Tracks & Trails
Squam Lakes Natural Science Center

Winter 2022
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Winter in a Black Bear's World

By Margaret Gillespie

In spring, I've watched in fascination as mother bears, with their young cubs, feast on new sprouts of green grass along the slopes of Cannon Mountain in Franconia Notch. These fresh greens appear to magically emerge where a blanket of snow lay just days earlier. To arrive at this spring abundance, black bears overwinter with their own version of hibernation. They are dormant most of the time and refrain from eating. However, in the midst of this winter survival mystery, bear cubs are born and nursed as needed by the female bear. How does this surprising seasonal lifestyle work for black bears?

The fall season finds bears feasting on nature's autumn harvest - berries and other fruits and nuts - packing on up to 30 pounds per week! Amazingly, this fat reserve will sustain bears through the winter season without additional food or water. Fat is burned for energy rather than utilizing and losing muscle. Decreasing day length is key to initiating this hibernation. Bears do not hibernate like groundhogs whose body temperature and heart rate drop dramatically, but bears still need to alter their lifestyle to conserve resources. Their winter den is comparatively small, possibly incorporating a fallen tree or a large rock crevice, just room for an adult female and her two to three cubs. The bears' thick coats add to the insulation. However, with body temperature only slightly lowered, black bears can still be aroused. The advice, "don't poke the bear," is wise guidance from the real world!

How do black bears maintain their muscle mass through such a long period of inactivity? In an article from *National Woodlands* about black bears being masterful at winter survival,

continued on page 11

In this issue...

Give the gift of nature and help support the Science Center this giving season.
See page 8 for details.

Support the Science Center with a gift to the Annual Fund.
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Forging Trails:
Bears Galore!

For me, the summer of 2022 was a bonanza for black bear sightings. On my daily commutes between the Science Center and my home in Sandwich, bear sightings were practically a daily occurrence. In the summer months, bears gorge on wild flowers and grasses, and there are certain clover-filled fields where I could count on seeing a family of bears on my way home. Momma would be grazing on the salad bar buffet, while the cubs frolicked and occasionally sampled the greens on offer.

Bears were a regular visitor to my yard too, as well as to my neighbor's chicken house. I don't think he lost any chickens, but they certainly hauled off his tub of chicken feed at least once! Judging by the number of times his night-time sound alarms went off, they tried a few times.

One yearling bear that we regularly viewed from our porch would grub around near the rock walls turning over logs and ripping apart rotten stumps in search of grubs and yellow jacket nests. Tess, our dog, treed him a couple times and would race around first thing in the morning snorting and growling as she smelled where he had been the night before. Obviously, bear populations are on the rise in New Hampshire and Sandwich seems to be a hotspot.

It is a delight to see them and I always get a thrill with every encounter. There are downsides of course. Three of the ten Bluebird nest boxes in my meadow were vandalized by a bear. The metal posts were bent to 45 degrees and the wooden boxes bitten and clawed open. Thankfully this happened after the nesting season. The same thing happened to a couple boxes last year and I attached those pine-scented, tree-shaped air fresheners to the poles of the occupied boxes this year. I read that black bears hate the scent of pine oil. Interestingly, the three that were hit this year did NOT have the stinky trees attached. I guess every box will get them next year!

A new black bear arrived here at the Science Center in October. This little male was confiscated from a family in South Carolina who had "adopted" him illegally. He is completely habituated to people and therefore could not be released back to the wild… so he needed a good home. At only 75lbs., he has a lot of growing to do to catch up with our old female bear. She weighs in at 375lbs! By the time he cleared the thirty-day quarantine, our trail season was over and it was nearly time for the bear's winter sleep, so he will not be introduced to the female bear and to the public until next May.

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Black bear and cubs by Iain MacLeod

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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.

Tracks & Trails is a regular publication of Squam Lakes Natural Science Center distributed to members and contributors. Comments are welcomed by newsletter editor Amanda Gillen.

Opening a Window to the Natural World

By Amanda Gillen, Development and Communications Director

In the Winter 2021 *Tracks & Trails*, we showcased our new solar photovoltaic array on the roof of Blue Heron School. This 24.82kW project has been up and running since last winter and produced 24.5 MWh of power this year. We are very excited to announce that we are in the final phase of our solar project which includes additional ground mount arrays between the parking lots in front of the Welcome Center.

You may have noticed site work happening at the Science Center this fall including digging trenches across the main driveway to accommodate conduit, tree removal in the parking areas, and heavy equipment preparing to install the racking system. As I write this, an excavator is placing steel posts for the racking and in the coming days the panels will be mounted, connected, and will go live.

The total project size is 142kW which should offset nearly 100% of the Science Center's electricity usage and save more than 250,000 pounds of CO2 annually. In our recent strategic plan we pledged to have 50% of our energy usage coming from renewable sources by 2030. We're thrilled to be making nearly 100% of our electricity from the sun by 2023!

Board Chair, Sarah Brown talks more about our new strategic plan on page 11. This plan includes climate change education so you'll be hearing more about this topic.

According to the Solar Energy Industries Association (SEIA) New Hampshire has approximately 184 MW of solar installed, which is enough to power over 28,000 homes. But New Hampshire is still only producing about 0.0117 percent of it's energy from the sun. We're ranked 40th in the US for solar installations.

It's a small part, but it's a step that we can collectively do together.

Are you interested in supporting our solar energy project? Contact me at amanda.gillen@nhnature.org.

Animal Enrichment

by Lauren Moulis, Animal Care Director

The non-releaseable animals at the Science Center are cared for by Animal Care team members who are responsible for many tasks during the day. Animal Care makes daily decisions that directly affect the animal's welfare. While staff are typically the ones making the best decisions for the animals, whether it be developing appropriate diets, or deciding when they will come in to their night habitats, one thing the animals have a choice about is how they interact with enrichment.

Our enrichment program enables us to increase the health and wellbeing of our animals by providing ways for the animals to be stimulated and use their natural behaviors like digging, smelling, ripping, and scent marking. One of the major challenges with captive animals is the potential stress and boredom that can come from being in the same space over a period of time. This often manifests itself in stereotypic behaviors like pacing, feather plucking, or over grooming. By taking part in behavioral husbandry/environmental enrichment, and sharing tools and resources among staff at other zoos and aquariums, we help reduce the animals' stress while providing the benefits of not being in the wild (e.g., consistent food, lack of disease and predation).

To provide the best enrichment, staff take the animal's natural history into account. Natural behaviors are the backbone of creating an enrichment program that will allow for the best care of the animal. Does the animal dig in the wild? Providing a dig pit of cocoa fiber and mealworms makes a novel challenge for the day. Does the animal climb? Something as simple as many logs and branches organized around the space will be a sure-fire win. Our enrichment plan requires daily enrichment changes, since what was fun on day one may be boring by day seven. Decreased effectiveness of the enrichment, results in decreased wellbeing of the animal. We work hard to ensure variety and documentation and are setting future goals for the different taxa in our collection.

An enrichment program is not successful without monitoring and evaluation. Our current program documents the type of enrichment used so that we are able to see trends and patterns about what is being offered. In the last couple of years, we have observed that animals engaged with food in puzzle feeders took longer to eat, were active longer, and maintained a healthier relationship with staff. In response, we changed from offering daily diets in bowls to only offering diets in different forms of enrichment feeders.

While you are walking the animal exhibit trail, you may notice whiteboards at select habitats that show the enrichment for the animal for the day. We generally provide scents and novel food items where our visitors can watch, which is part of a larger picture for all of our animals at the Science Center. Next time you visit, see if you can spot animals interacting with their habitat in enriching ways!

Naturalist's Corner

More About Bears

By Jeremy Phillips

Black bears (*Ursus Americanus*) not only have unique ways to survive winter, they also have fascinating ways to survive the rest of the year. These adaptations help bears find food in a variety of places and eat many different things. Black bears are very versatile and are an important part of the ecosystem.

One of a black bear's most notable features is its nose. A black bear's sense of smell is about 100 times greater than a human's. Even bloodhounds cannot match the sense of smell of a black bear. They can even find an animal carcass from over a mile away. Some scientists think black bears can smell something over 15 miles away. This sounds amazing, but polar bears (*Ursus maritimus*) have been known to track seals for up to 40 miles. Seventy-five percent of what a black bear eats is plant material, smelling apples in the fall, berries in summer, or fresh clover and dandelion in spring. The animal food they eat is usually dead things, insects, or something easy to catch. They may even use their nose to find insects under rotting logs and roll that log using their powerful muscles.

In addition to the large nose, bears have the help of a Jacobson's organ located just above the roof of the mouth. This same organ is used by snakes when they flick odors into the area of this organ. Bears, and other mammals, will also use the flehmen response where they open their mouth, curl their upper lip, and intake air.

Black bears are very strong. Rolling logs, rocks, or ripping open dead trees come in handy to get colonial insects. Bending back branches to access seed or fruit is another way they can use their strength. They will even sit in beech trees (*Fagus grandifolia*) bending branches back towards their sitting spot to get beech nuts. This causes the leaves on the broken branches to turn brown, creating what we call "bear nests". Black bears are excellent climbers with hooked claws helping them dig into grooved bark.

Other important adaptions are numerous. From teeth used to eat a variety of food types, the ability to eat quickly and reliance on mashing to occur in the stomach, as well as a good memory to recall food locations are from year to year, black bears are an important part of our ecosystem. Using their nose and power, their ability to climb and eat just about anything, they spread seeds through their scat creating a more diverse community. They are one of many animals that eat insects. Bears have truly amazing adaptions which make them well suited for life here in New Hampshire where they are a key part of our landscape.

Scan the QR code to support the Science Center with a gift to the Annual Fund today.

Wish List

For the Animals: Visit our wish list on Amazon at https://tinyurl.com/y62atm27
For Lake Cruises: waterproof flashlights (4), HawkEye DT2B DeptchTrax depth finder
For Animal Care: gift cards to local hardware and grocery stores; bath towels
For Operations: forks and spoons for office kitchen
For Intern Cottage: Working refrigerator
For Staff: Airline miles to attend professional development experiences

Kirkwood Gardens

By Emma Erler

Can you compost in the winter?

If you're new to composting, you may be wondering if it is okay, or even possible, to compost through the winter months. Most likely your stream of compostable kitchen waste won't diminish because of freezing temperatures and snow on the ground. Fortunately, it is absolutely possible to continue successfully composting during the winter. While the decomposition process slows down once the temperature drops, it doesn't totally stop, or at least not for long. Bacteria, fungi and other microbes, as well as larger decomposers like sowbugs, pillbugs and earthworms, can survive in compost piles year-round and will start breaking down organic matter as soon as it gets a little warmer. You'll have the most success composting in the winter if you use some of the following suggestions.

Gather Leaves
One of the most important things you can do in the fall is gather leaves for use in composting. Leaves and pine needles are excellent brown, carbon-rich materials which improve compost pile aeration and reduce odors. Don't have any leaves? Shredded newspaper or wood shavings are good alternatives.

Layer Greens with Browns
Just like in the summer, the composting process will be most efficient if you continue to layer greens with browns in the winter. A common mistake is to add only greens throughout the winter months, which can create a stinky, wet mess come the spring thaw.

Insulate the Pile
Insulate compost in order to keep it from freezing solid and halting decomposition. Compost bins can be surrounded with bags of leaves or straw bales to buffer against freezing temperatures. Another option is to ring the inside of the bin with 6-12 inches of leaves, sawdust or woodchips.

Wait to Turn the Pile
There is no need to turn the compost pile in the winter months, as doing so will only result in heat loss in the interior of the pile. This can slow the decomposition process further. Instead, wait to turn the pile in the spring once it is completely thawed.

Plant Spotlight

Kousa Dogwood

***Benthamidia japonica* 'Heart Throb'**
(formerly *Cornus kousa*)

Culture: Grows well in organically rich, medium moisture, well-drained soils in full sun to part shade. May require irrigation under drought conditions.

Height & Width: 15 to 20 feet tall and wide

Kousa dogwood is a small, deciduous flowering tree native to Japan, Korea, China, and Taiwan. It has grown in popularity over the past several decades because it has much better disease resistance and cold hardiness than flowering dogwood (*Benthamidia florida*). Kousa dogwoods are attractive throughout the entire year, with showy flowers from late spring through mid-summer, pinkish red fruits in late summer which are eaten by wildlife, reddish-purple fall foliage, and exfoliating gray bark which stands out in the winter.

Kirkwood location: Lower garden next to compost bins.

flickr.com/dorseymw CC BY 2.0

Christmas Fern

Polystichum acrostichoides

Culture: Best grown in rich, moist, well-drained soil in part shade to shade

Height: 24 inches

This dark green, leathery, clump-forming fern is native to the eastern U.S, and is often found in the New Hampshire Lakes Region in the understory of deciduous trees. It stays green throughout the winter, and the individual pinnae on each frond resemble tiny Christmas stockings. It tolerates New Hampshire's rocky soil and so is a great addition to any shade or woodland garden. The clumps grow but stay where planted. Tolerates deer, drought and heavy shade.

Kirkwood location: Several areas throughout the upper garden. It forms an edge in the bed under the large Sugar Maple by Route 3.

Photo by Susan Gurney

Staff Profiles
Jordan Fitzgerald and Jordy Gianforte

Dr Maria Montessori said "When children come into contact with nature, they reveal their strength."

Co-Directors Jordy Gianforte (L) and Jordan Fitzgerald (R).

Jordan Fitzgerald and Jordy Gianforte get to see the reality of that statement everyday through their work at Blue Heron School. Jordan and Jordy found their way to Blue Heron School through different paths, but fell in love with it for the same reasons. At Blue Heron, children are encouraged to discover a love for the earth, each other, and themselves. This is accomplished by allowing children to be responsible for their own choices and actions and presenting them with opportunities to learn about the world around them.

Blue Heron School follows a Montessori curriculum while focusing more intensely on the components involving nature that Montessori had implemented in her work. Teachers work with Science Center naturalists on a different nature topic each week. The forty children who attend the school are divided into small groups. The naturalist act as guides for the students using the Science Center's campus to participate in hands-on experiences in nature. Lessons are continued indoors and in the outside classroom. The children spend daily time outdoors in both structured and unstructured settings in every type of weather.

Jordan Fitzgerald has been working at Blue Heron School since it opened in 2010 and has been integral in making the school what it is today. She is committed to the Montessori philosophy and works to ensure a love for nature in all of her students. Jordy Gianforte joined Jordan at Blue Heron School in 2015. Jordan and Jordy worked closely together as co-teachers until the school expanded in 2018 when Jordy became a lead teacher in a second classroom.

When long time director Laura Mammarelli announced her retirement, it seemed natural for Jordan or Jordy to take her place. However, neither one of them wanted to give up being in the classroom with children every day. They came up with a Co-Director proposal that suited both their personalities and strengths. Sharing the responsibilities as Co- Directors has also given both teachers more time to be able to expand on the nature/Montessori curriculum and both have exciting ideas for new activities to implement in the classrooms and with the naturalists.

Both directors are optimistic about the future of Blue Heron School and would like to expand access to families from a variety of areas and backgrounds. They hope to continue developing the curriculum, and to be the model for future Montessori/Nature schools so that all children may have access to nature education, establishing a lifelong connection to the natural world.

From the Heron's Nest

Blue Heron students are learning about the natural world through their senses and with hands-on experiences with the naturalists. The kindergarten students learned about land and water forms by hiking Mount Fayal and going out on Squam Lake with Eric Egg and Kyle Kestrel. Students are also spending time in the outdoor classroom, learning to use tools and furthering their naturalist studies, while enjoying the fresh air!

Blue Heron School is a nature-based Montessori school for children ages three to six. For information please visit nhnature.org/programs or contact Blue Heron School Co-Directors Jordan Fitzgerald or Jordy Gianforte at 603-968-7036 or blueheron@nhnature.org.

Upcoming Programs & Events

Programs have limited capacities. Tickets must be reserved and paid for in advance at nhnature.org.

Wild Winter Walks

10:00 to 11:30 a.m.
For ages 7 and up

Saturday, January 7, 2023
Sunday, January 15, 2023
Saturday, January 28, 2023
Saturday, February 4, 2023
Saturday, February 11, 2023
Sunday, February 19, 2023
Saturday, February 25, 2023
Saturday, March 4, 2023
Sunday, March 12, 2023
Saturday, March 18, 2023

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 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. An adult must accompany children. This program is all outdoors; dress in warm layers with insulated snow boots, hats, and gloves.

Cost: $10/member; $13/non-member

Intro to Ice Fishing

Sunday, January 22, 2023, 7:00 to 10:30 a.m.
For ages 9 and up

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. All fishing instruction, equipment, and bait provided at no extra cost.

Ages 16 and up must have a current fishing license. Adults must accompany children as a registered program participant. Wear insulated, water-proof 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, hand and toe warmers, and a camp chair. Purchase fishing licenses through New Hampshire Fish & Game, which helps conservation efforts in our state.

Cost: $30/member; $35/non-member

Homeschool Series: Earth Cycles

Monthly through April

This educational series is specifically for homeschooled students. Programs focus on the cycles you can observe in the natural world. Topics include rock cycle, water cycle, life cycles, and more!

The program includes a series of monthly one-hour, in-person programs held outdoors, with a 30-minute virtual wrap-up the following week featuring a live animal.

In-person Outdoor Program: First Thursday of the month, 10:00 to 11:00 a.m.
Two sessions offered: Ages 4 to 6 or ages 7 to 10
December 1, January 5, February 2, March 2, April 6

Virtual Wrap-up with a live animal: Second Thursday of the month, 10:00 to 10:30 a.m.
For all ages
December 8, January 12, February 9, March 9, April 13

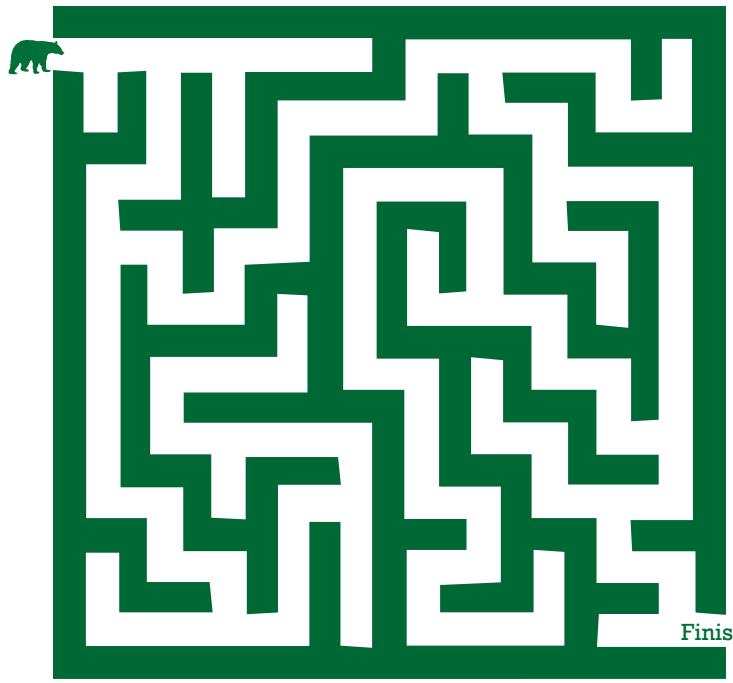
Cost per session: $9/member child; $11/non-member child
An adult must participate with children at no additional cost. Each additional adult pays child fee.

Save the Date: 2023 Family Picnic, Saturday, July 22, 2023

Kids Activities

Help the black bear find the way to his winter den.

Start



Finish

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Black Bear
Enrichment
Blue Heron School
Climate Change
Solar
Volunteer
Sleep
Adapt
Plug
Hibernate

Give The Gift of Nature

Gift Membership: Give the gift of nature to family and friends with full member benefits. Visit nhnature.org/membership

Sponsor A Species: Help provide food, health care, and housing for the animals for a favorite feathered or furry species. Visit nhnature.org/support

Birds of the Squam Lakes Region: A must-have for any bird watcher anywhere. Visit nhnature.org/books

Nearer to Nature: Reflections on nature by naturalist Margaret Gillespie. Visit nhnature.org/books

50 Nature Activities for Kids: Interactive and hands-on activities by season to experience nature in your backyard. Visit nhnature.org/books

School Programs

Make Learning Come Alive

Plan now for your winter (and even spring 2023) field trips at the Science Center! In-person outdoor programs at the Science Center or at your school are available for preschool through high school.

Learn more at nhnature.org/teachers

From the Archives: A look back at the Science Center's history in photographs.

Our mountain lion cubs at 9 weeks old in January 2003 (left photo) and the male mountain lion at 12 weeks old (right photo). These siblings were orphaned in Montana and could not be released back to the wild. The female mountain lion (front) was 19 years old when she passed away in November 2021. The male died at 20 years old in November 2022. Both died from complications associated with old age. In the wild, a mountain lion might live an average of 8 to 12 years, so ours lived very long lives.

In Memoriam: Bertha Fauver

Honorary trustee Bertha Fauver passed away in October at the age of 102. Bertha served as a trustee from 1971 until 1995 when she became an Honorary Trustee and served in that role until her passing. She was Vice President from 1975 to 1978 and again from 1992 to 1993, and President from 1983 to 1984. Bertha was Chair of the successful Quarter Century Fund capital campaign which was completed in 1991 and raised $1,250,000. She was also Development Committee Chair and helped create and implement new ways to get supporters involved with the Science Center. She led by example too, making generous financial contributions but also giving generously and graciously of her time and energy.

Bertha's interest in the natural world began early in life exploring the woods and lakes of New Jersey. Bertha rowed while her father fished and her mother taught her about flowers and trees. Bertha went on to graduate from Smith College with a degree in Zoology.

Bertha and her husband Al came to Plymouth in the early 1960s where Al was at Holderness School. They both shared a lifelong involvement with Camp Pemigewasset in nearby Wentworth. They became associated with the Science Center from its earliest days. Bertha seized the opportunity to make a difference at Squam Lakes Natural Science Center and to get other people involved because she wanted to be a part of a special place where the young and old would be drawn to learn more about and appreciate New Hampshire's natural world.

In Bertha's words, "I enjoy giving people the opportunity to participate in such a good cause."

Thank you Volunteers

This year, 22 new volunteers were trained in a variety of areas. There are still a couple of volunteer services that have not reopened due to COVID, including Animal Care.

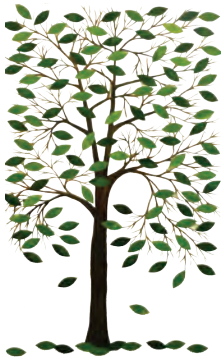
Volunteers and staff enjoyed a wonderful evening on August 31 at Camp Deerwood to celebrate and honor our magnificent team of volunteers. Trustees chose the Docent and First Guides Teams to highlight, with Education Director Audrey Eisenhauer sharing the long list of all they do. Since the Docent Program began in 1997, docents and junior docent First Guides (started in 2009) donated close to 33,000 hours of service. At today's value of a volunteer hour of $29.95 as set by the Independent Sector, that would translate to almost $1,000,000. Thank you docents, First Guides, and all volunteers for the incredible gift of your time and talents.

Now that the trail is closed for the season, volunteers will continue to be scheduled for a variety of services. In addition to mailings, programs and events, and outreaches, volunteers will be invited to attend continuing education programs, such as Volunteer Gatherings. Those interested in becoming a volunteer may visit the volunteer page on our website to read about many regularly-scheduled opportunities and access the Volunteer Application (https://nhnature.org/who/volunteer.php). Contact Volunteer Manager Carol Raymond at Carol.Raymond@nhnature.org for additional information.

Newsbriefs

- Visitor Services Manager Sarah Wall left the Science Center in late September to pursue a career in accounting. Sarah is currently pursuing a master's degree in this field.
- Joy Huke is handling private event rentals including wedding ceremonies and receptions, rehearsals, and other private events. We have two locations including Fox Meadow (located behind the Fish & Game boat parking) and Kirkwood Gardens. Visit our website for information nhnature.org/programs/garden_weddings.php
- A big welcome to Ashley Yeaton who joined Blue Heron School as Associate Teacher in September. We are excited to have Ashley join the Blue Heron School and Science Center community.
- MEMBERS: Show your Science Center membership card to receive free admission to the New Hampshire Telephone Museum in March 2023 (up to 2 adults and 2 children, one-time free admission).

Tribute Gifts can now be found online at nhnature.org/support



What Will Your Legacy Be?

This is a question we all may ask ourselves at different points in our lives. What do you want to leave behind and what impact do you want to have on future generations?

You do not need to be a millionaire to leave a legacy gift and it doesn't have to be complicated. It can be as simple as listing the Science Center as a beneficiary for a retirement plan or life insurance or listing the Science Center in a will or trust.

Learn more at nhnature.org/support/planned_giving.php

Trail's End
Strategic Planning

One of the most important tasks of a non-profit Board of Trustees is to establish long term plans and goals for the organization it is leading. Doing so is often called strategic planning, although I will forever call it "strategery" in honor of the hilarious Saturday Night Live skit in 2000 that used this garbled version of the word. Am I the only one who remembers that riff??

True to form, the Science Center Board is in the midst of developing a multiyear strategic plan. In truth, we are a bit behind because COVID made it so hard to meet and work together – but we are feeling more confident and healthy these days and the planning is now well underway. We sought the views of many Science Center communities – visitors, our terrific staff, current and past Board members, funders, docents, volunteers, and more.

The question on the table is: what should be our areas of emphasis over the next 5 plus years? At present, four topics have risen to the top.

First is the care and wellbeing of our extensive animal collection. We pride ourselves on our careful stewardship but also know that as standards evolve and understanding of animal behavior and cognition increases, we need to adjust, adapt, and improve. More about this area soon.

Second is a crisp focus on climate change education. The consensus is strong that although we are already doing quite a bit in this area, we can and must do more. Towards that end, we are looking carefully at additional steps that we might take – with a special emphasis on what individuals and local groups can do to help, and how we might work with other like-minded groups to have a larger impact.

Third, we want to make certain that a wide range of people – broadly defined – feel welcome and engaged in our efforts. Socio-economic and geographic diversity are an especially important part of this on-going work, as is a clear focus on making sure that our trails and programs are open to people with a wide variety of aptitudes and needs.

Fourth and fundamentally, we are planning an expanded emphasis on securing the financial future of the Science Center. Our many donors are generous beyond all measure and we hope to find new ways to express our appreciation to them and to increase their numbers.

Happy winter to us all! Stay safe and warm.

Trail's End is written by Sarah Brown, Chair of Squam Lakes Natural Science Center's Board of Trustees.
You may contact her at sarahbrown1948@gmail.com.

Bears *continued from page 1*

authors Lynn L. Rogers and Al Taylor describe how black bears can support muscle strength even in winter by reusing nitrogen in waste urea from their kidneys to generate protein! This process sounds like an amazing recycling plan. Bones maintain their strength as well, surprisingly because the bears are not weight-bearing in winter. Perhaps bears hold a key to healing for injured or sick humans who are bedridden.

When bears emerge in the spring, there is one necessary ritual to follow. Although the bears have not eaten all winter, some waste remains, forming a "plug" at the end of their digestive tract. This 3-4-inch firm packet is excreted and the bear begins a new year's cycle of foraging and gaining pounds for surviving the next winter.

With the length and severity of winters in New England decreasing, how are black bears reacting? In an Appalachian Mountain Club article entitled "How Changing Winters Affect Black Bears," Kelleigh Welch explores how bears are handling fluctuating conditions. She notes some behaviors which are switching - black bears may emerge earlier in the spring than in the past and also be aroused by early thaws causing flooding into dens. However, water also promotes plant growth which, in turn, means enhanced feeding opportunities before hot summers make foraging more difficult. What effect will hot summers have on bears preparing for the long fast of winter dormancy? There is concern they will not be able to adequately store fat reserves for winter. Many factors enter into the picture but change seems to be the constant.

Maybe in time, humans will learn more about healthy longevity and strategies for finding the best in New England winters. Let it snow!

Black Bear Quiz

1. In what season are black bear cubs born?
2. T or F? Black bears lose bone and muscle mass from inactivity in winter.
3. T or F? Black bear cubs nurse from their mother even in midwinter.
4. With effects of climate change, are black bears emerging earlier or later?
5. What is a bear "plug"?

Answers:

1. Winter
2. F
3. T
4. Earlier
5. A firm packet of waste which blocks the end of the bear's digestive tract during winter dormancy.

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