

# FIELD NOTES

## THE GREEN IN THE GRAY

by Claire Hanke '22, BFEC Student Manager

COME WINTER, WHAT WAS ONCE THRIVING WITH LIFE now appears to lay cold and barren. However, in this cold landscape, evergreen trees, or more specifically coniferous trees, provide a glimpse of green and a breath of life by way of their ability to maintain foliage year-round.

Because they remain green throughout winter, conifers have become symbols of hope, resilience and eternal life in many different traditions. Many winter rituals revolve around coniferous trees. Hundreds of years ago, people would bring tree boughs into their homes in the winter to remind them of the promise of spring. In the middle ages, someone in Scandinavia just brought the entire tree into their home, sparking the tradition of the Christmas tree. Certainly here in Gambier, when gray skies and early darkness make it seem as though all color has been drained from the natural landscape, it is comforting to catch a glimpse of the healthy green of an eastern white pine.

The best place to witness the majesty of the eastern white pine is the pine plantation at the BFEC. Take the pine plantation trail up the steep hill that sits above the BFEC's oldest prairie unit, and you will discover rows upon rows of this tree, planted in perfect uniformity. A walk through the pine plantation in the winter will reveal an abundance of life that exists even in the coldest months of the year. Find a spot between one of these rows and stand still. Listen for signs of life. Look around, and you may be able to spot one of the many birds or small mammals that take refuge in the pines.

The eastern white pine, native to the eastern U.S., has upswept branches that grow in whorls around the trunk. If you look closely at the needles, you will find that they grow in bundles of five.

Coniferous trees have several adaptations that allow them to stay green all year. The thin needles of conifers are modified leaves. This compact morphology results in minimal surface area. Couple that with a waxy coating, and these trees become highly efficient at reducing water loss which in turn protects the needles from freezing during the winter. Thick, sturdy bark protects the tree from extreme temperatures, and coniferous trees' thick cell walls may help them to resist changes in pressure due to ice expansion. By dropping its needles continuously through the year — as opposed to just once in the fall — the coniferous tree can sustain consistent levels of photosynthesis. This differs from the strategy of deciduous trees, which photosynthesize at extremely high levels in the spring and summer, but low to none in the fall and winter after they drop their leaves.

This winter, when you find yourself dreading another cold, overcast day, venture out to the BFEC's pine plantation and contemplate the white pine's adaptations to survive winter, the assurance of life's continuity, and the promise of another spring.

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# TWO FROSTS AND A TABER: THE SCIENCE OF FROST HEAVE

by Mia Fox '19, BFEC Post-Baccalaureate Fellow

*Something there is that doesn't love a wall,  
That sends the frozen-ground-swell under it,  
And spills the upper boulders in the sun*  
— “Mending Wall,” Robert Frost, 1914

In 1914, a poet and a scientist asked the same question: what is happening underground when it's cold? The same year Robert Frost described the “something” in his poem “Mending Wall,” Stephen Taber, a researcher at the University of South Carolina, launched research into the phenomenon we now know as frost heave.

In his studies, Tauber discovered the frost heave mode of action: when ground water freezes, the soil mixed with it expands with the water. Step outside on a late fall or early spring day, and you may notice bare ground jutting toward the sky in columns like soil stalagmites. However, most of us are more familiar with the destructive nature of frost heave, making pavement look like a crumpled blanket and causing a ding to your car.

When the temperatures fluctuate during cold months, previously fallen snow or ice will melt and trickle down into the soil below. If that soil has good drainage properties, melting poses no problems. The water continues to trickle

down. However, when the soil has a denser structure (such as stone or clay needed to support a roadway), it captures and holds water. That water will refreeze when the temperature drops again, promoting ice crystals soil scientists call Jack Frost formations.

Jack Frost formations in soil are as mischievous as the character himself. Their structure takes up much more space than regular ice would. This expansion property creates an ice layer between the soil and the pavement, called an ice lens. Eventually, pressure from the ice lens pushes up the road material and causes bumps, breaks and cracks that, in Robert Frost's words, “send the frozen-ground-swell under it” and spill the upper soil and pavement “in the sun.” Soon enough, the frost heaves will sink back down, and spring will be on its way.

Natural phenomena are wonderful that way. In the meantime, find a good mechanic in case the heaves get to you and your car.

# BENTLEY'S SNOWFLAKES

by Emma Renee Coffman '22, BFEC Student Manager

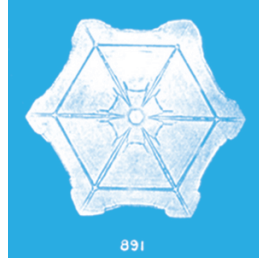
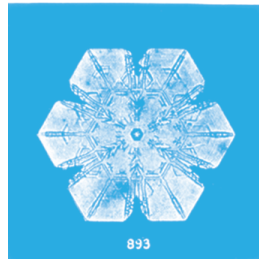
The first snowfall of the year is always a magical event. As snow falls to the ground, I can't help but wonder if the old saying is true — that no two snowflakes are exactly alike. And where do these crystalline droplets come from? How are they formed?

The ephemeral beauty of snowflakes was first unearthed by a man named Wilson Bentley in 1865. On a small farm in Vermont, Bentley used a new method of photography called photomicrography to take detailed, up-close images of snowflakes. Each one truly appeared to be unique, each with a varied array of different crystal formations like no other.

These designs and patterns are directly linked to how snowflakes are formed. High in the clouds on a cold winter day, water vapor can condense very rapidly into ice. If this ice condenses around a tiny particle (like dust or pollen),

then it can form a crystal. As it falls to the ground, the original ice crystal is covered with new frozen water vapor that creates the branches or arms of the snowflake. The symmetrical nature of the snowflake is due to the properties of water at the molecular level. There are only certain arrangements that molecules can make when they become crystallized, and these are represented in the snowflake as highly ordered and detailed designs.

Because there are so many factors influencing the shape of these water crystals, it is true that the odds of two snowflakes being identical are very low. Collisions between snowflakes in the sky, infinitely possible paths to the ground, and the vast amounts of possible molecular arrangements are all random factors that come together to create one of nature's most unique pieces of art: the snowflake.



Images of Bentley's snowflakes, circa 1902, from his work, “Studies among the Snow Crystals ...”

# WHAT CAN BE DONE WITH SOME SNOW?

by Kat Norton '20, BFEC student manager

It's MID-NOVEMBER HERE IN GAMBIER AS I WRITE THIS, and we've just had our first snowfall. There's really nothing like the joy of waking up on a cold morning and being greeted by a world blanketed in clean, white snow. It's on winter days like these that I feel nostalgic and find myself wishing I was back in elementary school, where any snowfall higher than two inches would send all the kids in my neighborhood into a frenzy of snowballs, igloos and impressive snowy sculptures — most often three rolled snowballs one on top of the other, two stick arms, a carrot nose and a charcoal eyes and mouth: the snowman.

The season's first snow really got me wondering about snowmen, why they have become a go-to for snow day activities, why they all seem to take the same shape and what their origin might be. I can imagine that as long as there has been snow and humans have been around to enjoy it, there have been snowmen. I can also appreciate that, because of their ephemeral nature, tracing snowmen into prehistory would be a pretty impossible feat. Lucky for us, written histories have been set down for quite a while, and snowmen seem to have captured our attention for many snowy winters.

In my research, I came across Bob Eckstein, a cartoonist at the New Yorker whose curiosity about snowmen turned into a seven-year research project that culminated in the book "The History of the Snowman." His book catalogues all the notable and strange appearances of snowmen through the ages and around the world. Eckstein found the first depiction of a snowman in "The Book of Hours," an illuminated manuscript from 1380. Since this first drawing, snowmen have continued to appear in wintry contexts in all types of media: drawings, photographs, movies, and stories, to name a few.

**QUICK QUIZ:** who has a corn cob pipe, button nose, and two eyes made of coal? If you answered Frosty the Snowman, you're correct! Today, while Frosty the Snowman comes to mind as the most iconic snowman, as well as a ubiquitous symbol of the winter months, I would like to call to your attention some other pop-culture snowman moments.

**Snowmen from the Classics:** Snowmen aren't just for amateur sculptors. In 1494, Pietro de' Medici commissioned Michelangelo to sculpt a snowman for the Medici courtyard. In 1857, Larkin Mead (the sculptor who designed Abraham Lincoln's Springfield tomb) rose to national fame with an eight-foot snow sculpture he unveiled on New Year's Day in Brattleboro, Vermont. The sculpture, of an angel holding a pen and paper, was said to be so beautiful that even naughty children refrained from throwing snowballs at it.

**Olympia the Snow Woman:** The residents of Bethel, Maine currently hold the Guinness World Record title for largest snowman ... er, snow woman. In 2008, they constructed Olympia, a 122-foot-tall snow woman, beating the record they set in 1999 for the tallest snowman, called Angus King of the Mountain. Olympia was made up of 13,000,000 pounds of snow, had skis for eyelashes, a 130-foot-long scarf, and two 30-foot-tall spruce trees for arms.

**First Photograph:** Mary Dillwyn, who is considered to be the first Welsh female photographer, snapped the earliest known photo of a snowman in 1845. Considering the camera was still pretty new in 1845, this snowman photo is also one of the earliest photos of anything.

**The Böögg:** Each year during a spring festival held in Zurich, Switzerland, at 6 p.m. on the dot, crowds gather for the main event: the burning of the Böögg. The Böögg is a snowman figure that is set atop a large pyre. The Böögg symbolizes winter and serves as a weather forecast for the upcoming summer. After the pyre is ignited, the time it takes for the flames to melt the Böögg and set off the fireworks that are packed in its head determines the quality of the summer. The more time the Böögg stays intact, the worse the summer will be.

All this talk of snow-people has inspired me to run outside and make one for myself, complete with a carrot nose and a scarf around its neck. Of course, to finish it off I'd enjoy a steaming mug of hot chocolate, which makes me wonder — who drank the first cup of hot chocolate?

Mary Dillwyn's "The Snowman No. 2," from 1845, is the earliest known photo of a snowman.



Image source: National Library of Wales

# UPCOMING EVENTS AND PROGRAMS

## Youth and Family Programs

### Family Nature Quest: Birds, Birds, Birds

JANUARY 18, 10:30–11:30 A.M.

Explore winter in Ohio by learning about our winter birds and how they survive. Then become a valuable resource for our winter birds by decorating your very own natural bird feeder to take home. If the weather is pleasant, we'll head outside with binoculars to see some of our feathered friends. *Meet at the Resource Center.*

### Family Nature Quest: Hibernation Station

JANUARY 25, 10:30–11:30 A.M.

What do animals do when it gets cold? Dress in your comfiest sleep attire to build a kid-sized bear den. We'll learn about the ways animals adapt to changing seasons, how they stay warm and how they find food. *Meet at the Resource Center.*

### Family Nature Quest: Love Bugs

FEBRUARY 15, 10:30–11:30 A.M.

Learn to love all the cool bugs at the BFEC. Examine our big bug collection under microscopes, make a native bee home to take away with you and find out how bugs see the world. *Meet at the Resource Center.*

### Family Nature Quest: Maple Madness!

FEBRUARY 29, 10:30–11:30 A.M.

Learn about how maple sugar is made and taste syrup made from maple trees on BFEC property. We'll have waffles to go with the freshly-made syrup. *Meet at the Resource Center.*

## Programs for All Ages

### Winter Tree ID

JANUARY 18, 2–3:30 P.M.

Yes, you can identify trees in winter. Learn about leaf scars, bundle traces, bud scales and more. We will learn some basics and then we'll test our new-found knowledge outside as we identify some common trees. Dress for the weather. *Meet at the Resource Center.*

### Miller Observatory Open House

JANUARY 31, 8–10 P.M.

Paula Turner, professor of physics at Kenyon, will share telescope views of celestial sites including the moon, planets like Venus, Jupiter and Saturn, as well as star clusters and nebulae. Weather permitting (if it's cloudy, the program will be cancelled). Free. *Meet at the Franklin Miller Observatory.*

### Bald Eagles of Knox County, Part 1

FEBRUARY 6, 6:30–7:30 P.M.

Knox County's bald eagle population is growing. Learn about mating rituals, rearing behaviors, juvenile molting stages, and so much more during this indoor presentation. Free. *Meet at the Resource Center.*

### Bald Eagles of Knox County, Part 2

FEBRUARY 8, 1–5 P.M.

We will take a driving tour of as many eagle nesting sites as possible before dark. Bring your binoculars and/or spotting scopes. Free. *Meet our leader, Jon Minard, at the Resource Center before carpooling and caravanning.*

## VOLUNTEERS, FALL 2019

Our tireless volunteers help us with back-breaking, knee-busting work to keep the trails and gardens accessible and beautiful. They teach programs, monitor our bluebird trail, and staff our events. Without these volunteers, not much would get done around here.

Adam Bell  
Alec Ogihara  
Alison Buckley  
Alyssa Sugar  
Andy Kelleher  
Anna Corbet  
Annie Hesse

Ariella Kissin  
Ava Earl  
Ben Dorfman  
Ben Fuhr  
Bjorn Nilsson  
Blythe Zadrozny  
Brian Miller,  
community member

Caitlin Kollins  
Cameron Henn  
Carrie Buckles,  
community member  
Carson Miller,  
community member  
Casey Capsambelis  
Celina German

Chloe Webb  
Chris Goodall  
Colter Hoar, Franklin  
University intern  
Darien Byrum  
Dave Heithaus,  
Kenyon staff  
Dianne Mack,  
community member  
Duncan Hardy,  
MVHS volunteer  
Ellen Harnsberger  
Ellie Randolph

Ellie Roman  
Emily Wright,  
community member  
Emma Buerher,  
MVHS volunteer  
Emma Derstine  
Erika Freiberg  
Erin Levar  
Estelle Parker,  
community member  
Fallon Raviol  
Fiona Dunn  
Flynn Klace

Gabrielle Must  
Georgia Stolle-  
McAllister  
Greg Gillen, Oberlin  
College intern  
Gwyneth Phillips  
Haley Bower,  
community member  
Haley Cohen  
Hannah Spector  
Harris White  
Henry Beidron  
Henry Terhune

Learn about Knox County's growing bald eagle population in a two-part program, February 6 and 8.

## Full Moon Night Hike

FEBRUARY 9, 6:30 P.M.

Ever wonder where the terms “lunatic” and “honeymoon” came from? Learn the facts and folklore about our closest celestial neighbor: the moon. Come enjoy part of our full moon night hike series. We will explore the BFEC during a one-hour hike under the “snow moon.” *Meet at the Resource Center.*

## Yellowstone in Winter

FEBRUARY 18, 7 P.M.

Denny Wiegman will take us on a photographic journey of Yellowstone National Park in the winter. He will share stories about wolves, bison, elk, skiing, photography, and so much more. Free. *Meet at the Resource Center.*

## Miller Observatory Open House

FEBRUARY 28, 8–10 P.M.

Paula Turner, professor of physics at Kenyon, will share telescope views of celestial sites including the moon, planets like Venus, Jupiter and Saturn, as well as star clusters and nebulae. Weather permitting (if it's cloudy, the program will be cancelled). Free. *Meet at the Franklin Miller Observatory.*

## Full Moon Night Hike

MARCH 9, 7:30 P.M.

Come enjoy part of our full moon night hike series. We will explore the BFEC during a one-hour hike under the “worm moon.” *Meet at the Resource Center.*



Photo: James Hurt

## Miller Observatory Open House

MARCH 27, 8–10 P.M.

Paula Turner, professor of physics at Kenyon, will share telescope views of celestial sites including the moon, planets like Venus, Jupiter and Saturn, as well as star clusters and nebulae. Weather permitting (if it's cloudy, the program will be cancelled). Free. *Meet at the Franklin Miller Observatory.*

## Full Moon Night Hike

APRIL 8, 8 P.M.

Come enjoy part of our full moon night hike series. We will explore the BFEC during a one-hour hike under the “pink moon.” *Meet at the Resource Center.*

## Keep It Wild: Earth Day at the BFEC

APRIL 18, NOON–4 P.M.

Celebrate Earth Day with this free event. We'll have owls, hawks, skunks, river otters, snakes and more for you to “meet” up-close. Make and take bluebird boxes, bat houses, and more. Live music and a food truck will round out the afternoon.

Inshira Modi-ud-din  
Jalene Fox  
Jason Zhao  
Jill Engelheinz  
Jillian Countey  
Johanna Fickel  
Josie Girard  
Kate LeMon  
Katya Naphtali  
Kayla Alcaide  
Kiele Anderson  
Kinsey Uzelac  
Kylie Millikin

Lara O'Callaghan  
Leah Anderson  
Liana Valin  
Libby Stupica  
Logan Snell  
Lucy White  
Lydia O'Donnell  
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community member  
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Madi Hamilton  
Maggie Willard  
Maria Huey

Mary Gerhardinger  
Megan Hasenfratz  
Melissa Nixon  
Meredith Glover  
Milan Crespo  
Miranda Wintz,  
community member  
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Otting, Kenyon  
faculty  
Morgan Engmann  
Natalie Cady  
Nell Simons

Nikki Anderson  
Olivia Carriero  
Paige Bullock  
Reid Stautberg  
Robbin Gan  
Ronan Elliott  
Sammie Hayes  
Sarah Goslee-Reed,  
community member  
Sofia de la Cruz  
Sofia Elizarraras  
Sophia Lacombe  
Sophia Rerhig

Stephanie Walsh  
Taylor Combs,  
Hocking College  
intern  
Terri Hieronimus,  
community member  
Zachary Manlin  
Al-Ummah students  
American Heritage  
Girls and Boys  
Troops

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Kenyon Ladies  
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Soccer  
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School, National  
Honor Society

# GREEN CORNER

## *Kenyon's Path Toward Climate Accountability*

by Dave Heithaus'99, Director of Green Initiatives

IN THE SHADOW OF THE SOUTH TOWER CRANE, jutting from the depths of the West Quad's construction crater, "sustainability" can become a nuanced term. It reminds one that progress is far from linear and almost never consists of a single line. Our job is to tease apart how the many lines intersect and to steer the most promising set toward the future we must achieve.

Several years ago, Kenyon set the ambitious goal of reaching net-zero greenhouse gas emissions by 2040. It seemed like a good, round number that coincided nicely with my likely retirement and fell well before a time we expected to see the worst of climate change. How things can shift in just a few short years! How are we progressing as the scientific community howls, Greenland melts, New Orleans sinks and the west burns?

Kenyon has entered what might be called phase two of our climate action planning. The lay of the land is relatively clear — we know what our

emissions liabilities are, we're able to track them and we have a much better understanding of what practical steps we can take to address them in the context of campus culture and college budgets. In the coming years, expect some changes you can see — new trees sequestering carbon at the BFEC, renewable energy production on campus — and many that may not be obvious, like building efficiency upgrades and offsetting institutional travel.

As the College moves in the direction of climate accountability, remember that our individual decisions matter as well. In cynical moments, I admit to doubting that; there is no shortage of arguments for the futility of individual action. But those arguments ignore the ripples that can spread through a culture when enough individuals do act. Don't listen to the cynics. And turn down your thermostat.

# OWLS IN OHIO

by Zoe Kleeman '22, BFEC Student Manager

WINTER IS THE BEST TIME to find different species of owls in Ohio. There are four owl species found year-round in our state: the little screech owl, the bigger barred owl, the much bigger great horned owl and the barn owl. The screech owl, barred owl and great horned owl are common in Ohio and found in every county. The barn owl, while widely distributed throughout North America, has had fluctuating populations in Ohio and is currently listed as threatened by the Ohio Division of Wildlife.

During the winter months, our residents are joined by owls that nest much farther north, some in the Arctic. These facultative migrators will only travel as far south as necessary to fulfill their dietary needs. Thus, a shortage of small mammals in the Arctic results in an eruptive fall migratory season. Ohio's most dramatic winter visitor is the snowy owl, all white or nearly so. It is usually found on the shores of Lake Erie but also on open farmland and, at times, can be found as far south as Knox County. The long-eared owl can also be seen in the winter, but it is very difficult to find. It hunts at night, and during the day it roosts in pine trees, sitting so close to the trunk it seems to be part of the tree bark. The short-eared owl, a diurnal hunter, is easier to spot. If you're lucky, this large owl can be seen flying with floppy wings over fields in search of mice and other small mammals.

The prize for the cutest owl in Ohio is no contest: it's the saw-whet owl, which weighs less than three ounces as an adult. This small but fierce-looking owl will turn up in shrubby thickets and grapevine tangles during migration.

So, how can you find one of these owls? Listen for their distinctive calls on cold winter nights, starting not too long after last light. A good field guide is all you need to enjoy winter birding — and owling — in Ohio. You can pick up "The Owls of Ohio," an ODNR guidebook, and its accompanying audio CD at the BFEC.



Photo: "Northern Saw-whet Owl," by Andy Reago and Chrissy McClarren. Licensed under Creative Commons 2.0. From commons.wikimedia.org.

# SCIENCE, DANCE, PSYCHOLOGY AND MORE AT THE BFEC

by Suzy Deems '22, BFEC Student Manager

**HUNDREDS OF STUDENTS OF ALL AGES** visit the BFEC each year. While well known as a popular educational resource for elementary students, the BFEC is also a popular destination for many different Kenyon classes. With just a little creativity, Kenyon faculty use the BFEC's facilities to enhance their courses. In fall 2019, the BFEC hosted professors and students from 12 Kenyon classes, ranging from environmental science, to dance, to Arabic.

Many faculty members lead their own class experience at the BFEC, and the BFEC team supports the class behind the scenes by reserving vans and driving the class to their location, or simply making space and equipment available. But when a professor wants BFEC personnel to develop or lead an activity, preparation begins with a conversation with the professor so they can get a sense of the course objectives and how activities at the BFEC can enhance those objectives.

For Claire Novotny's Habitat and Humanity class, Noelle Jordan, manager of the BFEC, developed a scavenger hunt to demonstrate some of the short-term changes in how humans have related to the landscape and buildings at the BFEC. For Leah Dickens's Positive Psychology class, Jordan briefly researched a few concepts in the field of positive psychology and then designed a simple mindfulness hike.

One fall morning, the 40 students in Robert Alexander's Introduction to Environmental Studies class visited the BFEC. Jordan worked with Shane McGuire, the BFEC land manager, and Mia Fox '19, the BFEC post-baccalaureate fellow, to organize two hands-on activities exploring water quality in the Kokosing River. In one activity, students used D-nets to capture and identify mayfly nymphs, caddisfly larvae, mussels and several dragonfly nymphs. Because these organisms are relatively intolerant to pollution, their presence indicated that the Kokosing is fairly healthy. Students also discussed the basics of aquatic food webs and learned that these macroinvertebrates are eaten by many fish.

Students participating in the second activity placed a seine net in a riffle and identified the species of fish that were caught in the net. Students caught banded darters, Johnny darters, rainbow darters, shiners and at least one stonecat madtom (a catfish). Darters are fairly sensitive to pollution, indicating, once again, low pollution levels in the river.

Zoe Kleeman '22, a BFEC student manager who explored the river with her class, enjoyed the experience because "it gave us a chance to get out of the classroom and conduct hands-on research," she says. "We determined the water quality based on the sensitivity of organisms that we found. It is so fascinating to learn about the water quality of where we live."

But it's not just science classes using the BFEC grounds. The students in Kora Radella's Contact Improvisation dance class experienced the preserve in a different way. By visiting the BFEC, Radella's students had the chance to get out of the dance studio and dance in the open air. After two visits to the BFEC to rehearse dance movements, the class performed during the Fall Harvest Festival in October.

"The dance program at Kenyon has a long history of working with students at the BFEC," says Radella. "I have worked with choreography students in site-specific work at the BFEC multiple times." She says her class loved rolling on the ground rather than on a dance floor, seeing the sky, and bringing dance to a space where students were not hemmed in by walls.

These visits by Kenyon classes are part of the BFEC's long-standing mission to support academics at Kenyon. Jordan believes that outdoor experiences, whether hands-on or immersive, add depth and texture to what is taught in the classroom. "Multi-sensory and kinesthetic experiences (smelling the fresh air, feeling the cold water in the river, hearing the birds, all while catching fish or macroinvertebrates) create anchor points in our memory, making it easy for people to recall," she says. Being outside increases cognitive ability, reduces stress levels, boosts the immune system and enhances creativity. Maybe this is why students love attending classes at the BFEC.

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Thanks to our generous donors for helping us keep things running at the BFEC.

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# Brown Family Environmental Center

at Kenyon College

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BROWN FAMILY ENVIRONMENTAL CENTER | 9781 LAYMON ROAD | GAMBIER, OH 43022-9623

## 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

Mia Fox '19, *Post Baccalaureate Fellow*

Jill Kerkhoff, *Facilities Coordinator and Office Administrator*

Shane McGuire, *Land Manager Naturalist*

Noelle Jordan, *Manager*

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