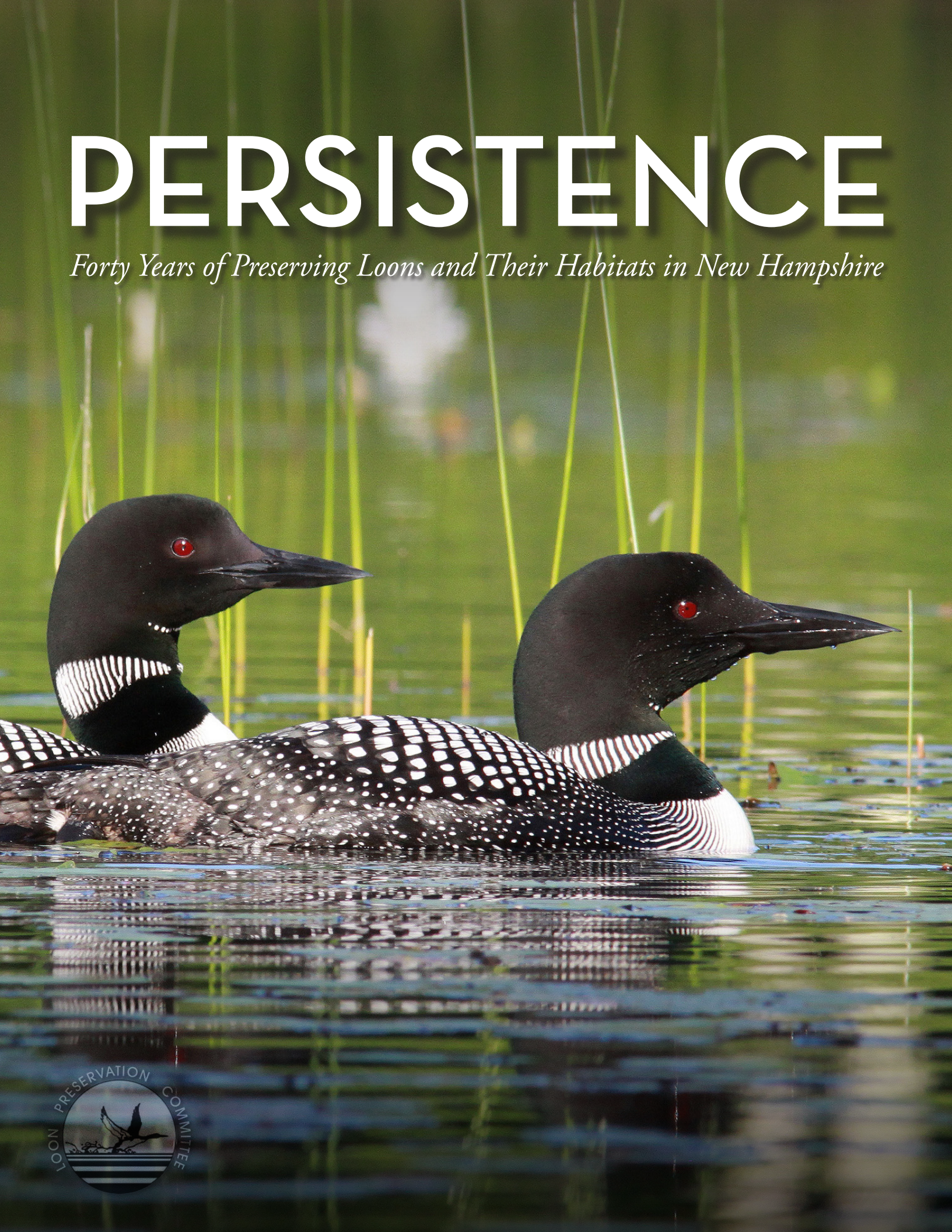
PERSISTENCE

Forty Years of Preserving Loons and Their Habitats in New Hampshire



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PERSISTENCE

FORTY YEARS OF PRESERVING LOONS AND THEIR HABITATS IN NEW HAMPSHIRE

THE MISSION

The Loon Preservation Committee exists to restore and maintain a healthy population of loons throughout New Hampshire; to monitor the health and productivity of loon populations as sentinels of environmental quality; and to promote a greater understanding of loons and the natural world.

The Loon Preservation Committee gratefully acknowledges the Preston Family Fund of the New Hampshire Charitable Foundation for funding LPC's 40 Year Report.

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This report is dedicated to thousands of Loon Preservation Committee volunteers, whose efforts over 40 years have shown that coordinated and thoughtful action can reverse the decline of a threatened species.

Message From the Chair

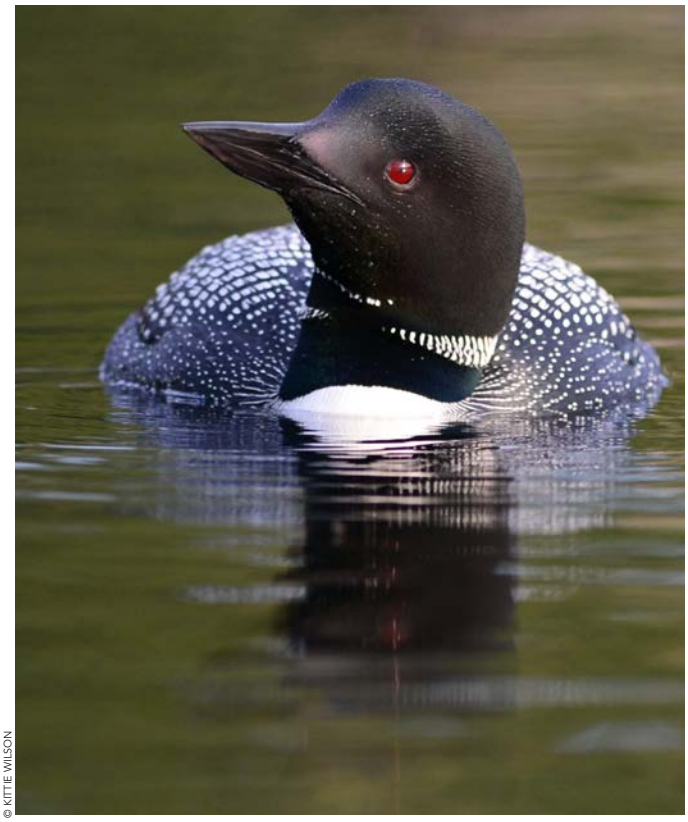
I first became aware of the Loon Preservation Committee (LPC) in the late 1970's when my in-laws served as program directors at Geneva Point Center. They would host presentations by LPC staff for the various conferences held at the Center. Once we moved to Moultonborough, my wife Nan and I both became involved with LPC. Beginning in the mid-1990's, I served two terms on what was then known as the LPC Policy Committee. At that time, LPC was a self-funded project of NH Audubon.

In 2006, with Audubon's blessing, LPC was reorganized as an independent constituent organization of NH Audubon. At this time, the LPC Policy Committee became the Board of Trustees. In 2012, again with the concurrence of Audubon, LPC became a separate non-profit membership corporation affiliated with NH Audubon.

I returned to the LPC Board as a trustee in 2011 and have had the honor of serving as Chair since 2013. During my years working with LPC, I have learned a lot. First, and foremost, the science has become more complex (and expensive) than was ever imagined four decades ago when LPC Founder, Rawson Wood, began our journey to restore and maintain a healthy population of loons throughout New Hampshire. In the early years, we were primarily concerned with understanding the reasons for nest failures and the effects of a few contaminants such as mercury and lead. Today we are looking at the effects on loons of many more contaminants, including flame retardants, stain repellants, pesticides, trace elements, and many other challenges.

Second, we couldn't have accomplished what we have without our many collaborators. Included here are the Cummings School of Veterinary Medicine at Tufts University, Plymouth State University, University of New Hampshire, Biodiversity Research Institute, US Fish & Wildlife Service, NH Fish & Game, NH Department of Environmental Services, NH Audubon and the Lakes Region Chapter of NH Audubon, Squam Lakes Natural Science Center, Squam Lakes Association, and NH Lakes Association among many others.

Also, it would be impossible to continue our work without the hundreds of members, volunteers and donors supporting LPC each year with their time, talent and treasure. Volunteers help at The Loon Center and with LPC's monitoring program and the annual Loon Census. They also help with the many LPC events such as the Summer Luncheon,



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Loon Festival, Carl R. Johnson Memorial Golf Tournament, Holiday Open House, Squam Lake Swim, and Yakking for Loons. Our members and donors are the lifeblood of our major initiatives, including the Loon Recovery Plan and the Squam Lake Loon Initiative.

Finally, I would especially like to recognize and thank our highly-motivated and hard-working staff and Board of Trustees. In the 20 plus years I have been involved with LPC, the number of loon pairs in New Hampshire has nearly doubled while our staff has only increased modestly. Because of the ever-increasing complexity of the science and the increasing number of loons to be monitored and protected, the workload for the staff has increased exponentially. Our Board of Trustees has stepped up to the plate to accept LPC's increased responsibilities as an independent organization. I am grateful for the energy and commitment of all our Board committees as they carry out their responsibilities in support of our staff.

Ronald A Baker

Message From the Senior Biologist/ Executive Director

Dave Hammond, the Loon Preservation Committee's first director, bought LPC's first "new" motorboat in 1976 – a beat-up fiberglass tri-hull with an ancient motor that put out 110 decibels of sound, measured from the driver's seat, and dumped a third of its fuel unburned into Lake Winnipesaukee when it didn't stall at idle. There was only one loon chick to keep track of on Winnipesaukee that year, but equipment limitations could not have helped in that task.

That boat was followed by an impressive assortment of decrepit vessels with well-used motors, some of which burned up, literally, as a fledgling LPC struggled to assist a remnant of a loon population in danger of winking out for good. The yearly budget was $5,000 back then, almost all of it fronted by LPC's founder, Rawson Wood. Hammond, a retired NH Fish & Game Conservation Officer, kept in touch with LPC biologists through a CB radio mounted in a "field office" – an ell between his house and barn in Moultonborough – that served as LPC Headquarters in those days.

It was a shaky beginning for a daunting undertaking with no assurance of success and maybe even some expectation of failure; after all, no one had tried anything remotely like it before. At least one prominent New Hampshire wildlife biologist gave LPC all of three years before it was relegated to the dust heap of good intentions.

The things we didn't know about loons in those days could fill a book – they still could today – but with many missteps and setbacks, LPC's stubbornly persistent staff and a growing corps of dedicated members and volunteers began to make a dent in the issues facing loons. We floated nesting rafts made of wood and mud to mimic loon nesting habitat, and loons took to our rickety rafts and began to hatch chicks from them. We put signs around nesting loons to protect them from the close approach of people, researched threats and ways to counter them, and talked to anyone who would listen about loons and their challenges. Those were simpler times in some ways, with simpler problems: flame retardants, stain-repellant chemicals, and climate change still lay far in our future.

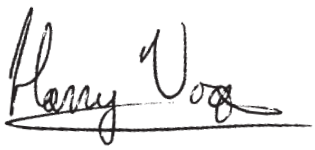
LPC staff, 1978 (top to bottom): Ralph Kirshner, Ann Levandowski, Jeff LeBaron, Mary Hall, Karen Parker, Scott Sutcliffe.

Over the years we lost good friends of loons and LPC, but we carried on to honor their care and commitment to a worthy cause.

Today, our research represents the longest and most complete study of any loon population, a record which becomes more valuable with each passing year. Our management is recognized as the most comprehensive, innovative, and successful of loon conservation efforts anywhere, and our educational activities have helped to fundamentally change the way people view loons and the natural world. We have plenty of loons in our freezers or under glass at The Loon Center as proof of our failures to save them from their various and increasing trials. But we also have a growing number of loons on our lakes – more than three times as many as when we started – as evidence of our successes.

As we've learned about our loons and their challenges, we've discovered that they are uniquely able to illuminate threats to other wildlife and to the aquatic environments on which we all depend. This insight led us to expand LPC's mission over time to monitor the health and productivity of loon populations as sentinels of environmental quality. Today we are working on projects, and with partners, that we could hardly have imagined at the start of our efforts to preserve loons.

It's gratifying to see our work recognized by our peers and our elected officials (see next page) – but our most important affirmations have always come from you, our members and friends. We have many challenges ahead; but, with your continued support, I am confident that the efforts described within this report will preserve the wild call of the loon in New Hampshire.



The State of New Hampshire
By Her Excellency
Margaret Wood Hassan, Governor

A Commendation

LOON PRESERVATION COMMITTEE

WHEREAS, Loons are an iconic and beloved symbol of New Hampshire's natural landscape; and

WHEREAS, Forty years ago, a small group of concerned citizens founded the Loon Preservation Committee in response to a dramatic and ongoing decrease in the loon population of New Hampshire; and

WHEREAS, The Loon Preservation Committee has more than tripled the number of loons in the wild by employing sound science and innovative management of loon populations; and

WHEREAS, The Loon Preservation Committee has created a comprehensive record of New Hampshire's loon population and provided researchers with an invaluable resource to increase our understanding of loons and other threatened or endangered species; and

WHEREAS, The Loon Preservation Committee has worked diligently to educate the public and the New Hampshire Legislature about factors affecting loons and to create an environment in which loons and people can thrive together in New Hampshire; and

WHEREAS, The unyielding efforts of the Loon Preservation Committee have led to policies to protect our loons, including legislation to limit pollution from power plants and a first-in-the-nation ban on the sale and use of small toxic lead fishing sinkers and lead-headed jigs; and

WHEREAS, The success of the Loon Preservation Committee in carrying out its mission and demonstrating that it is possible to reverse the decline of a threatened species has led to numerous other organizations created on the Loon Preservation Committee's model of integrity and outstanding work to preserve loons; and

WHEREAS, Loons in New Hampshire and throughout the northeast face growing challenges and addressing them will require continued efforts that build upon past successes;

NOW, THEREFORE, I, MARGARET WOOD HASSAN, GOVERNOR of the State of New Hampshire, do hereby join with the citizens of New Hampshire to honor the **LOON PRESERVATION COMMITTEE** for 40 years of leadership in the protection and recovery of one of New Hampshire's iconic native species and thank all those involved with the committee for their efforts to preserve the natural beauty that is critical to our state's high quality of life.

Given this 22nd day of June, in the year of Our Lord two thousand and fifteen, and the independence of the United States of America, two hundred and thirty-nine.

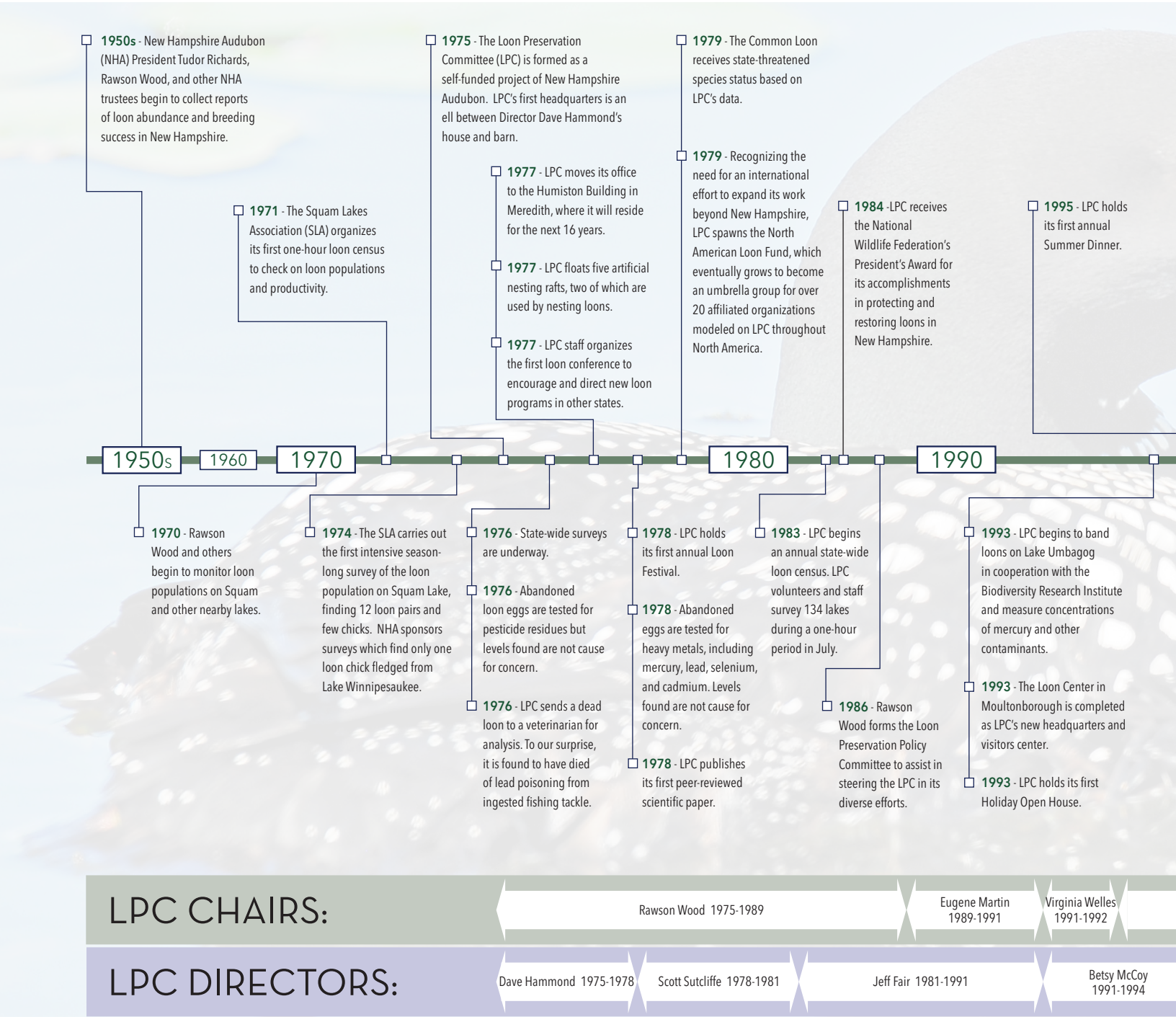
Maggie Hassan

Margaret Wood Hassan
Governor

THE BEGINNING

The Loon Preservation Committee was created in 1975 in response to dramatically declining loon populations and productivity and concerns about the effects of human activities on loons. Our founders reasoned that if human activities had played a role in those declines, then human activities, if they were thoughtful and coordinated, could reverse them.

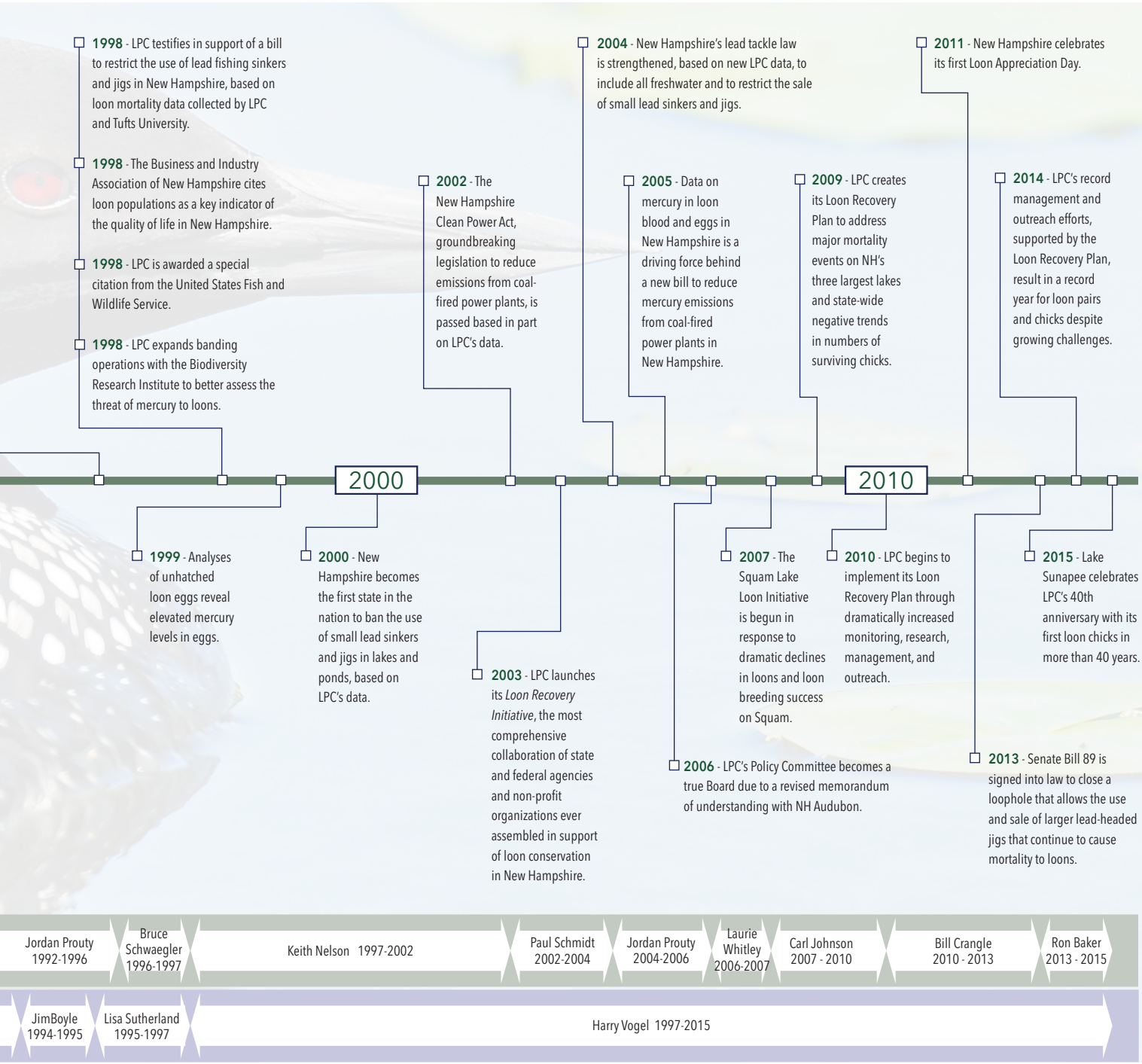
In part, these declines were due to our lack of knowledge of loons and their needs and the ways in which we could encourage our loon populations. The first loon to be found dead with an ingested lead fishing sinker, our first nesting raft, and the first intimation that mercury or



other contaminants were problems for our loons were still years in the future. But we were beginning to learn about the challenges facing loons and the ways in which we could help loons persist on New Hampshire's landscape.

The Common Loon was listed as a state-threatened species in 1979 based on LPC's monitoring data. As we improved our knowledge of the needs of loons, their numbers slowly and tentatively began to rise. Today our lakes hold more than three times as many loons as were present at that quiet point in New Hampshire's past.

The following are some of the milestones in LPC's celebrated history:



THE WORK

The Loon Preservation Committee works to preserve loons and their habitats in New Hampshire through monitoring, research, management, and public education, all fostered by an extensive network of dedicated members and volunteers. Many of LPC's initiatives to address threats to loons involve close coordination with federal and state agencies and other non-profit organizations.

"Do what you can, with what you have, where you are."
~ Theodore Roosevelt

Monitoring Loon Populations

First, seek to understand

Observation is the foundation of all good science, and LPC's work to preserve loons and their habitats begins and ends with monitoring. Counts of loon adults and chicks provide the first indication of problems with our loon population and are the ultimate measure of our success in helping loons overcome their challenges in New Hampshire.

LPC staff and volunteers monitor over 350 lakes throughout the state each year to collect data on numbers of adult loons, numbers of territorial loon pairs (pairs that defend an area of water and have the potential to produce young), nesting success, and survival of chicks. Not all of these lakes hold loons, but all of them have the potential to do so; and we are working to ensure that more of them will hold loons in the future. Our annual state-wide loon census in July mobilizes LPC's small staff and our large network of volunteers to provide a mid-season check on loon populations that complements our season-long monitoring.

With the help of our volunteers, we have kept track of virtually every territorial pair of loons in New Hampshire since the late 1970s. In the process, we have created a database of loon populations and productivity that is unequaled anywhere in the world. This database is an invaluable tool to provide insight into trends in loon populations over time and to measure our effectiveness in addressing the causes of declines in loons.

"Loons enhance our lives on lakes. We count loons, because loons count."

~ Bob Duchesne, Vice President of Maine's Penobscott Audubon Chapter

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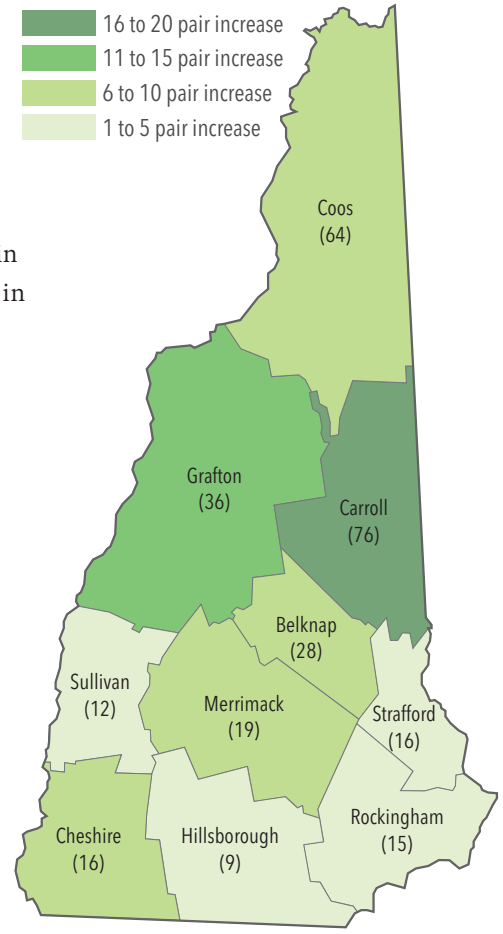
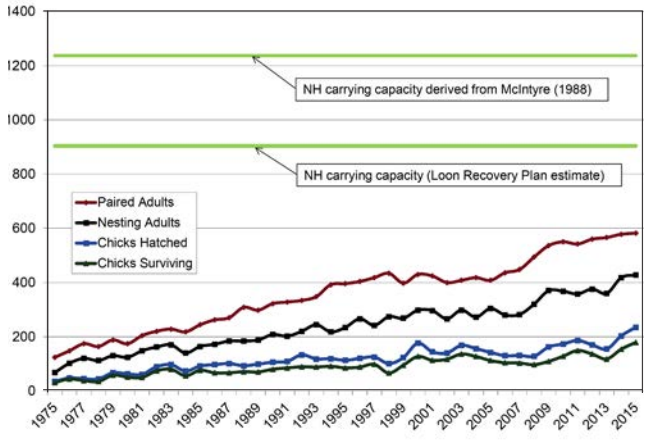
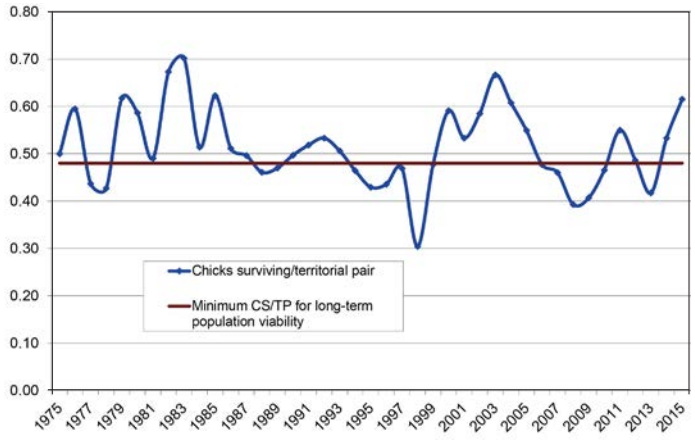


Territorial Loon Pairs by County in 2015 and Population Trends – 2006-2015



Loon Paired Adults, Nesting Adults, Chicks Hatched, and Chicks Surviving 1975-2015



Loon Chicks Surviving per Territorial Pair in New Hampshire 1975-2015

A loon with its head lowered over the nest is indicating stress, in this case caused by the close approach of people.

Research

In addition to monitoring loons, the Loon Preservation Committee conducts research to learn about loon life history, the severity and extent of challenges facing loons, and our ability to mitigate these challenges through focused management and public education.

Shoreline Development and Recreational Use of Lakes

The name "loon" is derived from the Scandinavian "lom", meaning clumsy or lame – a reference to their limited mobility on land thanks to legs that are made for swimming rather than walking. For that reason, loon nests are always built at the water's edge. Development of lake shorelines and recreational pressures on lakes can displace loons from traditional nesting sites and have been implicated in declines in loon abundance and breeding success. LPC is working to determine the effects of these changes on loons and to protect nesting sites and nursery areas for loons.

LPC digitally maps loon nesting and brooding sites using a Geographic Information System (GIS) to identify areas of important loon habitat across the state. The resulting maps are shared with the New Hampshire Department of Environmental Services and the New Hampshire Fish and Game Department. These agencies forward permit applications for shoreline alterations, dam repairs, and lake drawdowns to LPC for comment to minimize impacts on nesting loons.

LPC's efforts help ensure that development and use of our lakes is done in a way that recognizes and respects the needs of loons and other wildlife. We will continue to work cooperatively with other conservation organizations to preserve critical loon habitats through management, education, land acquisitions, and conservation easements.

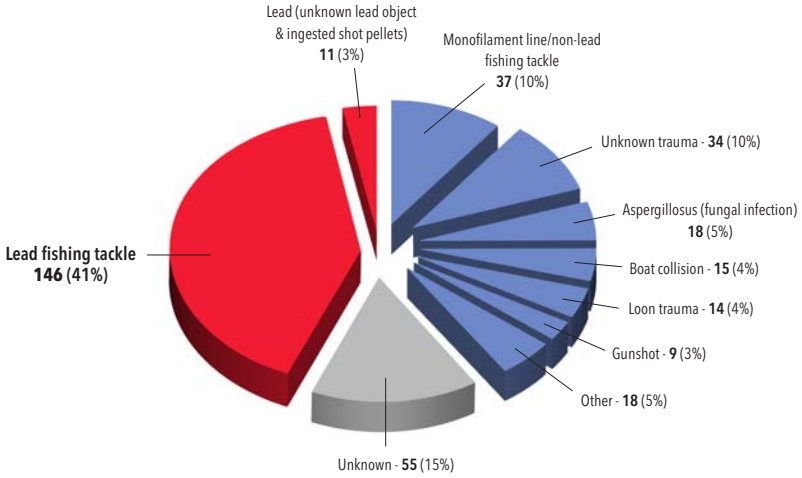
Causes of Mortality and Nest Failure

One of the best ways to discover the challenges facing New Hampshire's loon population is to determine causes of mortality of individual birds. For the past 40 years, LPC has collected dead loons and inviable loon eggs found by the public, LPC volunteers, and LPC field staff. Since 1989, the majority of necropsies (animal autopsies) on dead loons have been performed by Dr. Mark Pokras and his students at the Cummings School of Veterinary Medicine at Tufts University.

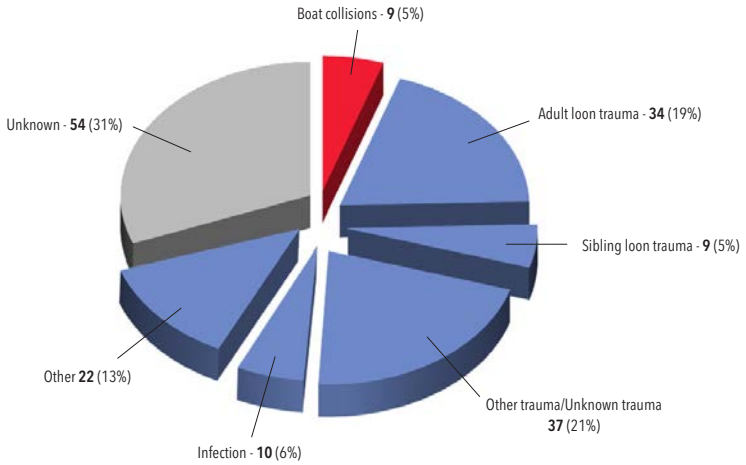
These necropsies have revealed that lead poisoning from ingested lead fishing sinkers and lead-headed jigs is by far the largest cause of known adult loon mortality in New Hampshire. Loons can swallow lead sinkers or jigs attached to a fish that has broken an angler's line, or directly from an angler's line as tackle is trolled or retrieved. Loons can also swallow lead tackle from the lake bottom along with the pebbles they ingest to help grind up and digest food. Swallowing a single lead sinker or lead-headed jig can kill a loon or other waterbird.

Young loon chicks are exposed to danger because they are small, dark, and too buoyant to dive well. The largest source of human-caused loon chick mortality is from collisions with fast-moving boats and personal watercraft. Loon chicks can also be killed by an older sibling, or by an intruding adult loon.

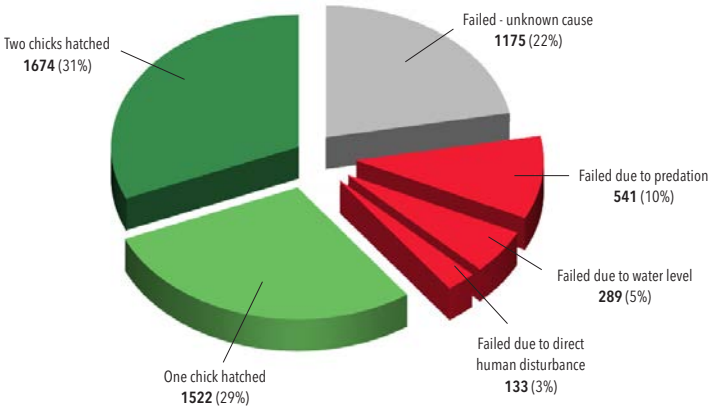
Loon nests fail for a variety of reasons. Water level rises or waves caused by storm events can flood nests, and lake drawdowns for flood control or power production can leave nests stranded and unreachable to loons. The close approach of people can cause incubating loons to abandon their nest, sometimes leading to predation of eggs by scavenging birds and mammals. LPC has begun to place motion-activated cameras around some loon nests to learn more about causes of nest failures and improve our ability to protect nests. Inviable loon eggs collected from failed nests



Causes of Adult Loon Mortality in New Hampshire, 1975-2014



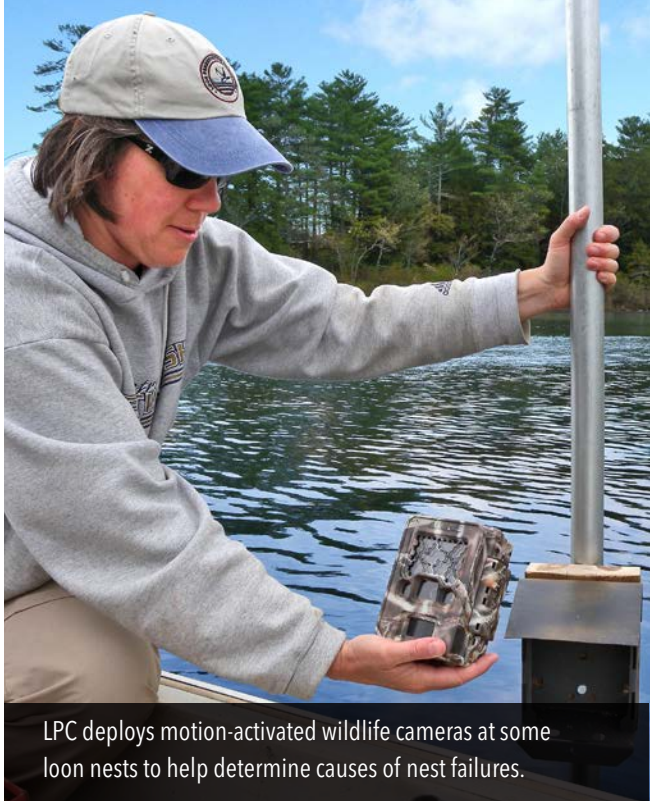
Causes of Loon Chick Mortality in New Hampshire, 1975-2014



Loon Nest Fates in New Hampshire, 1975-2014

are weighed, measured, opened, and analyzed for embryo development. Egg contents are sent to laboratories that specialize in measuring contaminants that may affect loon health and reproductive success, and LPC analyzes these results to understand the effects of contaminants on loon populations.

LPC uses data on causes of loon mortality and nest failures to understand threats facing New Hampshire's loon population and to refine our management and education efforts to address these threats and enhance protections for loons. The results of all necropsies and analyses are made available to federal and state wildlife agencies. Egg shells, egg contents, and tissue samples from loon adults and chicks are archived to be available for future reference and research.



LPC deploys motion-activated wildlife cameras at some loon nests to help determine causes of nest failures.

Banding and Tracking Loons

In 1993, LPC and the Biodiversity Research Institute in Falmouth, Maine, began placing colored bands on the legs of loons on Lake Umbagog and, beginning in 1998, on lakes throughout New Hampshire. Over the past twenty-two years, we have banded 410 loons throughout the state, each receiving a unique combination of colored bands. These bands allow us to identify and track individual loons to investigate aspects of their life history, such as life span, age at first breeding, fidelity to mates and breeding territories, and the relationship between their breeding and wintering grounds.

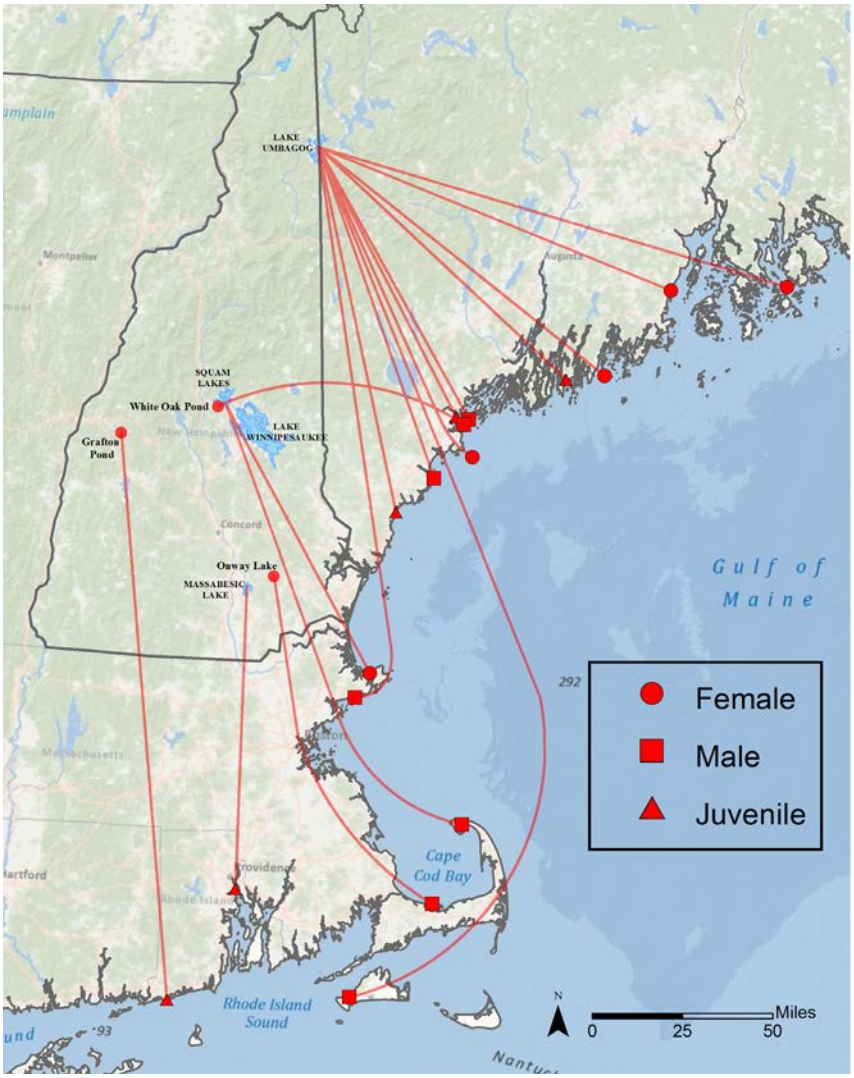
LPC places bands on loons' legs to identify and track individual loons.

Information gained from banding has provided a basis for the creation of loon population models and underscored the critical importance of adult survival in recovering a viable loon population in New Hampshire. Resightings of banded loons on the ocean have revealed that at least

some of New Hampshire's loons winter off the Atlantic coast from Maine to Rhode Island, and so remain in New England year-round. Staff biologists and the large network of LPC volunteers monitoring loons increase the chances of banded loons being sighted and reported.

The capture of loons for banding also allows the collection of blood and feather samples for analysis of toxic contaminants, stress-indicating hormones, genetic markers, blood parasites, and other disease-causing organisms.

The Sweats Meadow female loon banded on Lake Umbagog in 1993 hatched two chicks that year. Banding studies have shown that loons do not begin to breed until four years old at the earliest and average six years old at first breeding; therefore, when this loon was resighted in 2015, we knew that she was at least 26 years old and probably 28 years old or older, making her the oldest known loon in the northeastern United States.

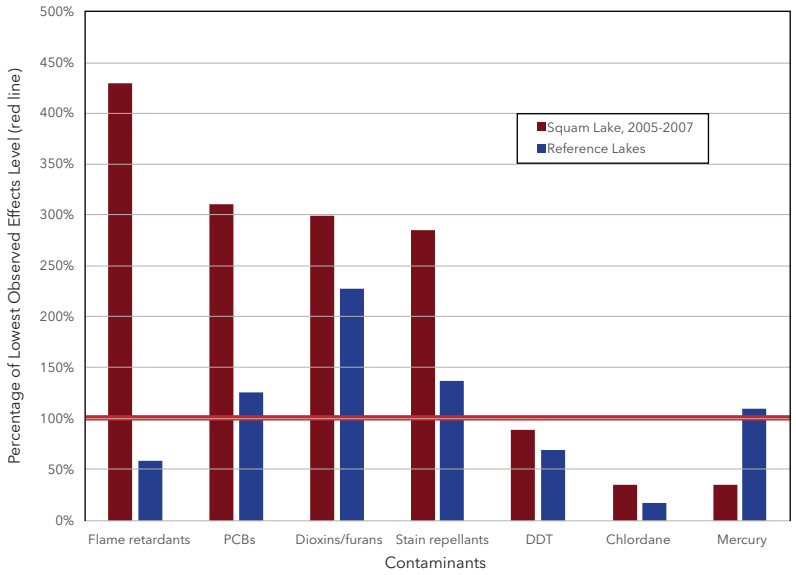


Ocean Recovery Sites for Loons Banded on Freshwater Lakes in New Hampshire

Contaminants and Pathogens in Loons

Loons are long-lived birds at the top of aquatic food webs and are therefore at risk from contaminants that bioaccumulate (increase in concentrations in animals over time) and biomagnify (increase in concentrations as they move up the food web). Mercury is a heavy metal that occurs naturally in our environment but has increased to unnaturally high levels as a result of human activities. Mercury enters our atmosphere when coal or other fossil fuels are burned to generate power, or when mercury-containing products like thermometers, batteries, electrical switches, and fluorescent light bulbs are incinerated. Mercury is a potent neurotoxin and can reach toxic levels in loons and other long-lived, fish-eating animals. Research conducted by LPC and the Biodiversity Research Institute has shown that loons in New Hampshire have among the highest concentrations of mercury recorded in loons anywhere in North America.

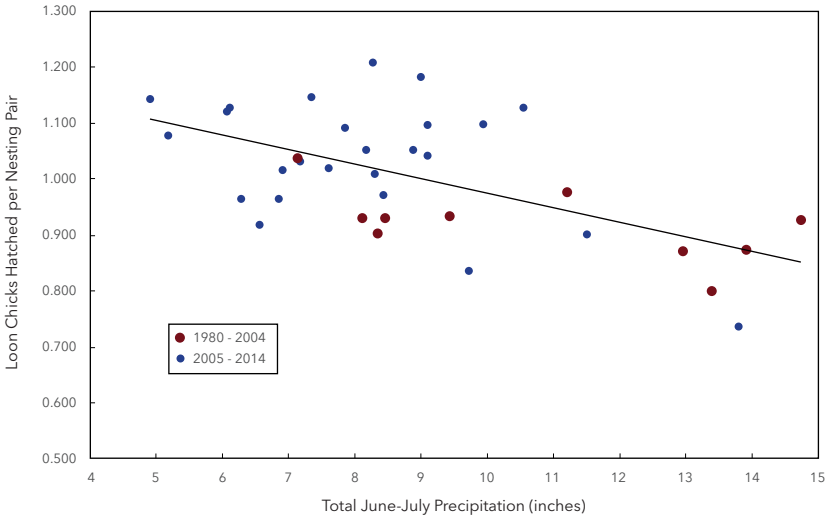
Organic contaminants also bioaccumulate and biomagnify in loons. LPC's analyses of eggs collected from Squam Lake to investigate the steep declines in loon abundance and breeding success on Squam between 2005 and 2007 are the most comprehensive ever undertaken on contaminants in loon eggs. Tested eggs contained elevated levels of PBDE's (flame retardants), PCB's (industrial cooling agents), dioxins/furans (byproducts of industrial processes), PFOS (stain repellants), and DDT and chlordane (insecticides). In many cases these contaminants exceeded lowest observed effects levels (levels known to cause measurable declines in health

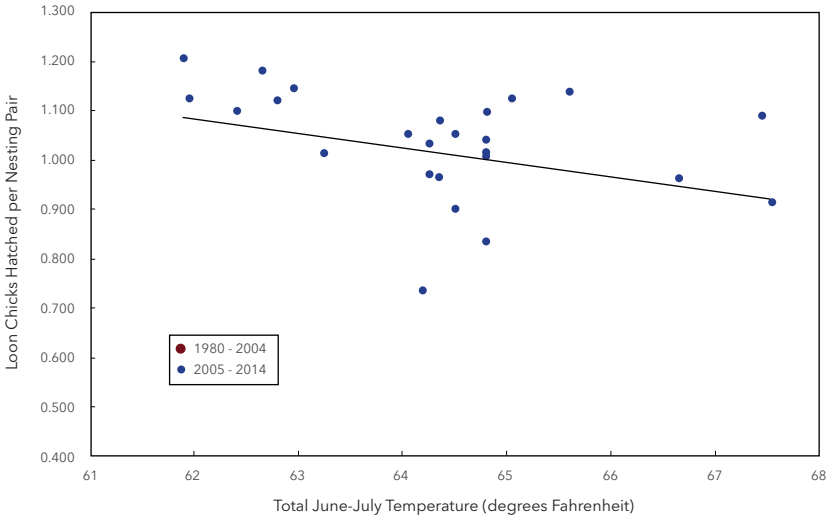


Many loon eggs tested during declines of loons on Squam Lake between 2005 and 2007, as well as from other lakes, held high levels of contaminants.

and/or reproductive success) in other fish-eating birds. LPC is continuing to investigate the levels, effects, and sources of these contaminants in loons to determine the threats they pose to individual loons and loon populations.

As with all living organisms, loons are also at risk from pathogens (disease-causing organisms). LPC's banding, blood-sampling, and loon rescues have revealed that loons in New Hampshire are susceptible to fungal diseases like aspergillosis and have been exposed to EEE (Eastern Equine Encephalitis), avian influenza, and Plasmodium parasites that cause malarial diseases. Some of these pathogens may become more problematic if New Hampshire's climate becomes warmer and wetter, as predicted in climate change models.





Climate Change

New Hampshire's loons are close to the southern limit of their breeding range and nest at the water's edge. They are therefore at risk from high temperatures, which can stress loons on the nest, and rain events, which can flood loon nests. National Weather Service records indicate that the average New Hampshire June-July (loon nesting season) temperature has increased about 2 degrees Fahrenheit and total June-July rainfall has increased more than 2 inches in the time LPC has monitored New Hampshire's loon population.

© BRIAN REILLY

LPC has found that loon breeding success, as measured by the number of chicks hatched per nesting loon pair, has declined as temperatures and rainfall have increased in New Hampshire. If further increases in temperatures and rainfall predicted by climate change models are accurate, these and a range of other possible effects of climate change will increasingly challenge New Hampshire's loons. LPC is studying the effects of increasing temperatures and rainfall on loons and ways in which we can help loons cope with these coming changes.

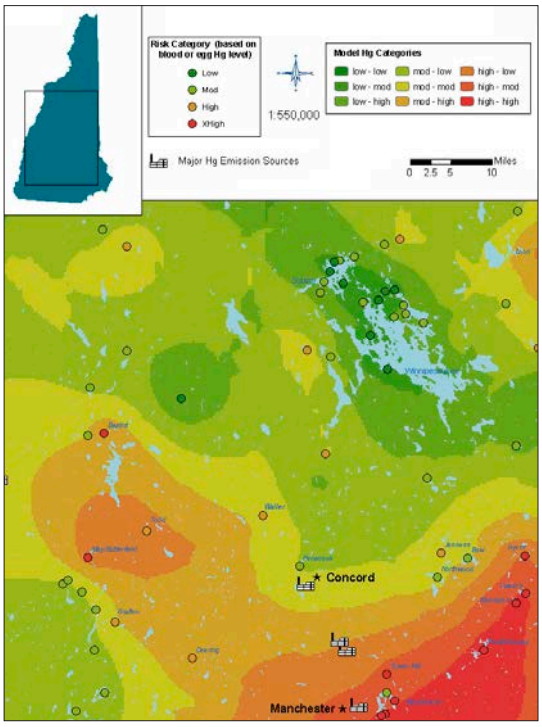
© JOHN ROCKWOOD

LPC is placing temperature data loggers in some loon nests to measure the effects of increasing temperatures on loon nesting success.

Loons as Biomonitors

Concentrations of contaminants in loons and loon eggs reflect concentrations of those contaminants in aquatic food webs. Many of these contaminants pose potential hazards to other wildlife and to human health as well as to loons. Atmospherically-distributed mercury has become a regional and national concern and has resulted in fish consumption advisories on lakes throughout New Hampshire. With a diet that consists almost entirely of fish, loons are good indicators of the health of our environment and the threat posed by mercury. Data collected by LPC and the Biodiversity Research Institute on mercury in loon eggs and blood have revealed "hot spots" (concentrations of mercury that are dangerous for loons and people) downwind of major emission sources like coal-fired power plants and municipal waste incinerators.

Like the canary in the coal mine, a healthy loon is an indicator of a healthy, functioning ecosystem. LPC's analyses of inviable loon eggs and yearly monitoring of the health and reproductive success of banded and blood-sampled loons are helping to identify areas of potentially dangerous concentrations of mercury and other contaminants in New Hampshire. This work is an important first step in reducing these contaminants in our environment to benefit loons, other wildlife, and people.



LPC's research has helped to identify areas of New Hampshire with concentrations of mercury that are potentially harmful to loons, other wildlife, and people.

Management

Each year, Loon Preservation Committee field biologists and volunteers conduct state-wide management efforts to benefit loons. Some of the most evident signs of LPC's presence in New Hampshire are floating loon nesting rafts and signs and rope lines to protect nesting loons.

Nest Rafts

Nesting loons face a number of challenges during their 28-day incubation of eggs. Loon nests are vulnerable to natural or human-induced water level changes that flood nests or leave them stranded out of reach of parents. Floating nest rafts rise and fall with water levels and help loons cope with these water level changes. Nest rafts also provide alternate nest sites to help loons displaced from traditional sites by shoreline development or recreational use of lakes and offer protection from raccoons and other scavengers whose populations have increased to unnaturally high levels due to the availability of human food and garbage.

LPC volunteers and staff have floated loon nesting rafts on New Hampshire lakes 1,685 times since their first use in 1977. Nesting loon pairs have used these rafts 917 times over those years and hatched 976 chicks from them – one of every four chicks hatched in the state throughout that time. Rafts have accounted for up to 90% of chicks hatched on more developed lakes like Squam and Winnipesaukee. In 2006, LPC began to fit rafts with covers to help protect nests from predation by eagles and other avian egg predators. These covers also seem to reduce nest abandonment due to human disturbance and may even help loons cope with increasing temperatures by providing shade for incubating loons.

When used correctly, nesting rafts are a very effective management tool. However, rafts are not a cure-all for loons. Nesting rafts can do more harm than good if they lure loons away from sheltered and well-hidden natural nesting sites to nest in more exposed or visible areas of the lake. We would much rather see loons nesting on natural sites than on man-made rafts, and preserving natural shorelines is still a priority for LPC because these measures help loons as well as providing habitat for other wildlife. Over time, we hope that our education efforts will encourage shoreline conservation and other practices that reduce the need for nesting rafts. Until then, rafts are the most practical solution to some of the problems facing nesting loons.

In addition to floating rafts, LPC works with lake associations, power companies, and other dam owners to hold lake water levels steady during critical loon nesting periods. This cooperative management reduces our reliance on floating rafts and benefits other wildlife that also rely on stable water levels.

One of every four loon chicks hatched in New Hampshire since 1975 has come from an LPC nesting raft.

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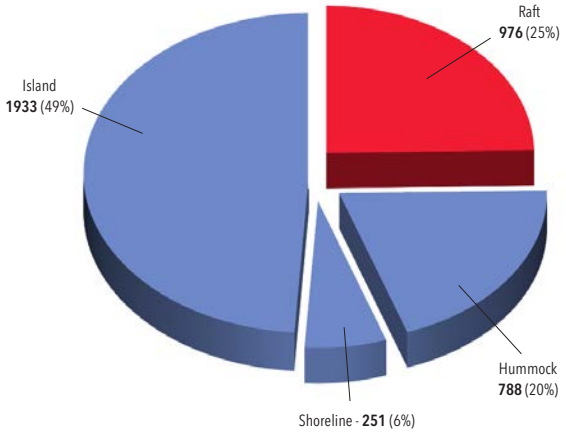

Loon Chicks Hatched in New Hampshire by Known Nesting Site, 1975-2015

Signs and Float Lines

A well-hidden loon nest is often safe from detection and disturbance; however, in cases where nests are threatened because of their visibility or proximity to shoreline developments or water traffic, LPC staff and volunteers place signs and float lines around nesting loons to help assure loons of the space they need to incubate eggs.

Since their first use in 1975, LPC staff and volunteers have protected 1,557 loon nests with signs and/or ropelines. Loons protected by these measures have hatched 1,412 chicks, more than one of every four chicks hatched over those years (and more than one of every two chicks hatched in 2014 and 2015). Once chicks have hatched, LPC will often float "Caution: Loon Chicks" signs to slow down boat traffic in chick nursery areas.

LPC floats signs around at-risk loon nests to protect nesting loons.


LPC staff rescue loons in distress as a result of human activities.

Loon Rescues

LPC staff members are not trained as animal rehabilitators, and it is LPC's policy not to intervene in cases of sibling rivalry among loon chicks, territorial conflicts between loons, or other natural processes that affect loon survival. However, we will come to a loon's assistance if a member of the public calls with a loon in distress as a possible result of human activities. LPC works with a network of veterinarians and wildlife rehabilitators to diagnose and attempt to treat and release ailing loons. Sadly, many of these rescue efforts end in humane euthanasia at a veterinarian's office because loons are notoriously hard to rehabilitate after an illness or injury. For this reason, a large part of LPC's work is focused on educating the public to teach people about loons and their needs and avert potential problems before they happen.

Outreach and Public Education

The Loon Preservation Committee's vision is to realize a future of loons and people thriving together in New Hampshire – but it will take more than our small but dedicated staff to realize that vision. If we've learned anything in our 40 years of monitoring, research, management, and education, it's that a caring and involved public is the key to preserving loons – or, for that matter, any wildlife species. Therefore, all of LPC's research and management initiatives have an outreach component to illustrate the effects of human activities on loons and encourage a culture of appreciation and respect that will allow loons to thrive.

Loon preservation touches on a wide range of issues, from human population growth and sprawl to fair and wise use of limited resources like lakes; from environmental contaminants, energy conservation, and recycling to scavenger wildlife populations and proper disposal of garbage; and from general education about loons and their needs to changing specific practices like the use of lead fishing sinkers and lead-headed jigs.

Information about loons and their challenges is presented to the public at The Loon Center; through presentations at lake associations, schools, and other venues throughout the state; and through one-on-one contact to engage the public and lake users "in the field." LPC's Loon Festival is an annual event at The Loon Center that celebrates loons and our fascination with them. In addition to these events and presentations, LPC posts educational signs at lake access points and lakeside businesses and publishes its research findings in peer-reviewed scientific journals, in the Loon Preservation Committee Newsletter, and in other popular forums.

"Never doubt that a small group of concerned and committed citizens can change the world. Indeed, that's the only thing that ever has."

~ Margaret Mead

LPC staff present information on loons and their challenges at venues throughout New Hampshire.

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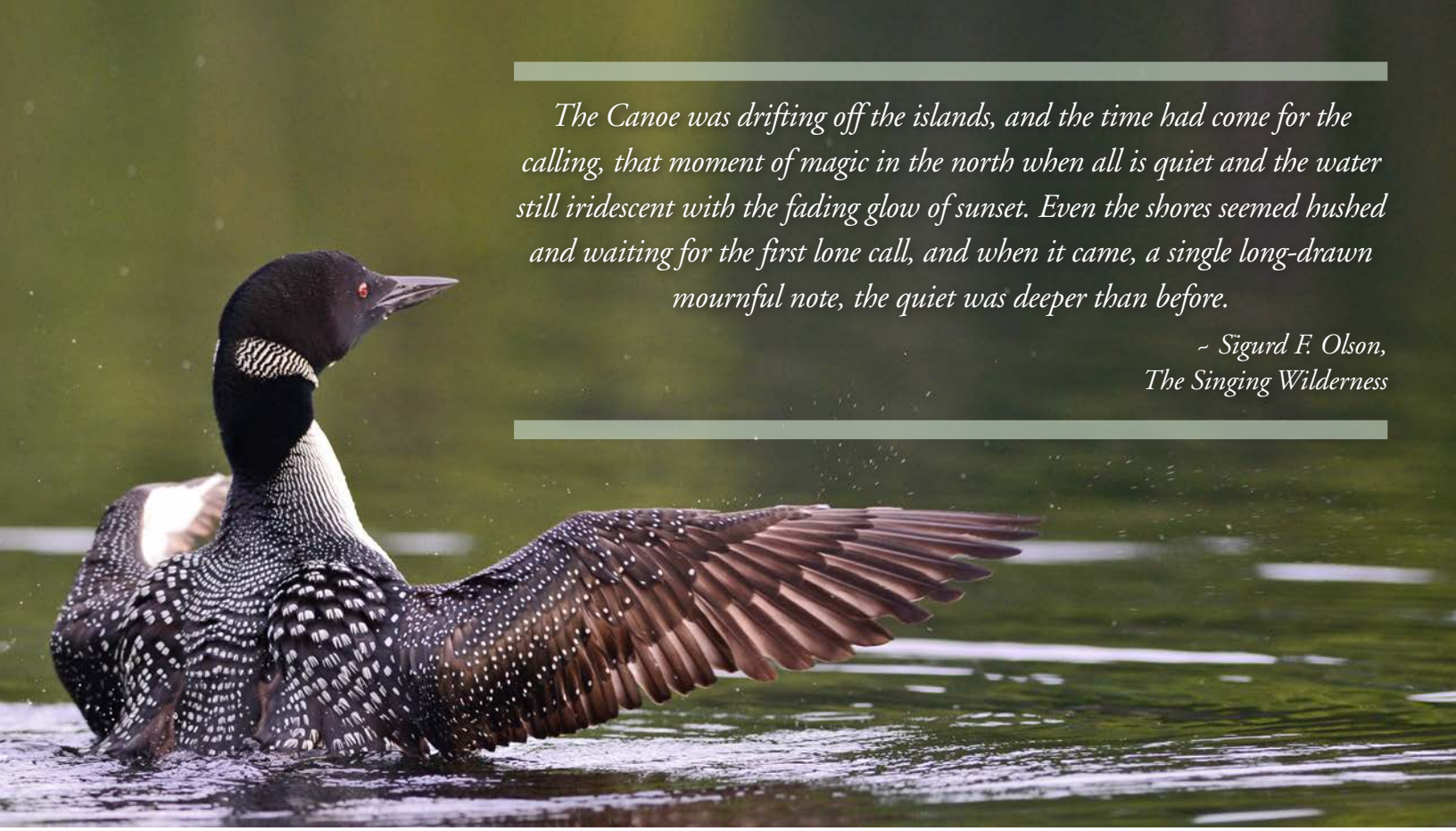
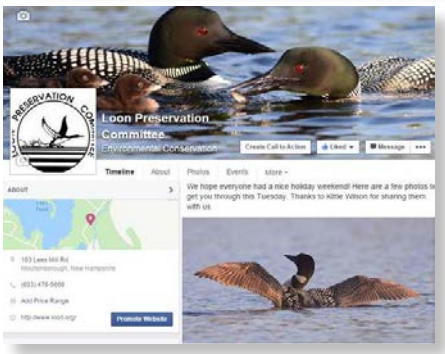


The Canoe was drifting off the islands, and the time had come for the calling, that moment of magic in the north when all is quiet and the water still iridescent with the fading glow of sunset. Even the shores seemed hushed and waiting for the first lone call, and when it came, a single long-drawn mournful note, the quiet was deeper than before.

~ Sigurd F. Olson,
The Singing Wilderness

The Internet and Social Media

The Internet provides an unrivaled opportunity to educate the public about loons and their needs and to exchange ideas and findings on loon conservation in North America. LPC's website at ***loon.org*** includes information about loon natural history, the challenges facing loons, and LPC's work in support of loons. LPC began to reach a more widespread audience beginning in 2010 with the distribution of an e-newsletter and the creation of its Facebook page. In 2014 and 2015, LPC provided a live webcam broadcast of loons on a New Hampshire nest to a worldwide audience.



"Who has ever paddled a canoe, or cast a fly, or pitched a tent in the north woods and has not stopped to listen to this wail of the wilderness? And what would the wilderness be without it?"

~ Arthur Cleveland Bent

Legislation

The results of the Loon Preservation Committee's research are increasingly being used to direct conservation activities and legislation to benefit wildlife and their habitats. LPC has presented its cooperative research findings to encourage informed discussion of many bills that directly impact loons and other wildlife. LPC's data have been a driving force behind landmark legislation to reduce mercury and other contaminants from coal-fired power plants and have contributed to efforts to reduce mercury in packaging and eliminate mercury in household batteries.

Data on ingested lead fishing tackle collected in collaboration with the Cummings School of Veterinary Medicine at Tufts University resulted in first-in-the-nation legislation to restrict the use of small lead sinkers and jigs on lakes and ponds within New Hampshire in 2000. This was followed by legislation to extend this ban to all freshwaters in New Hampshire beginning in 2005 and restrict the sale of this same tackle beginning in 2006. Senate Bill 89 was passed in 2013 to close a loophole that allowed the use and sale of larger lead-headed jigs that were continuing to kill loons. As of June of 2016, this bill will restrict the sale and freshwater use of all lead sinkers and lead-headed jigs weighing one ounce or less, making New Hampshire once again a leader in safeguarding loons from this avoidable cause of loon mortality. In addition to safeguarding New Hampshire's loons, these efforts have prompted legislation or regulations restricting the sale or use of lead tackle in Maine, New York, Vermont, and Massachusetts. The success of these bills is evidence that persistent efforts on the part of the Loon Preservation Committee and its collaborators are making progress in encouraging a conservation ethic in our legislature.

Education to help people understand the worth of loons and a healthy environment are logical endpoints for the work that our dedicated volunteers and staff have carried out over these past 40 years. The more we can encourage these connections between wildlife, the public, and our legislators, the greater the chance that the data LPC is collecting has its desired end of helping to fledge a new worldview that values a healthy Earth and all of its communities. That change, when it happens, will be a true measure of our success as a socially and environmentally advanced society.

Governor Hassan signs Senate Bill 89 at The Loon Center to protect loons from lead fishing tackle.

The Loon Center and Markus Wildlife Sanctuary

The Loon Center, located on the north shore of Lake Winnipesaukee on the Frederick and Paula Anna Markus Wildlife Sanctuary in Moultonborough, was built as the new headquarters of the Loon Preservation Committee in 1993. In addition to staff offices, public meeting rooms, and a research laboratory, The Loon Center houses exhibits, displays, and The Loon's Feather Gift Shop, with all proceeds from the store benefitting LPC's work to protect and recover New Hampshire's loon population. Our interpretive exhibits, presentations, and nature trails on our 200-acre wildlife sanctuary (including over 5,000 feet of pristine shoreline on the shore of Winnipesaukee) give close to 10,000 yearly visitors an introduction to the natural environment of New Hampshire and promote a greater understanding of the natural world.

The Loon Center in Moultonborough, NH, is LPC's headquarters and visitor center.

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PARTNERSHIPS FOR CONSERVATION

Conservation and environmental organizations face common challenges in their efforts to minimize the impacts of human activities on wildlife populations. The development of collaborative research and working relationships with other environmental groups, agencies, and individuals working toward the conservation of loons and their habitats is paramount to the accomplishment of the Loon Preservation Committee's mission.

LPC contributes data to the New Hampshire Natural Heritage Inventory and consults with the New Hampshire Fish & Game Department and the New Hampshire Department of Environmental Services on proposed shoreline developments, dam repairs, and other lake modifications. We also share our findings and expertise through our partnerships with universities, veterinary colleges, environmental organizations, and federal agencies. Throughout its history, LPC has benefitted tremendously from its associations with these and other organizations and programs too numerous to list.

LPC is an affiliate member of the Northeast Loon Study Working Group (NELSWG), a consortium of federal and state agencies, universities, and non-profit organizations from New England states and eastern Canadian provinces created because of wide-spread concerns about the health of loons. With input from LPC and other members, NELSWG coordinates cooperative research and other actions on issues beyond the scope of its member organizations.

LPC is a founding member of the New Hampshire Lead and Loons Working Group (partners include NH LAKES, NH Audubon, NH Fish & Game, NH Department of Environmental Services, and the US Fish & Wildlife Service). This group is working with other states to implement the Fish Lead Free initiative to ensure a comprehensive and unified message on the dangers of lead fishing tackle to loons and other wildlife and to implement actions to replace lead tackle with non-toxic alternatives. As part of this initiative, LPC's lead tackle exchange program helps to remove hazardous lead sinkers from our environment, promote sound fishing practices, and engage lake users in loon conservation.

"We have taken great pains to keep LPC a grassroots effort based on and supported solely by the efforts and dedication of the people who care."

~ Jeff Fair, August 1985 Summer Newsletter

Northeast Loon Study Working Group (NELSWG) members meeting at The Loon Center.

The Loon Recovery Plan

The Loon Preservation Committee's monitoring recorded significant population declines or mortality incidents on New Hampshire's three largest lakes (Winnipesaukee, Umbagog, and Squam) between 2001 and 2008 and five consecutive years of state-wide declines in the number of surviving loon chicks from 2004 to 2008. These declines threatened to undo the hard-won gains that LPC's research, management, and educational efforts had achieved to that point and were the impetus for the creation of the Loon Recovery Plan (LRP), a plan to inform and direct LPC's work to promote a healthy and growing loon population throughout New Hampshire. The Loon Recovery Plan includes:

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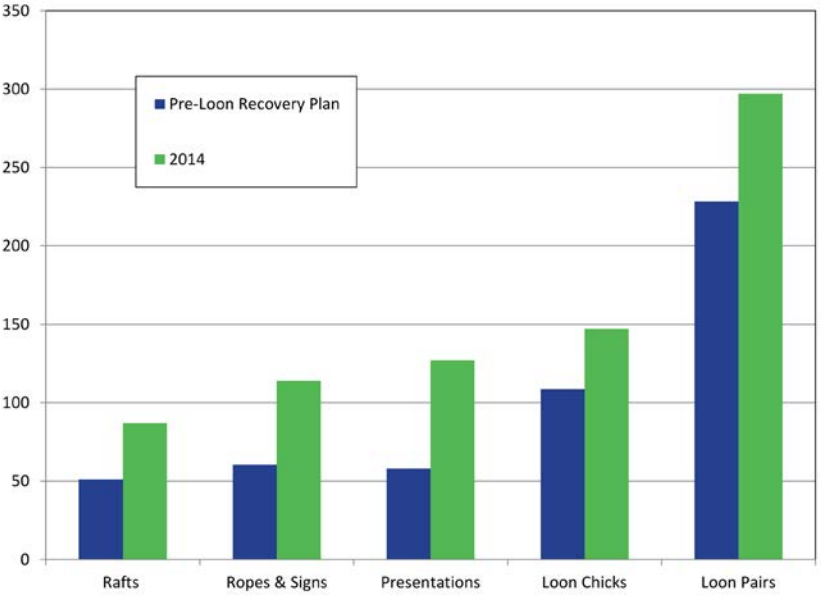

The Loon Recovery Plan has driven dramatic increases in LPC's state-wide research, management, and educational activities to protect and recover New Hampshire's loons.

1. Analyses that estimate New Hampshire's state-wide carrying capacity for loons to establish the number of loons New Hampshire's lakes can and should support;

2. Population models that measure the effects of man-made stressors on loon survival and breeding success to target our resources toward mitigating these stressors;

3. An assessment of our ability to help loons cope with these challenges through research, management, and outreach/education; and,

4. Strategies that will be implemented to increase loon populations to historical, pre-decline levels of an estimated 450-600 or more loon pairs.

The Loon Recovery Plan is LPC's most ambitious undertaking to date. It has helped us identify gaps in our knowledge of loons; implement new studies to establish the relative importance of a large number of physical, chemical, and cultural factors on the presence, abundance, and reproductive success of loons; develop and implement new management plans; and increase our organizational capacity and public involvement in safeguarding our loon population. It also provides a conceptual framework to integrate our educational products and programs with new and ongoing research and management activities to preserve loons.

The implementation of the Loon Recovery Plan has resulted in a dramatically increased monitoring, research, management, and outreach effort to help loons cope with the growing impacts of human activities and achieve LPC's ultimate goal of a recovered and viable loon population in New Hampshire. The Plan also serves as a model to plan and implement the recovery of other threatened or endangered species in New Hampshire, as well as the recovery of loons in other states.

The Squam Lake Loon Initiative

Between the fall of 2004 and the spring of 2005, Squam Lake lost seven of its 16 loon pairs – a 44% decline that remains unprecedented on any large lake in LPC's 40-year history of monitoring loons throughout New Hampshire. This decline brought Squam's loon population to its lowest level since LPC began to survey Squam Lake in 1975, and it was followed by the near-complete reproductive failure of the remaining loon population: in 2007, Squam produced only one surviving chick. Loons on Squam had not experienced a breeding failure of this magnitude since 1978, the year LPC petitioned to have loons added to the Threatened Species list in New Hampshire.

The Squam Lake Loon Initiative was created to understand the causes of these declines and restore a healthy population of loons to the lake. Loons on Squam are facing multiple stressors, including increases in boating, egg predators, temperatures, and rain events. All of these factors are common to loons on lakes throughout New Hampshire, yet declines on Squam have been more severe and protracted than those on other lakes.

LPC's groundbreaking research revealed levels of PBDE (flame retardants), PFOS (stain guards), PCB (industrial insulating/cooling agents), DDT and chlordane (both pesticides), and dioxins and furans (byproducts of industrial processes) in Squam loon eggs that were up to nine times higher than levels found in eggs collected from other lakes. Our work also revealed a rate of loon mortality from ingested lead fishing tackle that had increased to twice the statewide rate with increased boating and fishing activity on the lake.

The Squam Lake Loon Initiative has already provided critical baseline data on contaminants and other environmental stressors on loons which will be invaluable to assess changes in and effects of these stressors in the future. LPC's testing of loon eggs and other samples is the most comprehensive undertaken anywhere to date, and our intensive banding efforts on Squam have increased our knowledge of the survival and breeding success of known individuals and their relationships with contaminant burdens. LPC's work on Squam will help avoid future declines of loons on Squam and on other lakes, bring to light what could be a much larger systemic problem on Squam indicated by the decline of loons, inform other LPC initiatives such as the Loon Recovery Plan, and help LPC and others make more informed decisions to protect loons and other wildlife on Squam Lake and throughout New Hampshire.

"It is clear that we cannot assure loon nesting success without continued intensive management and educational programs."

~ Fall 1980
Loon Preservation Committee Newsletter

Nest cameras like this one focused on a nesting raft on Squam Lake provide valuable insights into potential sources of disturbance and threats to nesting loons.

THE VOLUNTEERS

From the beginning, LPC has been a grassroots effort. LPC's members and volunteers are a vital part of all of our work and are our greatest resource in our mission to preserve loons.

We have benefitted from the assistance of many thousands of dedicated people over the past 40 years. Our volunteers conduct LPC's annual mid-summer loon census, record the presence of loon adults and chicks throughout the breeding season, look for dead loons and unhatched loon eggs, help build and float nest rafts and signs, watch over nesting loons, and work to prevent conflicts between loons and people. Loon Center volunteers offer invaluable assistance with building upkeep, hospitality, mailings, general office work, and store operations.

The efforts of our volunteers have allowed LPC to conduct the research, management, and public education needed to restore and maintain a healthy loon population throughout New Hampshire. LPC has worked to encourage a stewardship ethic in its members and volunteers, and they in turn have become powerful advocates for loons and extended LPC's efforts and message of hope far beyond the reach of our small staff. Without our volunteers, LPC could never have demonstrated that coordinated and thoughtful human intervention could reverse the decline of a threatened species like the loon.

Volunteers at an LPC raft-building workshop at The Loon Center.

Every year this mission gets a little bigger and every year our volunteers and donors take up the slack, often with little recompense except a haphazard note from the director and the sound of calling in the night (also sometimes from the director).

~ Jeff Fair
Spring 1989 Loon Preservation Committee Newsletter.

The Loon Preservation Committee Board

The Loon Preservation Committee Board is comprised of a wide variety of professionals with diverse skills who volunteer their time and expertise to oversee LPC's activities. Several committees, including a Technical Committee that assesses LPC's research efforts and ensures that LPC's science in support of its mission meets the highest standards, are organized under the Board and report to the Board on a regular basis.

Trustees of the Board and members of its committees include business and community leaders and biologists from the New Hampshire Fish & Game Department, the New Hampshire Department of Environmental Services, the United States Fish & Wildlife Service, and the United States Environmental Protection Agency. In the winter of 2015-2016, the LPC Board, its committees, and LPC staff will work together to update LPC's Strategic Plan and its short- and long-term goals to guide LPC's efforts in the years ahead.

One measure of LPC's success in its important work is the quality of people that are attracted to serve its worthy cause. We are fortunate at LPC to have such an active group of extraordinary people willing to volunteer their time for this organization. Their guidance is integral to LPC's continued success in preserving loons and their habitats in New Hampshire.

The loon recovery effort is as much a "movement" as an organization. And the responsibility for protecting and assisting the loon population is right where it belongs – on the minds and shoulders of the human population.

~ LPC Ten Year Report

PERSISTENCE

It is the personal concern by human neighbors of the loons that makes protection possible and survival a reasonable hope.

~ Rawson L. Wood, Loon Preservation Committee Founder

There is room left for loon populations to grow in New Hampshire, and work left for LPC to do. The evolution of this organization has led us in new and sometimes unexpected directions, from confronting the obvious challenges facing loons to insidious threats that our founders could not have anticipated, and toward continually more focused, refined and diverse strategies to help loons. The unlikely and welcome result is that, despite seemingly insurmountable obstacles, our loons are persisting, with the chance to thrive.

Despite our efforts and our progress in recovering New Hampshire's loon population, the loon remains a threatened species in our state and faces many challenges. Our growing human population will continue to make wild places and quiet spaces harder to find, and we will need to find creative solutions to help loons survive. The world has shrunk in the past four decades – today we are aware of the smallness of our planet and the interconnectedness of all things. New perils like climate change are providing compelling evidence of our impacts on our world, with potentially grave consequences for humans and wildlife.

It's hard to imagine that one small organization protecting one species of bird in one of these United States could have much of an impact on that vast challenge. But over the past 40 years we have proven that concerned citizens can and do effect positive change. LPC was one of the first organizations anywhere to show that coordinated and thoughtful human actions could reverse the decline of a threatened or endangered species. And the work we do extends far beyond loons, and far beyond New Hampshire. Our success has inspired the creation of state-wide, regional and even international organizations to preserve loons, and our efforts continue to benefit other species that depend on clean water, natural shorelines and functioning ecosystems.

Forty years ago, the Loon Preservation Committee was a voice in the wilderness for a voice in the wilderness. In the years between we have shown that loons and people can live together if we value loons and respect their needs. Their challenges will continue to grow in number and scope, but we will continue to work for informed choices and for wise stewardship of loons. With the continued support of our members and friends, I predict we will surprise even those idealists who first accepted the task of safeguarding loons and the natural character of New Hampshire 40 years ago. We will be satisfied with nothing less than a real and substantive renewal of the spirit of these northern lakes. May the next 40 years bring as much wisdom, progress, and resolve as has served LPC so well in the past as we aspire to a bright future for loons and for people in New Hampshire.

"Hope is the thing with feathers" (Emily Dickinson). In this case, two loon chicks on Lake Sunapee – the first in more than 40 years, since before LPC began its work to protect and recover New Hampshire's loons.

Selected Technical Publications based on Loon Preservation Committee Data

Papers in Peer-reviewed Journals and Published Proceedings

Blair, R.B. 1992. Lake features, water quality, and the summer distribution of Common Loons in New Hampshire. Journal of Field Ornithology 63(1): 1-9.

Brennan, M.W., R.G. Congalton, P.J. Pekins and K.M. Taylor. 1998. Use of Remote Sensing and GIS tools for Common Loon (Gavia immer) management in New Hampshire. In Proceedings of the 64th Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Tampa, FL, pp. 470-478 (CD-ROM).

Brennan, M.W. and R.G. Congalton. 1999. Analysis of spatially related data for Common Loon (Gavia immer) management in New Hampshire. In Proceedings of the 65th Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Portland, OR, pp. 203-206 (CD-ROM).

DeSorbo, C. R., Fair, J., Taylor, K., Hanson, W., Evers, D. C., Vogel, H. S., and J.H. Cooley. 2008. Guidelines for Constructing and Deploying Common Loon Nesting Rafts. Northeastern Naturalist, 15(1), 75–86.

Desorbo, C.R., K.M. Taylor, D.E. Kramer, J. Fair, J.H. Cooley, D.C. Evers, W. Hanson, H.S. Vogel, and J.L. Atwood. 2006. Reproductive advantages for Common Loons using rafts. Journal of Wildlife Management 71(4): 1206-1213.

Evers, D.C. 2006. Status assessment and conservation plan for the Common Loon (Gavia immer) in North America. U.S. Fish and Wildlife Service, Denver, CO.

Evers, D.C., L.J. Savoy, C.R. DeSorbo, D.E. Yates, W. Hanson, K.M. Taylor, L.S. Siegel, J.H. Cooley Jr., M.S. Bank, A. Major, K. Munney, B.F. Mower, H.S. Vogel, N. Schoch, M. Pokras, M.W. Goodale, and J. Fair. 2008. Adverse effects from environmental mercury loads on breeding common loons. Ecotoxicology 17:69-81.

Evers, D.C., K.M. Taylor, A. Major, R.J. Taylor, R.H. Poppenga and A.M. Scheuhammer. 2003. Common Loon eggs as indicators of methylmercury availability in North America. Ecotoxicology 12: 69-81.

Fair, J.S. 1979. Water level fluctuations and Common Loon nest failure. In S.A. Sutcliffe (ed.), Proceedings of the North American Conference on Common Loon Research and Management. National Audubon Society 2: 57-63

Fair, J.S. 1991. Cover for loon rafts to obstruct avian depredation. In L. Morse, S. Stockwell, and M. Pokras (eds), Proceedings of the 1992 Conference on the Loon and its Ecosystem. U.S. Fish and Wildlife Service, Concord, NH, pp. 235-236.

Fair, J.S. and K.B. Nielsen. 1986. Use of artificial islands to enhance Common Loon nesting success in New Hampshire. Transactions of the Northeast Section of the Wildlife Society 43: 73.

Fair, J.S. and B.M. Poirier. 1993. Managing for Common Loons on hydroelectric project reservoirs in northern New England. In L. Morse, S. Stockwell, and M. Pokras (eds), Proceedings of the 1992 Conference on the Loon and its Ecosystem. U.S. Fish and Wildlife Service, Concord, NH, p. 221.

Grear, J. S., Meyer, M. W., Cooley, J. H., Kuhn, A., Piper, W. H., Mitro, M. G., Vogel, H.S., Taylor, K., Stacey, C., and D.E. Nacci. 2009. Population Growth and Demography of Common Loons in the Northern United States. Journal of Wildlife Management, 73(7), 1108–1115.

Haseltine, S.D, J.S. Fair, S.A. Sutcliffe and D.M. Swineford. 1983. Trends of organochlorine and mercury residues in common loon (Gavia immer) eggs in New Hampshire. Transactions of the Northeast Section of the Wildlife Society, 40th Northeast Fish and Wildlife Conference, W. Dover, VT, p.203.

McCoy, B. 1988. The New Hampshire Common Loon recovery program. In P.I.V. Strong (ed.), Papers from the 1987 Conference on Loon Research and Management. North American Loon Fund, Meredith, NH, pp. 160-166.

Miconi, R., M. Pokras and K.M. Taylor. 2000. Mortality in breeding loons: how big a factor is trauma? In J.W. McIntyre, D.C. Evers (eds), Loons: old history and new findings. Proceedings of a symposium from the 1997 meeting of the American Ornithological Union. North American Loon Fund, Holderness, NH, pp. 19-24.

Sidor, I.F., M.A. Pokras, A.R. Major, K.M. Taylor and R.M. Miconi. 2003. Mortality of the Common Loon in New England, 1987-2000. Journal of Wildlife Diseases 39(2): 306-315.

Strong, P.I.V., J.A. Bissonette and J.S. Fair. 1987. Reuse of nesting and nursery areas by Common Loons. Journal of Wildlife Management 51: 123-127.

Sutcliffe, S.A. 1978. Changes in status and factors affecting Common Loon populations in New Hampshire, USA. Transactions of the Northeast Section of the Wildlife Society 35: 219-224.

Sutcliffe, S.A. 1978. Pesticide levels and shell thickness of Common Loon eggs in New Hampshire. Wilson Bulletin 90: 637-640.

Sutcliffe, S.A. 1979. Common Loon status in New Hampshire 1976-1978. In S.A. Sutcliffe (ed.), Proceedings of the North American Conference on Common Loon Research and Management. National Audubon Society 2: 111-116.

Sutcliffe, S.A. 1979. Artificial Common Loon nesting site construction, placement and utilization in New Hampshire. In S.A. Sutcliffe (ed.), Proceedings of the North American Conference on Common Loon Research and Management. National Audubon Society 2: 147-152.

Sutcliffe, S.A. 1982. Prolonged incubation behavior in Common Loons. Wilson Bulletin 94: 361-362.

Taylor, K.M. and H.S. Vogel. 2000. Status and trends in Common Loon populations in New Hampshire, 1977-1997. In J.W. McIntyre, D.C. Evers (eds), Loons: old history and new findings. Proceedings of a symposium from the 1997 meeting of the American Ornithological Union. North American Loon Fund, Holderness, NH, pp. 110-113.

Taylor, K.M. and H.S. Vogel. 2003. Unprecedented loss of Common Loon pairs on Lake Umbagog. New Hampshire Bird Records 22(2): 42-44.

Masters Theses and Ph.D. Dissertations

Brennan, M.W. 2005. Spatial Distribution and Analysis of Colonization and Nest Characteristics of the Common Loon in New Hampshire. Ph.D Dissertation, University of New Hampshire.

Grade, T.J. 2011. Effects of Lead Fishing Tackle on Common Loons (Gavia immer) in New Hampshire, 1989-2010. M.S. Thesis, University of Wisconsin-Madison.

Kuhn-Hines, A. 2008. A multi-scale approach to breeding habitat model development and evaluation for the Common Loon, Gavia immer, in New Hampshire, USA. Ph.D Dissertation, University of Rhode Island.

Leszek, M.L. 2015. Changing Angler Behavior to Reduce the Impacts of Lead Fishing Tackle in New Hampshire: Applied Social Science Using Community Based Social Marketing. M.S. Thesis, Plymouth State University.

Rudko, A.M. 2010. An evaluation of habitat models for the Common Loon (Gavia immer). M.S. Thesis, University of New Hampshire.

Spagnuolo, V.A. 2012. Landscape assessment of habitat and population recovery of Common Loons in Massachusetts, USA. M.L.A. Thesis, Harvard University.

Sutcliffe, S.A. 1980. Aspects of the nesting ecology of Common Loons in New Hampshire. M.S. Thesis, University of New Hampshire.

Wohlfort, K.A. 2001. Effects of lake development on common loons (Gavia immer) in southwest New Hampshire. M.S. Thesis, Antioch New England Graduate School.

Professional Presentations

Desorbo, C. 2005. Air Pollution and Birds Don't Mix: Mercury Issues in the Northeast. Vermont-New Hampshire Birder's Conference, Fairlee, VT. Hosted by Vermont Institute of Natural Science and Audubon Society of New Hampshire.

Evers, D.C. 1998. Effects of mercury on wildlife. The conference of New England Governors and eastern Canadian Premiers, Portland, ME.

Evers, D.C., P.S. Reaman, B. Hanson and A.R. Major. 1998. The importance of working together: A case study of the Northeast Loon Study Workgroup. Northeast Fish and Wildlife Conference, Framingham, MA.

Evers, D.C., P.S. Reaman, A.R. Major, B. Hanson and B. Poppenga. 1998. Assessing the risk of mercury in a breeding population of Common Loons in New England. Regional Mercury Conference, Fredericton, NB.

Evers, D.C., T. Gleason, and K.M. Taylor. 2000. Demographic models of the Common Loon. The Waterbird Society, Plymouth, MA.

Evers, D.C., P.S. Reaman, A.R. Major, K.M. Taylor, B. Hanson and B. Poppenga. 2000. Assessing risk of methylmercury availability in New England using the Common Loon. Society of Environmental Toxicology and Chemistry 20th Annual Meeting, Philadelphia, PA.

Evers, D.C., M. Mitro and T. Gleason. 2001. Projecting the population-level effects of mercury on the Common Loon in the Northeast. U.S. EPA Workshop on the Fate, Transport, and Transformation of Mercury in Aquatic and Terrestrial Environments, West Palm Beach, FL.

Grade, T.J. 2014. Contaminants in the food web and the decline of the Common Loon population on Squam Lake, NH. North American Loon Symposium, Ashland, WI.

Hanson, E. 2005. A 30-year Success Story: The Recovery of Common Loons in VT and NH. Vermont-New Hampshire Birder's Conference, Fairlee, VT. Hosted by Vermont Institute of Natural Science and Audubon Society of New Hampshire.

Major, A.R., K. Munney, D.C. Evers, P.S. Reaman, B. Hanson, B. Poppenga and K.M. Taylor. 1999. Mercury concentrations in fish from northern New England and their relationship to blood mercury level in Common Loons. Northeast Fish and Wildlife Conference, Manchester, NH.

Nacci, D., R. Bennett, J. Copeland, J. Grear, A. Kuhn, J. Nichols, M. Nicholson, S. Walters, H.S. Vogel and K.M. Taylor. 2005. An approach to assess risks to wildlife populations from mercury and other stressors. 26th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Baltimore, MD.

Reaman, P.S., D.C. Evers, T. Cooley, M. Pokras, A.R. Major and E. Braselton. 1996. Lead poisoning and mortality in Common Loons from Michigan and New England. 52nd Annual Northeast Fish and Wildlife Conference, Farmington, CT.

External Reports

Evers, D.C. 2000. Aspects of hydrological impacts on the Common Loon at Lake Umbagog, 1976-99. Submitted to U.S. Fish and Wildlife Service, Concord, NH.

Evers, D.C. and P.S. Reaman. 1998. A comparison of mercury exposure and risk between artificial impoundments and natural lakes measured in Common Loons and their prey, 1996-97. Submitted to Central Maine Power Co., Augusta, ME.

Taylor, K.M. 2004. Northeast Loon Study Working Group (NELSWG) Protocol for Surveying and Managing Common Loons. Submitted to FPL Maine Hydro and the Errol Dam Stakeholders.

Taylor, K.M. and H.S. Vogel. 1998. Mercury Exposure as measured through abandoned Common Loon Eggs in New Hampshire. Submitted to US Fish and Wildlife Service, Concord, NH. 6pp.

Taylor K.M., H.S. Vogel and D.C. Evers. 2005. Field Assessment of Habitat Quality in Comparison to Reproductive Success of Common Loons in Central New Hampshire. Submitted to the NH State Conservation Committee, Brentwood, NH.

Taylor, K.M, D.C. Evers and T. Daigle. 2004. Common Loon Population Estimates and Reproductive Success in the Northeast: A Report in Response to the Bouchard Barge No. 120 (Buzzards Bay Oil Spill). Submitted to US Fish and Wildlife Service, Concord, NH.

Vogel, H.S. and K.M. Taylor. 2005. Common Loon Species Profile. Submitted to New Hampshire Fish and Game Department, Concord, NH.

Vogel, H.S. 2013. Effects of Lead Fishing Tackle on Loons in New Hampshire, 1989-2011. Submitted to the New Hampshire Legislature, Concord, NH.

The Loon Preservation Committee gratefully acknowledges
the Preston Family Fund of the New Hampshire Charitable Foundation
for funding LPC's 40 Year Report.

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