



Brown Family Environmental Center

FIELD NOTES

Ohio Moths in Winter

BY LUCY WHITE '22, BFEC STUDENT MANAGER

Just below our feet during the cold winter months, transformations are taking place that will fill the spring air with moths. In the spring and summer, these airy, fairy-like creatures are everywhere, fluttering in and out of view during both daylight and twilight.

Ohio has an abundance of moth species. According to the Ohio Division of Wildlife, the exact number of moth species in the state is unknown: “New species are still added annually, but the number of species is certainly over 3,000.”

Moths survive the cold months in one of their four life stages (egg, larva, pupa, adult), depending on the species. Let’s take a look at three of Ohio’s favorite moths, with a glimpse into their winter lifestyle.

Continued inside

The rosy maple moth burrows under the soil over winter before appearing in full, vibrant color.

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ROSY MAPLE MOTH

The rosy maple moth looks like it flew straight out of the rabbit hole in “Alice and Wonderland,” but lucky for us, these whimsical moths are no myth. Their vibrant pink and yellow tie-dye wings and woolly body can be spotted at dusk in Ohio forests during the spring and summer. From egg to adulthood, they have a lifespan of about 2-9 months; most of this time is spent overwintering as pupae. During the winter, most adults die off. Before the caterpillar reaches the pupal stage, it burrows into the soil for protection. It is here that the caterpillar will pupate, remaining dormant until the soil gets warm enough for the adult moth to emerge.

ISABELLA TIGER MOTH

Very few of us have heard of the Isabella tiger moth, but everyone knows about woolly bears. They are one and the same. These fuzzy black and brown caterpillars are notorious for their winter lore. According to legend, the amount of black hair on the caterpillar is a predictor of the severity of the coming winter — if the caterpillar has proportionally more black than brown, it is a sign of a harsher and snowier winter, while a larger brown band indicates a mild winter. Another myth suggests that the thickness of the caterpillar’s coat predicts the winter — the thicker the woolly coat, the colder the winter. Although these myths have been scientifically debunked — the coloring and thickness of the

caterpillar’s coat is dependent on its age and environment — the emergence of the woolly bear caterpillar in the fall is a sign of impending winter. The Isabella tiger moth will overwinter as a caterpillar. The caterpillars will typically burrow under the insulation of leaves and wood and will remain dormant until spring. When the weather warms, the caterpillars surface for a few weeks to find food and then spin their cocoon, from which an Isabella tiger moth will emerge as an adult about two weeks later.

LUNA MOTH

The iridescent green luna moth may be mistaken for a fairy as it floats briefly under the spring moonlight. Catching a glimpse of a luna moth is a rare treat, in part because of their ability to mimic their environment. While this moth has a 12-month life cycle, it spends only 10 days as a beautiful adult. Most of their life is spent as a caterpillar in the trees, eating enough leaves to quadruple in size. When the caterpillar is ready to pupate, it leaves its perch in the trees, dropping to the ground below. There, it spins a papery brown cocoon, perfectly camouflaged in the leaf litter. It will remain there through the winter. Then, in a mid morning in late spring, the adult luna moth emerges from the cocoon without a mouth. Unable to eat, the moth survives off the fat it stored during the caterpillar stage and, as a result, dies quickly after laying eggs, beginning the cycle over again.



From caterpillar to moth:
The Isabella tiger moth (left, top and bottom) and luna moth (right, top and bottom).



Images (clockwise from upper left): Judy Gallagher, Benny Mazur, Andrea Westmoreland, Andy Reago and Chrissy McClarren. From Wikimedia Commons. Licensed under Creative Commons.

The History of Ohio Wildlife

BY SHANE MCGUIRE, BFEC LAND MANAGER/NATURALIST

Centuries ago, when Ohio was estimated to be 95 percent forest and occupied by the Miami, Shawnee, Lenape and other native peoples, it was also home to an abundance of wildlife that we may or may not see today — bison, elk, wolves, black bear and turkey, to name a few. Many of our native wildlife species were extirpated from the state by the end of the 19th century. Some species we will most likely never see again, but others have made a return.

In order to understand what caused the extirpation of these animals, we need to look back in time. Before European settlement, evidence suggests that animal populations were thriving. Bison, elk, wolves, black bear and turkey were found in great numbers throughout Ohio.

In 1788, Marietta became the first European settlement in Ohio. Shortly after that, more and more settlers moved to the area. Bison became an economic asset to the settlers as the meat and leather trade became popular, but they also proved to be fun sport. In 1803, the same year Ohio became the 17th state, the last known Ohio bison was killed in Lawrence County. Unregulated hunting is believed to be the primary reason for their disappearance. Elk and wolves were soon to follow.

In the early 1800s, bears were still found in Ohio, but settlers were growing more discontent because bears would sometimes kill livestock. Around 1818, settlers declared the “war of extermination,” killing every bear they could find. Another factor contributing to the dwindling numbers of bears during

this time was habitat loss. Forests were cut down to make way for towns and crop fields, causing many bears to leave the area. The Ohio Department of Natural Resources claims that by the 1850s black bears were considered extirpated from the state.

Turkeys need old, well-established forests for cover and roosting. Because Ohio was mostly virgin forest a few centuries ago, turkeys were thriving in the 1800s. But by 1900, Ohio was estimated to be only 10 percent forest. Because of this habitat loss, by 1904 no wild turkeys could be found in the state.

Now that we understand how we lost these iconic animals, let’s look at what has been done to support animal populations in Ohio. In 1873, the Ohio Fish Commission was established to help prevent declining fish populations in streams and inland lakes. Later, this organization became the Ohio Fish and Game Commission and is known today as the Ohio Division of Wildlife. This agency enforces laws that protect habitats and prevent over-hunting.

By the early 1950s, some of Ohio’s forests had grown back, creating more suitable habitat for wild turkeys. The Division of Wildlife tried releasing farm-raised turkeys into the wild, but this effort was unsuccessful. Not long after, they captured wild turkeys from Pennsylvania, West Virginia, and Kentucky and released them in Ohio. Success! In 1966, Ohio’s turkey population was great enough to have a regulated hunting season in a handful of counties in eastern Ohio.

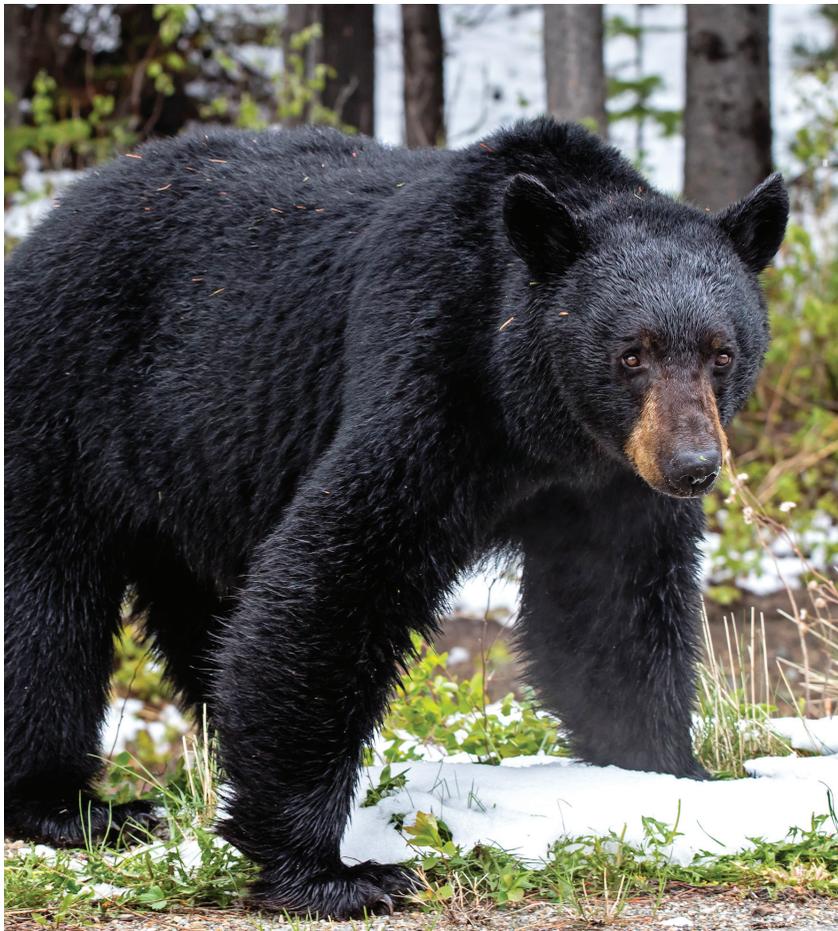
In the meantime, growing bear populations were found in Pennsylvania and West Virginia, and black bears began to push into Ohio. After almost 100 years, black bear sightings started to occur. Today, black bears are still considered endangered in Ohio and are, therefore, protected. The Division of Wildlife currently tracks black bear sightings. In 1993, fewer than 50 bears were reported, but by 2018, almost 200 were sighted. During this same time, Knox County has had one confirmed bear sighting and 3 unconfirmed sightings.

Most of the bears seen today in Ohio are thought to be sub-adult males. Only three confirmed sightings have been reported of female bears with cubs — one in Lawrence County and the other two in Ashtabula County. While we cannot currently say that bears are re-established in Ohio, professionals are cautiously optimistic that it will eventually happen.

We most likely will never see free roaming herds of bison, elk or wolves in Ohio, but many other successful returns can be attributed to the hard work of dedicated professionals, hunting organizations and volunteers. Because of their work, animals like deer, bobcats, bald eagles and otters are now commonly seen in Ohio’s wild areas.

Making a return

While still considered endangered in Ohio, black bears have been sighted around the state with growing frequency.



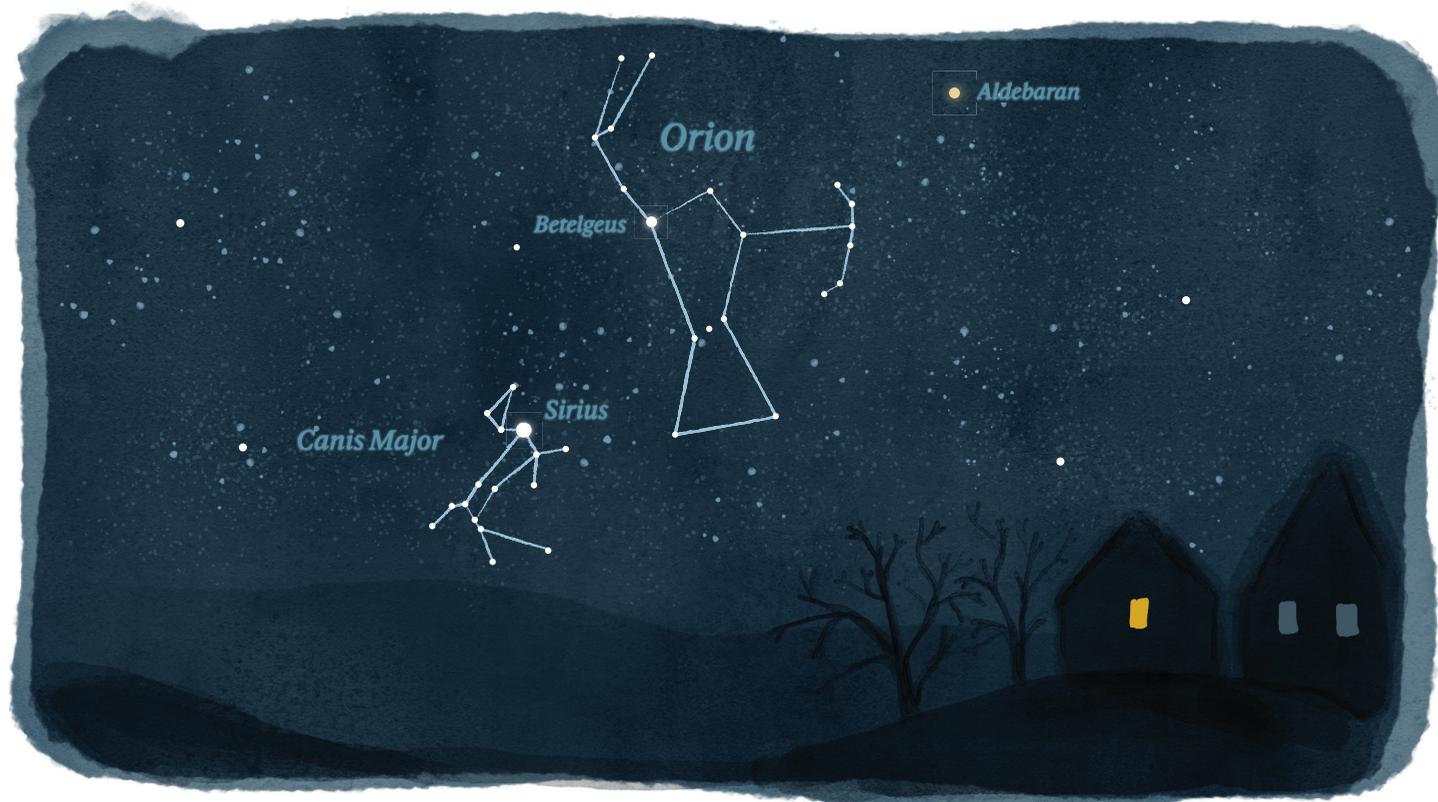


Illustration: Katelyn Ratajczak

Bright Lights for Cold Nights

BY AVA-ROSE BEECH '21, BFEC POST-BACCALAUREATE FELLOW

As the days become shorter, darker and cooler, light is an immense source of comfort across many cultures. Whether it is the flickering flame of a candle, warmth from a crackling fire or twinkling lights lining city streets, light brings a sense of warmth and security in even the most frigid of temperatures. And a constant source of light throughout the winter is right above us every night — in the sky.

Although it may be cold outside, winter is an excellent time for stargazing. During the winter months in the northern hemisphere, the Earth faces a smaller section, or “spiral arm,” of the Milky Way called the Orion Arm. (Spiral arms are the smaller sections of stars extending from spiral galaxies.) Named for one of the prominent winter constellations, the Orion Arm is on the outskirts of the Milky Way and has fewer stars than the section of the galaxy we face during the summer months. The stars in the Orion Arm are particularly large, and because there are fewer of them, winter stars appear much brighter than those we see in summer. In addition to the size of these stars, the Orion Arm is also within the same arm of the galaxy that Earth is in, meaning we are closer to them.

But why are the constellations we see in the winter different from those we see during the summer? First of all, we should be clear that we’re talking about constellations that can be viewed around 9 p.m. Throughout the year, as the earth orbits the sun, the stars appear to move slowly in a westerly direction, thus the section of stars we see at 9 p.m. changes. A few popular winter constellations include Orion, Taurus, the Pleiades and Canis Major. During the summer, you have to be an early riser to see these constellations — around 5 a.m.

The prominent winter constellation Orion (named after the mythical hunter), can be seen in the southwest sky. The easiest way to spot this constellation is to look for the signature three stars making up the straight line of Orion’s belt. From there, you can spot the two stars north of the belt, making up the shoulders, and the two stars south of the belt, which are his knees. The brightest star in this constellation is one of Orion’s shoulders (the left one as we look at it), Betelgeuse, affectionately referred to as “Beetle Juice.”

Now, for what we like to call “star hopping”: to find the constellation Taurus, follow the line of Orion’s belt to your right

and slightly upward. Orion’s belt points to the V-shaped cluster of stars that makes up the face of Taurus the Bull. The orange tinted star, Aldebaran, forms the eye of the Bull and is the brightest star in this constellation.

From Taurus’s nose (the bottom point of the V), look farther to your right and slightly upwards, and you will see a faint cluster of seven stars, the Pleiades, or Seven Sisters. Lore says that Orion the Hunter was trying to protect the seven sisters from Taurus the Bull.

Backtracking a bit, Canis Major is one of Orion’s dogs and sits at Orion’s feet. If you start again at Orion’s belt, this time look down and to the left and you will find Sirius, the brightest star in the night sky. Sirius is the neck of the great dog.

Although it may be cold, the winter sky is ablaze with bright lights all season long. The Franklin Miller Observatory, which holds open house viewing opportunities on the last Friday of every month, is an excellent place to view the winter sky (assuming the clouds part long enough for us to catch a glimpse).

The Loss of Quiet Spaces

BY MADI HOFSTETTER '24, BFEC STUDENT MANAGER

“Silence isn’t the absence of something, but the presence of everything.” —Gordon Hempton

With snow-quilted Ohio winters comes a deep silence. When temperatures fall and snow begins to stick to the ground, nature falls into quiet patterns. Many birds migrate to warmer climates; some animals curl into pockets of hibernation in order to survive. Humans, too, develop slower, more insulated habits, tucking themselves indoors. But there is a subtler reason for the hush — one beyond preservational instincts — rooted in snow crystal acoustics.

Snow has the ability to absorb sound waves due to snowflakes’ hollow crystalline structure. Snowfalls have a 50-90 percent sound absorption rating, meaning a dense layer of snow can mute the majority of noises from the outside world.

With the arrival of winter at the BFEC, many people seek the nurturing silence of winter hikes. But despite places like the BFEC, there are few places left where we can experience silence. This alarming trend is catching the attention of researchers: silence is on the verge of extinction.

Across the United States, noise pollution is affecting more and more natural spaces. Noise pollution is not always as obvious as a foghorn or a rumbling helicopter. When studying the loss of quiet, scientists seek to preserve what American auditory ecologist Gordon Hempton describes as “silence from noise pollution of modern life — sounds that have nothing to do with the natural acoustic system.” Hempton alludes to noise pollution including the most subtle sounds like the distant whir of cars on provincial roads, the rumble of the cooling system in freezers, even the hum funneled into our ears by noise-cancelling headphones.

Hempton is one of the researchers on the forefront of Western science’s realization that silence truly matters — for the health of nature and humans alike. A physical, natural space is more than the quality of light, the diversity of plant life, or even the direction of the wind. Natural sounds are a vital piece of a habitat, and the clean base layer of silence allows organisms to communicate with each other, find food and avoid predators. Quiet also benefits humans, as interacting with a peaceful auditory landscape reduces anxiety, ameliorates the risk of chronic health issues and improves sleep quality. In fact, in an essay on silence in Yale’s environmental publication *Environmental* 360, Norwegian epidemiologist Marie Pedersen calls

human-created noise “a known psychological and physiological stressor.”

Studies in the last decade have reported that human noise doubled the din of background noise in 63 percent of protected natural American spaces. Even more significantly, studies have shown that 90 percent of children will not experience the pure silence that scientists like Hempton are fighting to preserve.

Hempton is striving to prevent this tragedy from expanding through the establishment of projects like One Square Inch of Silence. Located in the Hoh Rain Forest at Olympic National Park, a red painted rock indicates what is believed to be one of the last remaining bubbles

Despite places like the BFEC, there are few places left where we can experience silence. This alarming trend is catching the attention of researchers: *silence is on the verge of extinction.*

of silence in America. Although National Park Service policies do not address the protection of quiet, One Square Inch of Silence strives to draw attention to and build appreciation for true, complete natural silence. The project has expanded into Quiet Parks International (QPI), a nonprofit organization whose mission is “to save quiet for the benefit of all life.” QPI does this by awarding Quiet Park certifications to public spaces, urban areas and trails all over the globe. They are developing a quiet research program that involves scientists, musicologists, citizens and researchers to document the world’s auditory landscapes. QPI strives to protect the delicate details of natural spaces that are vital to the wellbeing of humanity and nature.

This winter, when you pad through the soft drifts of snow, take a moment to appreciate the heightened sense of quiet. Appreciation becomes advocacy, and advocacy becomes preservation of our natural world — sight, silence and all.

Cold-Blooded in the Cold

BY EMMA COFFMAN '22, BFEC STUDENT MANAGER

When it gets cold outside, there's nothing better than bundling up inside with some soft blankets and a cup of hot chocolate. But for the creatures that can't maintain their own body heat, that isn't an option. What do the cold-blooded critters in the Kokosing River do to survive the winter?

First, let's talk about the river itself. Unlike lakes and ponds, rivers are constantly flowing. Because of this, most rivers do not freeze all the way through; they have more sporadic freezing patterns. In slower parts of the river, ice may form at the surface. When surface ice becomes trapped by a log or rock, it allows more ice to form around it. This eventually creates a sheet of stationary surface ice.

In other portions of the river, the water flows fast enough that surface ice will not form. But in these areas, freezing air temperatures may supercool the water. When this happens, ice crystals from the surface of the water are plunged into the deeper water. More crystallization occurs around the submerged crystals, until a slushy substance forms. We call this frazil ice.

What does this mean for fish in the river? In general, sporadic freezing patterns like this will cause serious problems for Kokosing River fish. Frazil ice is known to stick to many surfaces, including the bottoms of rivers — exactly where little fish may want to wait

out the cold. Due to the changing conditions in the river, most of the fish will need to be on the move.



Smaller fish, like minnows and darters, will do their best to weather the cold in slow-moving, deeper waters. They will hover near the river bottom where the water is warmest, seeking out still pools and deep crevices to weather the cold of the winter. To conserve oxygen and energy, their metabolism will slow. In this slower state, they will eat and travel as little as possible.

Larger fish like largemouth bass that prey on the smaller fish will have much slimmer pickings in the winter than in the warmer months. To prepare for the harsh cold, they will build up their fat reserves by eating well in the summer and fall. This way, they will have more energy reserves to burn while they search for food, even as their metabolism slows.

Another cold-blooded animal has found its ways to adapt to the ever-changing waters of the Kokosing River: turtles. Some of the species you might find, like painted turtles and snapping turtles, hunker down in the warmer waters at the bottom like fish do. Spiny softshell turtles will bury themselves in the mud. From their hibernation hides, their metabolisms will decrease to conserve energy, just like fish — but they have a different problem. From deep under the river ice, turtles cannot come up for air. Instead, they have developed special adaptations that allow them to breathe through their skin, particularly through their pharynx (the lining of their throat) or their cloaca (their back end).

Luckily for us warm-blooded humans, we just need a little help to maintain our own body heat. Being cold-blooded, like our friends in the Kokosing River, requires many adaptations for survival — none of them as fun and curling up under a blanket.

VOLUNTEERS AND DONORS

FALL 2021

With the addition of the Hall Farm property (another 111 acres), the support that we receive from our generous donors is felt and appreciated more deeply than ever. Humble thanks to each of our supporters; we could not meet our mission without you.

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Lessons from a Crow

BY LISA SCHOTT '80, MANAGING DIRECTOR OF THE PHILANDER CHASE CONSERVANCY
AND ZALI WIN '84, PCC BOARD CHAIR

NATURE'S LESSONS COME IN MANY FORMS

If you know bird behavior at all, you know that the crow has a unique ability to adapt to its environment. Species that are able to adapt and alter behaviors are most likely to survive, and the crow is a patient and masterful problem solver.

Did you know that crows learned how to use cars to crush the shells of nuts? They couldn't crack them with their beaks, but by observing traffic, they learned to drop the nuts in front of cars stopped at traffic lights. The cars crushed the shells, and the crows waited for the cars to pass before retrieving their meal.

The Ohio Bird Sanctuary recently wrote about crows and their abilities and offered the following lessons we can learn from crows:

1. Don't panic. Take time to study what is happening.
2. Inventory your primary needs and focus on them. Can you get them from another source?
3. What changes are you capable of making? How can you benefit from the changes?
4. Learn from the process and build on your strengths.
5. If needed, make allies and reach out to friends and neighbors for assistance.

STUDY WHAT IS HAPPENING

For the past year, Philander Chase Conservancy has practiced lessons from the crow. We used our 20th anniversary year to think about the past 20 years and our next 20 years with regard to what we need to do to respond to challenges and opportunities. Fortunately, panic was not an issue. Thanks

to a strong base of support from both donors and the College, the Conservancy is on firm footing financially. The past 20 years were primarily focused on conserving as many acres as possible in our five-mile radius around Gambier. We talk about conserving at least 8,000 acres, as many acres as Bishop Philander Chase originally purchased in Knox County, and to date, the Conservancy has conserved 5,580 acres. We also focused on developing best standards and practices, developing more awareness of our mission and we have applied for accreditation with the Land Trust Alliance, the gold standard for land conversation organizations.

BUILD ON STRENGTHS

We took time to study what is happening, surveyed Kenyon students, faculty, and staff, and reached out to our major stakeholders and partners in Gambier and the county. Development pressure from Columbus will continue to move north toward the Gambier area, and environmental issues will continue to be at the forefront of national challenges. We've learned from the process and can now build on our strengths, and we're developing a plan for the next 20 years that will respond to these challenges. We look forward to sharing our plans with you a year from now.

BFEC PROGRAMS AND EVENTS

For up-to-date information on programming, check bfec.kenyon.edu; follow us on Facebook or Instagram; call 740-427-5052; or send an email to jordan2@kenyon.edu

Many thanks to our dedicated volunteers! For September, October and November, the following folks donated 334 hours of their time to monitor trails, remove invasive plants, help in the garden, staff our Fall Harvest Festival, clean up the Hall Farm property, and so much more! (If not otherwise indicated, volunteers are Kenyon College students.)

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OUR MISSION

The Brown Family Environmental Center exists to support the academic goals of Kenyon College, to provide opportunities for education and research, to engage Central Ohioans of all ages with nature, and to conserve the natural diversity of the Kokosing River valley.

OUR STAFF

Ava-Rose Beech '21, *Post-Baccalaureate Fellow*

Jill Kerkhoff, *Facilities Coordinator and Office Administrator*

Shane McGuire, *Land Manager Naturalist*

Noelle Jordan, *Manager*

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