



SNOW CAT

By Margaret Gillespie

I have never seen a Canada lynx in the wild. There were certainly opportunities when I grew up, spending time cross-country skiing through the Laurentian Mountains north of Montreal. This mysterious cat is making news in northern New Hampshire now and I am all ears. In 2011, lynx jumped into the spotlight with a wildlife sighting in Pittsburg. Observers identified four lynx kits – a sign of a growing population. Interest snowballed with intensive surveys, including deployment of trail cameras, as well as surveys of snowshoe hare, the lynx’s main prey. What is the story behind this snow cat, this bobcat relative, the one with the huge feet that rival the function of any human snowshoes?

The “Canada” in Canada lynx (*Lynx canadensis*) shouts out adaptations and dependence on winter snow cover. Lynx have huge, seemingly oversized paws – the better to outmaneuver their primary prey, the aptly named snowshoe hare. Snowshoe hare are white in winter, brown in summer, utilizing camouflage matching the seasons. When a snowshoe hare is flushed by a lynx, it is one “big foot” against another. Obviously, they both win some and lose some, in a proportion for each species to continue on. Snowshoe hare are a lynx’s first choice on the menu but this big cat will also ably catch red squirrels and ruffed grouse.

What tips the balance for lynx and snowshoe hare? It all comes down to habitat, in this case the food source for snowshoe hare as Jillian Kilborn, wildlife biologist with New Hampshire Fish and Game Department in Lancaster, notes in a recent *New Hampshire Wildlife Journal* article entitled *Shadow Cat*. Snowshoe hare prefer young spruce fir forests where needles for browsing are right at their height. As the forests mature, needles grow beyond reach, hare habitat deteriorates, and hare numbers decline. Lynx populations follow suit.

Lynx and bobcat – do their ranges overlap and what are the main differences between them? Imagine being in deep snow with no snowshoes and trying to outpace someone sporting them. Lynx, with their huge feet, furred on the bottom for warmth, have the advantage in northern, snowy locations. The strongholds for lynx in New Hampshire are in far northern parts of the state, with fewer in the White Mountains. Bobcats, with much smaller feet, do well in limited snow, which in New Hampshire means south of the White Mountains. Bobcats may often frequent south facing rocky slopes where the sun’s action decreases snow cover.

Photo courtesy flickr/Eric Kilby/ CC BY-SA 2.0

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2020 WINTER PROGRAMMING:

- Ice Fishing
- Wild Winter Walks
- Backyard Birds
- Bald Eagle Watching
- Forts and Fires
- ... and more!

FORGING TRAILS: BIRDS ARE DISAPPEARING



In September of this year a study was published in the journal *Science* (K.V. Rosenberg et al., *Science*, 10.1126/science.aaw1313 (2019)) that highlighted an alarming decline in bird populations throughout North America. Similar studies in Europe have found the same. The report indicates a net* population decline of 29% (about three billion birds) in North America since 1970. Yes, that's billion . . . with a "b."

I wasn't shocked when I read the report. It confirms what I and every other bird researcher I know have

observed and suspected. We've all noted the declines of familiar species like Towhees, Wood Thrushes, and Meadowlarks. I was curious to take a look at the local scale and see what I could glean from New Hampshire data.

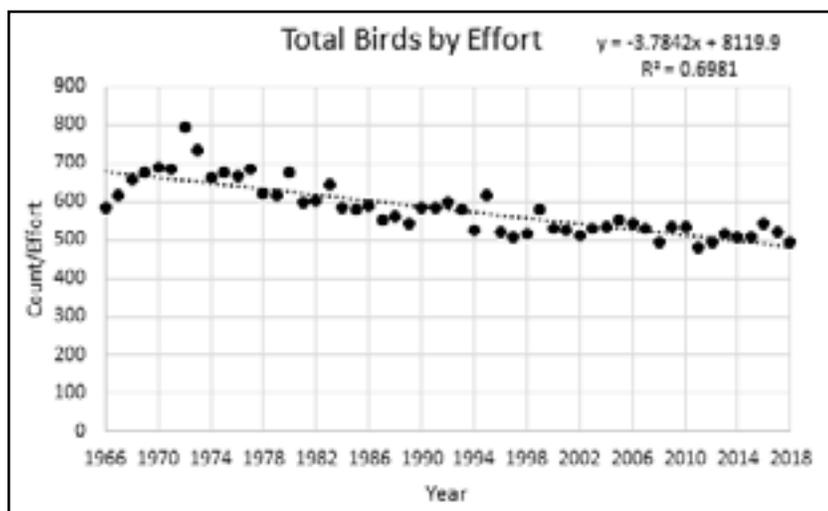
Every year for the last 18 years, I have conducted a Breeding Bird Survey (BBS) in the New Hampshire towns of Milan and Berlin. It is one of more than 4,800 such routes (each 24.5 miles long with 50 three-minute count stops) covered in North America as part of a long-term, large-scale, international avian monitoring program. It was initiated in 1966 to track the status and trends of North American bird populations. The USGS Patuxent Wildlife Research Center, the Canadian Wildlife Service, and National Wildlife Research Center jointly coordinate the BBS program. Its data was used in the recently published study, so I took a look at it for my route and the other 22 New Hampshire surveys.

The Milan route has been surveyed every year for 53 years with only a few years missed. The number of species fluctuates each year but doesn't show a significant change. The raw count of individual birds indicates a steady drop. The average annual count for the first 10 years (1966 -1975) was 666 birds. The average count for the latest 10 years is 507. That's a 24% decline!

Looking at the bigger picture for the whole state, we've seen an identical 24% decline. To calculate the number, I took the total bird count per year for all routes, divided by the number of routes covered per year. Then I averaged the adjusted count for the first 10-year period compared to the average of the last 10 years.

New Hampshire's data for some individual species is really alarming: Baltimore Oriole down 57%, Purple Finch down 59%, Eastern Kingbird down 64%, Barn Swallow down 79%, Wood Thrush down 84%, Bank Swallow down 92%, Eastern Towhee down 98%, and Eastern Meadowlark down 99%.

Along with the losers, there are some winners: Pileated Woodpecker is up by over 800% (but Northern Flicker is down 68%), Blue-headed Vireo is up 106%, and Black-capped Chickadee is up by 63%. Tufted Titmouse wasn't recorded on any surveys in New Hampshire until 1975. Its raw count average for the last 10 years is 240. Hermit Thrush is up by 118% and Pine Warbler has gone from an average of seven in the first 10 years to 141 in the last 10 – a 1,892% jump.



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Squam Lakes Natural Science Center is a non-profit educational institution incorporated in 1966 as a charitable organization under statutes of the State of New Hampshire with its principal place of business in Holderness. Its mission is to advance understanding of ecology by exploring New Hampshire's natural world.

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STAFF PROFILE

KEVIN VANGORDEN

Tell me how you first got involved at the Science Center.

Like many children who grow up in New Hampshire, I first experienced the Science Center on an elementary school field trip. After that, it was many years before I was next at the Science Center. In 2010, I was a junior in college wanting to gain experience in the field of biology. I started volunteering as a docent that summer and returned in 2011 as a docent mentor. In 2012, I was fortunate enough to be granted an internship as an Education Program Intern for the summer. I ended up staying on until November as Assistant Naturalist, working in animal care and presenting programs. I returned in June 2015 to work in animal care temporarily while the Science Center looked for a new Animal Care Associate and was hired full time that August.

Tell us about yourself.

I like to keep busy and learn new skills. I learned to scuba dive, build archery equipment from scratch, and I practice three different schools of martial arts. I taught myself how to make high level (think movie quality) costumes for comic conventions, and became an award-winning costume maker. I coach varsity high school soccer and play in an adult indoor soccer league. When I have spare time, I like to play strategic board games and attend conventions. And I'm trying to travel more.

What would you tell someone who is thinking about donating or volunteering?

If you are looking for a place to volunteer some time, the Science Center is a great option. We have lots of different projects and volunteer positions available.

What surprised you most about working here?

The Science Center staff is hard working, friendly, and dedicated to providing the best experience for visitors. It is honestly amazing at just how well staff get along and actively seek to spend time together outside of work. You can often find staff members fishing together on the weekends or getting together for a few board games after work.

What do you think is the Science Center's greatest challenge?

In an increasingly technological world, the Science Center has done a great job of getting folks nearer to nature. As someone who grew up learning to build computers, code software, and work in a technologically rich society, I believe technology can be a powerful tool in both education and exhibit design when done properly. Using technology to build a connection with each generation of visitors and to communicate complex ecological ideas, while still meeting our goal of connecting individuals to our natural world is a challenge. It is a challenge I believe the Science Center has already started to meet and will continue to meet over the years to come.



Kevin VanGorden grew up in New Hampshire as one of three siblings (including an identical twin brother) in a family of teachers. Kevin knew from a young age he never wanted to be a teacher, but instead wanted to work with animals. He received his B.A. in Biology from the University of Maine at Machias. He then went on to intern at the International Exotic Animal Sanctuary in Boyd, Texas and Squam Lakes Natural Science Center. He taught at residential environmental schools in Tennessee, Minnesota, and Massachusetts, finding a passion for education he never knew he had. In 2013, he earned his Environmental Education Teaching Certification from Hamline University in St. Paul, Minnesota.

FORGING TRAILS *continued from page 2*

Out of the 178 species recorded on the surveys in all years, 94 show declines, 75 are stable or show increases, and nine were recorded so infrequently that there were no trends. The 94 declining species represented 76% of the count in 1966 - 1975, but now represent only 43% in the last 10 years.

It's clear overall, there are far fewer songbirds around. The reasons for these declines are likely many and varied: habitat loss and change, rapid climate change, invasive species, pesticides, outdoor cats (estimated to kill over two billion birds a year in North America), increases in native mammalian predators (fisher, mink, raccoons, etc.), and window strikes (perhaps a billion birds each year in North America).

**A net decline indicates the annual mortality rate is higher than the hatch/fledge rate (recruitment). To see a net decline of three billion birds in 48 years means an average mortality rate 0.18% higher than recruitment. For example, if in 1970 there was a base population of 10 billion breeding adults and they fledged an average of four chicks per year (40 billion chicks), then the mortality rate would be on average 40.072 billion birds. If that was consistent over the 48 years, by 2018 there would be a base population of just over 7 billion birds. These are the sort of declines the report found.*

Data Citation:

Pardieck, K.L., D.J. Ziolkowski Jr., M. Lutmerding, V. Aponte and M.-A.R. Hudson. 2019. North American Breeding Bird Survey Dataset 1966 - 2018, version 2018.0. U.S. Geological Survey, Patuxent Wildlife Research Center. <https://doi.org/10.5066/P9HE8XYJ>.

Some of these are irreversible, but there are some simple things you can do: keep cats inside, strike-proof your windows, plant native shrubs, don't use insecticides, and be vigilant environmental stewards and voters. These native songbirds are the proverbial canary in the coalmine. They are showing us loud and clear that the environment around us (and on which we depend) is in big trouble.

A handwritten signature in black ink, appearing to read "Iain MacLeod".

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NATURALIST'S CORNER

BIRD BEAKS

By Jeremy Phillips

Wrench, screwdriver, saw, knife, hammer, clamp, shovel, shears... there are a lot of tools in the toolshed. "Choose the correct tool for the job," my middle school woodshop instructor used to say. In the bird world, one job rules all - eating. The correct tool for birds, when it comes to eating, is the beak. It is not as simple as just having a beak. Woodpeckers, hawks, loons, and hummingbirds do not eat the same things. Diving into the beak realm could fill a book, but let's skim the top and look at some local birds.

First, all birds have beaks and no modern species of birds have teeth. Archaeopteryx (they lived in the late Jurassic about 150 million years ago) did have teeth and are widely considered to be the first birds. Without teeth, modern birds can't chew their food. Instead, they have a gizzard, a muscular organ to help crush food into small bits.

Bird beaks are crucial and distinct, adapted to the food the birds eat. Seedeaters are most prevalent around our bird feeders and in the natural landscape at this time of year. Seedeaters, generally, have triangular shaped bills to grasp and open seeds. But even among seedeaters, there is a large variation of beak adaptations. Evening Grosbeaks (*Coccothraustes vespertinus*) have a large head and massive beak (the name "Grosbeak" means large beak). Large beaks are better than smaller beaks at opening larger seeds. Other seedeaters include sparrows, finches, and crossbills, such as the Red Crossbill (*Loxia curvirostra*) and White-winged Crossbill (*Loxia leucoptera*). Crossbills break the triangular beak rule of seedeaters. Their name is an apt indication of what their bill looks like when it's closed. They have a unique way to get to seeds. They use their crossed bills and strong tongues to pry open pinecones and eat the seeds inside. Seedeaters are able to use a large variety of available food here in the winter.

One beak type we do not see is the small, tweezer-like beak good at picking insects from leaves, bark, and twigs. The lack of insects in winter means these insect eaters migrate south in the colder months. Warblers have this type of beak and all 25 species that nest in New Hampshire migrate.

Warblers are not the only insect eaters. Flycatchers, like the Eastern Phoebe, (*Sayornis phoebe*) have a small, flat beak, wide at the base, perfect for catching insects out of the air. Flycatchers are similar in coloration and can be difficult to identify. The bobbing tail of the phoebe gives them away. Flycatchers sit on a branch, wire, or fencerow and exhibit a looped flight from the perch to catch a flying insect and back to the perch. They are commonly seen near human structures, often using them for nesting. I usually have one nesting under an overhang on my deck.

Some birds do not capture their prey using their beaks. Raptors use their sharp talons to grasp their prey (raptor means grasping feet). Their beaks are hooked, built to rip and tear food into pieces.

These beaks are only a few of the many different types found in New Hampshire. Beaks help birds do a variety of things - catch prey, crunch seeds, chisel holes in trees, sift through mud, get worms from deep underground, or snatch insects from leaves or the air. There are beaks that curve down, beaks that curve to the side, and some even have hinges. Beaks can look like spoons or act as filters. Whatever birds have evolved to eat, beaks are important because they help the bird consume its food. Evolution means a bird always has the right tool for the job.



Evening Grosbeak



Magnolia Warbler



Great Crested Flycatcher



Osprey



FROM THE HERON'S NEST

By Laura Mammarelli



Children and teachers at Blue Heron School are happily moved into their new space in the Early Childhood Education building in September. As always, there is no such thing as bad weather and children are enjoying their new expanded outdoor area, which includes a large sandbox, a garden, a patio, and the entire pine grove. Volunteers constructed bookcases, roofed shelving units used to store outdoor toys, and installed hooks outside for where children hang up their backpacks and jackets. We appreciate all the time, energy, and skills of the volunteers and their essential contributions.

Blue Heron School is a nature-based Montessori school for children ages three to six. For more information please visit www.nhnature.org/programs or contact Laura Mammarelli, Blue Heron School Director, at 603-968-7036 or blueheron@nhnature.org.

KIRKWOOD GARDENS PLANT SPOTLIGHT

By Brenda Erler

Black-eyed Susan

Rudbeckia fulgida 'Goldsturm'

Culture: Enjoys average, moist, well-drained soil in full sun

Bloom: July to September

Height: 24 to 36 inches

This cultivar of a midwest native wildflower is great in meadows, wildflower gardens, or in masses in your perennial border. The prolific, beautiful flowers attract butterflies and are good for cutting. The seedheads provide winter interest, as well as a tasty snack for many birds.

Kirkwood location: Lower garden around old apple tree



Spicebush

Lindera benzoin

Culture: Easily grown in average, medium moist, well-drained soil in full sun to part shade. Tolerant of full shade. Plants are either male or female, so plant at least one of each for cross-pollination and fruit production.

Bloom: clusters of tiny yellow-green flowers in March to April

Height: 8 to 10 feet

This eastern native understory shrub is called spicebush because of the spicy, fragrant foliage that turns a lovely yellow in the fall. Its red fruit is relished by birds. Use in a shrub border, shade, naturalized or native garden, or in moist areas along streams or ponds.

Kirkwood location: Lower garden close to compost bins



Plant Spotlight and Kirkwood Gardens are sponsored by Belknap Landscape Company, Inc.
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NEWSBRIEFS

- After 40 years on staff, Senior Naturalist Dave Erler taught his last program on November 1. It's impossible to sum up Dave's influence on the Science Center or count the number of lives he shaped. His enthusiasm for teaching natural history never dimmed. His intelligence, knowledge, sense of humor, work ethic, vision, and leadership guided this organization. Dave loves birds and his annual bird census and bird banding programs were annual highlights. Along with all his other achievements, Dave is proud he helped the Science Center to seek and receive accreditation from the Association of Zoos and Aquariums.
- Kate Banyas joined Blue Heron School staff this fall as Assistant Teacher. Kate received a B.A. in Natural History and Education from Sterling College in Craftsbury, Vermont and an M.S. in Ecological Teaching and Learning from Lesley University in Cambridge, Massachusetts. Kate has worked in environmental education for 15 years.
- Josh Flagg spent the summer as an Education Program Intern



- and stayed part-time this fall as an Assistant Naturalist. In January, he will become a Naturalist/Animal Ambassador Trainer. Josh graduates in December from Unity College, Unity, Maine with a B.S. in Captive Wildlife Care and Education.
- Dan Walsh joined the staff as Facilities Assistant in September. Dan's background is in carpentry, focused on restoring older buildings.
- In August, Blue Heron School teachers participated in the national Natural Start Alliance annual conference held in Manchester. Blue Heron School Director Laura Mammarelli presented *Montessori and Nature Based Education: Bringing the Outdoors in and the Indoors Out*. Conference participants also took a field trip to see the new Early Childhood Education Center.
- Executive Director Iain MacLeod was awarded the Goodhue-Elkins Award at New Hampshire Audubon's 105th Annual Meeting in September. The award is presented annually to an individual who has made an outstanding contribution to the study of New Hampshire birds.
- In October, Education Director Audrey Eisenhauer, Volunteer Manager Carol Raymond, and Naturalist Jeremy Phillips attended the North American Association for Environmental

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CALENDAR OF PROGRAMS & EVENTS

Advance registration is required by noon the day before the program. If minimum enrollment is not met, programs may be cancelled. Walk-ins accommodated if space is available.

JANUARY

<p>JANUARY 4 SATURDAY 7:00 to 10:30 a.m. For adults and families with children ages 9 and up</p>	<p>Intro to Ice Fishing Beneath the snow and ice is a wondrous world of peril: oxygen starts to deplete, food is scarce, and water temperature is barely above 37°F. Join us in search of fish that remain active under these conditions. Try to entice fish to the end of your line using lures and jigging techniques that mimic their natural food. Learn about fish adaptations by observing fish colors, fins, and mouthparts. Whether you fish for food, as a social gathering, or to be out in the elements, ice fishing is a great activity to foster your love for nature. <i>All fishing instruction and equipment provided at no extra cost. Children must be accompanied by an adult. Ages 16 and up must have a current fishing license. Wear insulated snow boots with non-cotton socks. Wear many, many layers of clothing including non-cotton insulating base layers, a wind-proof outer layer, sunscreen, sunglasses, hat, and gloves. Bring an extra pair of gloves, snacks, a thermos with a hot beverage, and a camp chair. Fishing licenses may be purchased through New Hampshire Fish & Game, which helps conservation efforts in our state.</i> <i>Cost: \$15/member; \$18/non-member</i></p>
<p>JANUARY 5 SUNDAY 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up</p>	<p>Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail Have you ever wondered what happens to the animals at the Science Center during the winter? Most of them stay in the same place, just as they would in the wild. Join a staff naturalist for a guided walk on the live animal exhibit trail to see our animal ambassadors dressed in their winter coats and discuss how these native animals are well adapted for winter in New Hampshire. If needed, snowshoes are available at no extra cost or bring your own. Children must be accompanied by an adult. Dress to be outdoors with insulated snow boots, hats, gloves, and warm layers. <i>Pre-registration is required for Wild Winter Walks. No walk-ins available.</i> <i>Cost: \$9/member; \$11/non-member</i></p>
<p>JANUARY 9 THURSDAY 10:00 to 11:30 a.m. For children ages 4 to 6</p>	<p>Homeschool Series: All About Series - Skunks Join us with your child to learn all about New Hampshire wildlife. Each session considers a different group of living things through activities, hands-on experiences, and a meeting with a live animal. An adult must participate with children at no additional cost. Each additional adult pays child fee. <i>Cost \$9/member child; \$11/non-member child</i></p>
<p>JANUARY 9 THURSDAY 10:00 to 11:30 a.m. For children ages 7 to 10</p>	<p>Homeschool Series: Get HAPI! - Interrelationships The primary interpretive focus of the Science Center's programs and exhibits is community ecology, which has four major concepts: Habitats, Adaptations, Populations, and Interrelationships (HAPI). Join us with your child to investigate these topics in depth. <i>Cost \$9/member child; \$11/non-member child</i></p>
<p>JANUARY 11 SATURDAY</p>	<p>Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i></p>
<p>JANUARY 14 TUESDAY 6:00 to 8:00 p.m. For adults</p>	<p>Science Pub: Community Conversations on Climate Change Canaries in the Coalmine: Bird Population Declines in New Hampshire by Iain MacLeod, Executive Director, Squam Lakes Natural Science Center Join us in the lounge at Walter's Basin for engaging evenings discussing climate change solutions over drinks and appetizers. Climate change is affecting our natural world and the animals (including us) that inhabit our planet in many ways. We will focus on solutions to this global problem. Different scientists and organizations will speak for about 30 minutes with a lively discussion to follow. Bring your questions and plan to contribute to this community conversation on climate change. Sponsored by Squam Lakes Natural Science Center, Squam Lakes Association, and Squam Lakes Conservation Society. <i>Cost: No charge to attend. Order and pay for food and drinks individually. Seating is lounge style. For dining with traditional seating, arrive early to eat in the dining room prior to the 6:30 p.m. presentation start time in the lounge. Advance registration requested.</i></p>
<p>JANUARY 18 SATURDAY</p>	<p>Ice Fishing for Families on Free Fishing Day 7:00 to 10:30 a.m. For adults and families with children ages 9 and up <i>See description for January 4.</i> <i>January 18 is New Hampshire's Free Fishing Day - no charge for the program and no license required.</i></p>
<p>JANUARY 19 SUNDAY</p>	<p>Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i></p>
<p>JANUARY 25 SATURDAY 10:00 a.m. to 12:00 p.m. For adults and families with children ages 5 and up</p>	<p>Binos and Bird Feeders: Winter Backyard Birds What birds overwinter in New Hampshire? How do they survive? Gather around our bird feeders and learn to identify backyard birds. You can even try letting the birds eat out of your hand! We will discuss bird feeding basics, make a bird feeder from natural or recycled materials to take home, go on a walk to identify birds in the field and forest using binoculars, and finish up by meeting a bird some may consider an uninvited guest at bird feeders. Binoculars and snowshoes will be provided or you may bring your own. Dress to be outside with insulated snow boots and warm layers. <i>Cost: \$9/member; \$11/non-member</i></p>

JANUARY CONTINUED

JANUARY 26 SUNDAY **Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 6 and up
 See description for January 5.

FEBRUARY

FEBRUARY 1 SATURDAY **Winter Bald Eagle Watching**
 9:00 a.m. to 12:00 p.m.
 For adults and families with children ages 12 and up
 Join Executive Director Iain MacLeod to tour around the Lakes Region to spot Bald Eagles. Iain will share the natural history and adaptations of these majestic birds, the story of how we almost lost our national symbol of freedom, and what has led to their comeback. We will carpool to viewing sites. Binoculars will be available or you may bring your own. Dress to be outside and wear insulated snow boots and warm layers.
 Cost: \$12/member; \$15/non-member

FEBRUARY 2 SUNDAY **Ice Fishing: Panfish**
 7:00 to 10:30 a.m. | For adults and families with children ages 9 and up
 See description for January 4.

FEBRUARY 6 THURSDAY **Homeschool Series: All About Series - Groundhogs**
 10:00 to 11:30 a.m. | For ages 4 to 6
 See description for January 9.

FEBRUARY 6 THURSDAY **Homeschool Series: Get HAPI! - Populations**
 10:00 to 11:30 a.m. | For ages 7 to 10
 See description for January 9.

FEBRUARY 8 SATURDAY **Winter Forts and Fires**
 10:00 a.m. to 12:00 p.m.
 For families with children ages 4 and up
 Join us for some winter fun! Build forts, play games, and then warm up around a fire with cocoa and toasted marshmallows. Head inside to meet a live animal ambassador that has special adaptations for winter survival. Dress to be outside with insulated snow boots and warm layers. Bring an extra pair of gloves. If needed, snowshoes are available at no extra cost or bring your own.
 Cost: \$9/member; \$11/non-member

FEBRUARY 11 TUESDAY **Science Pub: Community Conversations on Climate Change Making Changes at the Political Level**
 by Ted Vasant, Founder and President of New England Commercial Solar Services
 6:00 to 8:00 p.m. | For adults
 See description for January 14.

FEBRUARY 15 SATURDAY **Winter Bald Eagle Watching**
 9:00 a.m. to 12:00 p.m. | For adults and families with children ages 12 and up
 See description for February 1.

FEBRUARY 16 SUNDAY **Binos and Bird Feeders: Winter Backyard Birds**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 5 and up
 *Observations on February 16 will be submitted to National Audubon Society's Great Backyard Bird Count.
 See description for January 25.

FEBRUARY 16 SUNDAY **Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail**
 1:00 to 3:00 p.m. | For adults and families with children ages 6 and up
 See description for January 5.

FEBRUARY 22 SATURDAY **Winter Forts and Fires**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 4 and up
 See description for February 8.

FEBRUARY 23 SUNDAY **Ice Fishing: Trout**
 7:00 to 10:30 a.m. | For adults and families with children ages 9 and up
 See description for January 4.

SCHOOL VACATION WEEK

FEBRUARY 25 TUESDAY **Winter Forts and Fires**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 4 and up
 See description for February 8.

FEBRUARY 26 WEDNESDAY **Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 6 and up
 See description for January 5.

FEBRUARY 27 THURSDAY **Binos and Bird Feeders: Winter Backyard Birds**
 10:00 a.m. to 12:00 p.m. | For adults and families with children ages 5 and up
 See description for January 25.

FEBRUARY 27 THURSDAY **Animals in Winter**
 1:00 to 2:00 p.m.
 For for all ages
 What strategies do animals use to survive the winter? What adaptations do they have to help them stay warm and find food? Meet three live animals during this indoor program and learn about the adaptations that they have to survive in the wild during this challenging time of year.
 Cost: \$7/member; \$9/non-member

FEBRUARY CONTINUED

FEBRUARY 29 SATURDAY	Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i>
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MARCH

MARCH 1 SUNDAY	Ice Fishing: Panfish 7:00 to 10:30 a.m. For adults and families with children ages 9 and up <i>See description for January 4.</i>
MARCH 5 THURSDAY	Homeschool Series: All About Series - Owls 10:00 to 11:30 a.m. For ages 4 to 6 <i>See description for January 9.</i>
MARCH 5 THURSDAY	Homeschool Series: Get HAPI! - Habitats 10:00 to 11:30 a.m. For ages 7 to 10 <i>See description for January 9.</i>
MARCH 8 SUNDAY	Binos and Bird Feeders: Winter Backyard Birds 10:00 a.m. to 12:00 p.m. For adults and families with children ages 5 and up <i>See description for January 25.</i>
MARCH 8 SUNDAY	Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 1:00 to 3:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i>
MARCH 10 TUESDAY	Science Pub: Community Conversations on Climate Change Trends in Tick Populations Due to Climate Change by Kaitlyn Morse of Bebob Labs 6:00 to 8:00 p.m. For adults <i>See description for January 14.</i>
MARCH 14 SATURDAY	Ice Fishing: Trout 7:00 to 10:30 a.m. For adults and families with children ages 9 and up <i>See description for January 4.</i>
MARCH 15 SUNDAY	Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i>
MARCH 21 SATURDAY	Winter Forts and Fires 10:00 a.m. to 12:00 p.m. For adults and families with children ages 4 and up <i>See description for February 8.</i>
MARCH 22 SUNDAY	Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i>
MARCH 28 SATURDAY	Wild Winter Walk: Guided Tour of the Live Animal Exhibit Trail 10:00 a.m. to 12:00 p.m. For adults and families with children ages 6 and up <i>See description for January 5.</i>

APRIL

APRIL 2 THURSDAY	Homeschool Series: All About Series - Turtles 10:00 to 11:30 a.m. For ages 4 to 6 <i>See description for January 9.</i>
APRIL 2 THURSDAY	Homeschool Series: Get HAPI! - Ecosystems 10:00 to 11:30 a.m. For ages 7 to 10 <i>See description for January 9.</i>
APRIL 14 TUESDAY	Science Pub: Community Conversations on Climate Change Businesses and Towns Take Action on Climate Change by Jennifer Andrews, Sustainability Project Director at University of New Hampshire Sustainability Institute 6:00 to 8:00 p.m. For adults <i>See description for January 14.</i>

Save the Date: Summer Splash, July 25, 2020

WISH LIST

For Visitor Services - push wheelchair, 50-cup coffee urn
For Office - small desk or table
For Marketing - GoPro camera
For Intern Cottage - toaster oven

For Animal Care - electric utility vehicle, natural sisal rope, large Jet Sled
For Facilities - loppers and pruners for invasive species removal

For Blue Heron School - baking pans, cookie sheets, cooling racks
For Kirkwood Gardens - garden wagons or carts, garden items for treasures sale such as decorative pots, garden art, tools

VOLUNTEER UPDATE: THANK YOU VOLUNTEERS!



In 2018, 311 volunteers donated a total of 8,637 hours. *Why do we report these numbers every year?* It's because they show a quantitative level of community support. What they don't measure is the spirit, joy, dedication, enthusiasm, skills, and knowledge that volunteers give.

The annual Parsons Volunteer Recognition Dinner is named for Natalie and Don Parsons,

dedicated volunteers who donated many years of service. This year the dinner was held at the Common Man Restaurant in Plymouth. The dinner was sponsored by Cross Insurance, Meredith Village Savings Bank, and Patty Stewart and Associates.

The Board of Trustees recognizes a group of volunteers at the dinner each year to highlight one of the many roles volunteers play. This year, the spotlight was for Naturalist Eric D'Aleo's Field Cam Assistants. This small group helped with the Hidden Stories project, which documents the wildlife that visit the Science Center through a network of motion-sensor cameras. This volunteer corps includes Caitlyn Bourret, Charlie Bourret, Dawn Bourret, Elaine Egolf, John Egolf, Michelle Janosa, Barb Laverack, Blake Schaffer, Lea A. Stewart, Tess Tremblay, and Betsy Whitmore.

"Volunteers Complete the Picture" in the Trailhead Gallery is dedicated to our volunteers. It is updated annually to show cumulative hours of service over the course of time for

volunteers exceeding 200 hours of service. Volunteers who attained 200 or more hours in 2018 are: Sylvia Detscher, John Egolf, Karen Grauly, George Gurney, Lex Hetrick, Linda Michelson, Karen Rosolen, and Tess Tremblay. Joan Martin, Peggy Martin, Wayne Martin, and Ken Ruhm surpassed the 500-hour total. Gary Robertson exceeded 1,000 hours.

Executive Director Iain MacLeod presented the President's Volunteer Service Awards, a national program, which celebrates the impact volunteers make in bettering our communities and our world. Volunteers who achieved the Bronze Award for donating between 100 and 249 hours in 2018 are: David Detscher, John Egolf, Susan Gurney, Michelle Janosa, Karin Karagozian, David Martin, Wayne Martin, Ellena Merrill, Linda Michelsen, Karen Rosolen, Nance Ruhm, Carol Stewart, and Lea Stewart. Jim Barry donated 403 hours in 2018, earning a Silver Award. Immediate past Board Chair Ken Evans donated 752 hours and earned the Gold Award.

Many thanks to all the dedicated volunteers who give their time and skills so generously!



Deb Doe and Sarah Porrazzo greeting visitors.



Bebe Wood and Iain MacLeod at the Parsons Volunteer Dinner.

BUSINESSES INVEST IN EDUCATION: THANK YOU FOR YOUR SUPPORT!

Many local businesses provide support through memberships, sponsorships, and in-kind contribution of goods and service each year. In 2019, these businesses supported educational programs through their contributions. Learn more at nhnature.org/support.

Business Members: Bob's Shur-Fine Market, Cormack Construction Management, David M. Dolan Associates, Donahue, Tucker & Ciandella, East Coast Foundation, Foreco, Franklin Savings Bank, Giuseppe's Pizzeria & Ristorante, E.M. Heath Supermarket, Holderness Harbor, Home Repair Plus, Malone, Dirubbo & Company, Neurodevelopmental Institute of New Hampshire, New Hampshire Electric Co-op, Peabody and Smith Realty, Pike Industries, Rockywold-Deephaven Camps, Six Burner Bistro, and Transformative Healthcare New Hampshire.

Business Sponsors: Belknap Landscape Company, Common Man, Cross Insurance Company, Dead River Company, Keller Williams-Lake and Island Properties, Meredith Village Savings Bank, New Hampshire Electric Co-op, New Hampshire Electric Co-op Foundation, Patty Stewart and Associates, Rockywold-Deephaven Camps, and Christopher P. Williams Architects.

Summer Splash: Alpine Adventures, Art by Michelle, Canterbury Shaker Village, Center Sandwich Fine Craft Gallery, Common Man, Cormack Construction, Cottage Place on Squam Lake, Dunkin Donuts, East Coast Foundation, Ehlers Management Group, Functional Fitness, Giuseppe's Pizzeria & Ristorante, Lucy Golden Jewelry, Great Glen Trails, E.M. Heath Supermarket, Irwin Automotive Group, Malone, Dirubbo & Co., Meredith Village Savings Bank, Mill Falls at the Lake, Minuteman Press of Plymouth, Mount Washington Auto Road, Mount Washington Cog Railway, New England Commercial

Solar Services, New Hampshire Fisher Cats, Orvis, Patrick's Pub, Peabody and Smith Realty, Rhino Bike Works, Samyn-D'Elia Architects, Six Burner Bistro, Squam Lakes Financial Advisors, Tall Timber Lodge, White Mountains Country Club, Wholly Tara, and Christopher P. Williams Architects.

In-Kind Donors: Aubuchon Hardware - Meredith and Moultonboro, Belknap Landscape Company, Biederman's Deli, Cackleberries Garden Center, Canterbury Plantation, Chick-a-dee Station, Common Man, Country Cottage, Country Lady Bug Greenhouse, DiFilippe Family Farm & Greenhouse, Dirty Worm Greenhouse, Donovan Tree Experts, Emma's Perennials, Greentek Mapping Services, Hannaford - Plymouth and Meredith, E.M. Heath Supermarket, Home Comfort, Lowes - Gilford, Lucy Golden Jewelry, Marie's Catering, Megaprint, Meredith Rotary Club, Mill Falls at the Lake, Moulton Farm, Petal Pushers, Plymouth Animal Hospital, Precision Lumber, Spider Web Gardens, Squam Boat Livery, Squam Lake Marketplace, Stephens Landscaping Professionals, Stonyfield Farm Organics, Van Berkum Nursery, Wayside Farm and Great Northern Berries, Webster Lake Ice Fishing Derby, Winnepesaukee Playhouse, and Yeaton Agway.

Volunteer Groups: Americorps, Granite United Way, Hypertherm, J Jill, Proctor Academy, Stonyfield Farm Organics, Strong Foundations Charter School, and University of New Hampshire Natural Resources Stewards.

We gratefully acknowledge all business supporters. Please notify Development Officer Kim Beardwood Smith if any listings are inaccurate or missing. Contact Kim to learn about 2020 sponsorships. Contact Volunteer Manager Carol Raymond for information about volunteering.

OPENING A WINDOW TO THE NATURAL WORLD

Please Give to our 2019 Annual Fund Appeal



You may be a member, a volunteer, a donor, a business sponsor, a trail visitor, or a program participant. In whatever way you are connected, thank you. Please give to our Annual Fund to support this unique place where people of all ages connect with nature. Give to support an educational philosophy that natural science literacy is just as important as reading, writing, and arithmetic. Give to support meaningful and memorable educational programs about the natural world.

There are many ways you can give:

- Respond to the letter you recently received and mail a gift.
- Call the office at 603-968-7194.
- Donate online at www.nhnature.org/support/annual_fund.php.
- Double your donation with a matching gift through your employer.

- Give from your IRA – if you are 70 ½ or older, you can save on taxes through a tax-free IRA distribution to a qualified charitable organization like the Science Center.
- Celebrate a special occasion or honor a friend or family member with an honorary gift.

Every year individuals, foundations, and businesses give critical support for our mission to advance understanding of ecology by exploring New Hampshire's natural world. Please support natural science education by making an Annual Fund donation by December 31. Thank you.

Opening a Window to the Natural World is written by Development and Communications Director Janet Robertson. You may contact Janet at 603-968-7194 x 12 or janet.robertson@nhnature.org.

These generous donors made tribute gifts, which were received between July 1 and September 30, 2019:

In memory of William Bierlin
Elizabeth Bierlin
Carolyn Bierlin Cerasi

In honor of Sarah and Win Brown
Ann and John Grube

In memory of Betsy Merrill Burnham
Jean and Brad Byrd

In memory of Caddy
Sonja Guzman

In honor of Nancy and Bill Dailey
Tim Van Winkle

In memory of David Farley
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In memory of Janet and Richard Ford
Ginny and Frank Corcoran

In honor of Brenda and Fred Jackson
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In memory of Barbara Ridgely
Virginia Ridgely Howe

In memory of William W. Vogel
Kent and Ellen Albright

Linda Anderson
Bob and Kathy Bird
Ann Brecker
Joan and William Carpenter
Warren Miller
Buck and Mary Scott
James Wood

In honor of Judy Wishnant and John Bell
Celia Wishnant

NEWSBRIEFS *continued from page 5*

Education annual conference in Lexington, Kentucky. Carol and Audrey presented on Community Action Projects, which are now part of the First Guides program, through the ee360 Community Fellows mini-grant program.

- Blue Heron School teachers attended the New Hampshire Montessori Association conference in October.

- Iain MacLeod appeared on a panel on NHPR's Exchange on October 18 talking about "underappreciated or misunderstood critters" such as opossums, fisher, and porcupine.

- The Helen Clay Frick Foundation of Pittsburgh, Pennsylvania donated grant funding to build a new kiosk in Kirkwood Gardens. Surplus funds were used for a new interactive Solar Energy Exhibit. Frick Trustees Natalie Della Rosa and Ned Dane helped to acquire the funding.

- The record-breaking year for visitors this season meant just under 72,000 visitors enjoyed the live animal exhibit trail.

- There will be a timber harvest this winter, as recommended in the Science Center's forest management plan. The

first harvest was four years ago. This second thinning is smaller (about 20 acres) and is located near the fire station, along the western property boundary. Forester Dan Stepanauskas will oversee the project.

- Halloween Hoot 'N Howl took place on a beautiful starry night on October 19. More than 330 people enjoyed four seasonal skits, followed by treats and drinks provided by Dunkin Donuts - Plymouth, Hannaford Supermarkets - Meredith, E.M. Heath, Moulton Farm, Tootsie Roll Industries, and many talented volunteer bakers. Volunteers from Hypertherm put up decorations and carved pumpkins.

- Iain MacLeod was named to the 2019 It List from *New Hampshire Magazine*. The list showcases the people making an impact on New Hampshire.

- 2020 Summer Internship descriptions are available on the Careers page at nhnature.org/who. Internships are a great way for college students to gain experience. Internships include Animal Care, Education Program (2), Guided Discoveries, Marketing, and Volunteer Program.



Become a member of the Naturalist's Legacy Society.
Visit nhnature.org/support

GREEN TIP: ANSWER THE CALL...RECYCLE!

Your old unused handheld electronics that is!

Drop off your cell phones, Smartphones, ipods, ipads, tablets, adapters, chargers, MP3 players, handheld gaming systems, and the accessories that come with them. These items have a huge impact on the environment. We will send them to Ecocell and they will be reused or recycled and the Science Center will receive cash back.

<https://www.eco-cell.com/>

TRAIL'S END

WILD ENCOUNTERS



As a Blue Heron School parent, a volunteer, and a frequent visitor to our animals and trail, I figure I visited the Science Center more than 200 times in 2018. And I have been doing that every year for the past six years. I thought that gave me a pretty good understanding of all the things the Science Center does. I was wrong.

One of the really fun things about being Chair for the past few months is all the events I've attended, which I'd never been to before. At our annual Parsons Volunteer Recognition Dinner, I saw just how many volunteers are integrally involved in every aspect of our mission. Attending a lunch for past trustees, I heard much about so many of the issues and challenges the Science Center has faced over the years. Perhaps the most enjoyable was the Naturalist's Legacy Society event, which included hands on animal enrichment activities. It is not surprising - but still wonderful - to see just how much we do to make sure all our animals live wonderful lives.

During one of these events, a former trustee's wife pointed out our animal friends are enjoyed not only by little kids, but also by 70- and 80-year-old kids! Soon after, I learned about the amazing number of outreach events our education staff puts on every year.

That got me thinking about how wonderful it would be to do outreach visits with seniors. Of course, I soon learned the staff was already a couple of steps ahead of me (this happens a lot!). About five years ago, Executive Director Iain MacLeod and his team did a number of these visits.

Unfortunately, as with our programming for kids, not everyone has the funding they need. Fortunately, the Science Center's wonderful mission and reputation resulted in an anonymous donor willing to underwrite the outreach visits to our area's senior centers and skilled nursing and assisted living facilities. If you know of one that would benefit from a free outreach program from November through April, please reach out to Education Director Audrey Eisenhauer to inquire about New Hampshire Wildlife programs (603-968-7194 x 14 or audrey.eisenhauer@nhnature.org). For more information, see <https://www.nhnature.org/programs/outreach.php>.

Trail's End is written by Justin Van Etten, Chair of Squam Lakes Natural Science Center's Board of Trustees.
You may contact Justin at justin.vanetten@gmail.com

SNOW CAT *continued from page 1*

Tail contest? The bobcat's name refers to its bobbed or short tail. Ironically, the lynx has the shorter tail but is also taller than the bobcat. A fascinating feature of the lynx is the extended black fur tips on its ears, much longer than bobcats'. These are thought, in some way, to heighten its sense of hearing. With snowshoe hare hiding camouflaged in brushy hollows, lynx need their ears to work in tandem with their acute eyesight to detect camouflaged prey.

One feature, which lynx and bobcat share, has always intrigued me. If you imagine the young kittens attempting to follow their mother through dark forest and brushy woods at night you can understand why both species have a white patch on the back of their ears, acting as a beacon for the youngsters to follow.



What does the future hold for lynx? Changing climate conditions will continue to present challenges. With warmer winters and rainy thaws, the deep, soft snow lynx glide over with ease is more often being replaced by crusty snow. Competition then heightens between lynx and predators like coyotes and fisher. Way up in northern

New Hampshire this elusive snow cat continues to surprise, intrigue, and find a home. May the soft snows continue to build, the spruce fir forests proliferate, and the snowshoe hare multiply.



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<http://smile.amazon.com>

LYNX QUIZ

1. What is the major factor that makes lynx more adept in deep snow than bobcats?
2. True or False? When snowshoe hare populations decline in an area, so do lynx populations.
3. What kind of forest do snowshoe hare prefer?
A. Deciduous B. White pine C. Spruce/fir
4. What is an emerging weather threat for lynx in northern New England?
5. What surprising color is on the back of a lynx's ears?

Answers:

1. Large paws | 2. True | 3. C | 4. Climate change | 5. White

GIFTS OF NATURE

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- ★ Gift Membership
- ★ Sponsor A Species

Available at the Howling Coyote Gift Shop by calling 603-968-7194 x 47.

- ★ *Nearer to Nature* Book (\$19.95)
- ★ *50 Nature Activities for Kids* Book (\$14.95)
- ★ Science Center etched logo glasses including stemless wine glass (\$13.95) and rocks glass (\$12.95).





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