

# FIELD NOTES



Photo: Leaves beginning to change color

## FALLING LEAVES

by Noelle Jordan

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FALL. MY FAVORITE TIME OF YEAR. Cool, crisp days, and color, color, color — reds, purples, yellows and oranges, the defining colors of fall in the northeast U.S.

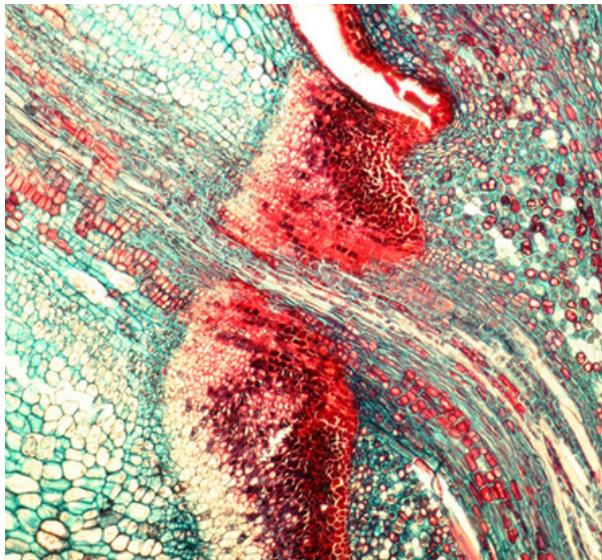
Deciduous trees (those that lose their leaves in the fall) take cues from the shorter days and cooler temperatures and begin to prepare for winter. The winterization process for deciduous trees is necessary for their survival.

In spring and summer, leaves are vitally important, making food for the tree. During the process of photosynthesis, chlorophyll, the green pigment in the leaves, converts sunlight and carbon dioxide into food for the tree. This process also creates water, which the tree releases. As fall progresses into winter, there is less sunlight available for photosynthesis and less water to replace what is lost. Fairly quickly, the leaves become a liability to the tree.

But deciduous trees have developed a mechanism to deal with this liability. The cooler temperatures and shorter photoperiod (amount of daylight) trigger two processes: the breakdown of chlorophyll, and the development of new cells called abscission cells.

Chlorophyll is broken down by a series of complicated chemical reactions that scientists are still struggling to fully understand. While the scientists struggle, we enjoy the end result: the revelation of other pigments that have been in the leaf all along, the yellow xanthophyll and the orange carotenoids.

■ Story continued on the next page.



After the tree breaks down the chlorophyll, it then begins to create abscission cells at the point where the leaf stem (petiole) meets the branch. These cells slowly create a barrier between the petiole and the branch, slowly closing the vessels that exchange water and nutrients between the tree and the leaf. Eventually, the leaf is cut off—cut off from water, and eventually, cut off from the tree.

Then, when the wind blows, the leaves fall from the tree. As the leaves fall, the tree enters dormancy—a period of water and nutrient conservation—to save its energy for next spring.

**Photo:** Abscission cells are stained red and mark the boundary between the branch (left) and the leaf stalk. University of Wisconsin Plant Image Teaching Collection

# WINGSTEM: FLYING INTO FALL

By Maddie Morgan '18, BFEC Post-Baccalaureate Fellow

You may have noticed a recent appearance of bright yellow flowers decorating the forest floors, river edges and roadsides as summer transitions to fall. These are the flowers of a plant known as wingstem or yellow ironweed (*Verbesina alternifolia*). The plant typically flowers between late summer and early autumn for about a month and a half.

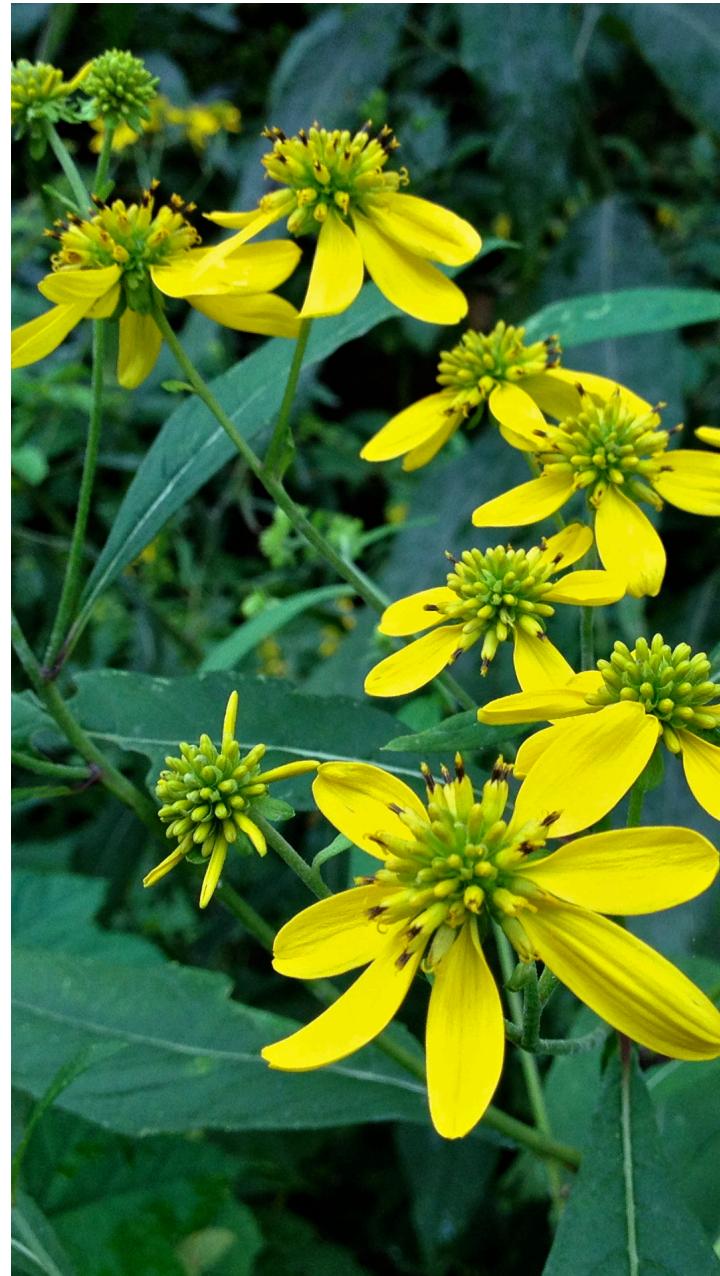
Wingstem was one of the first native plants I was introduced to and learned to identify when I started working at the BFEC in June. I have been excitedly watching it grow all summer. I didn't know much about it, so I was pleasantly surprised to see their beautiful, vibrant yellow flowers as August rolled around.

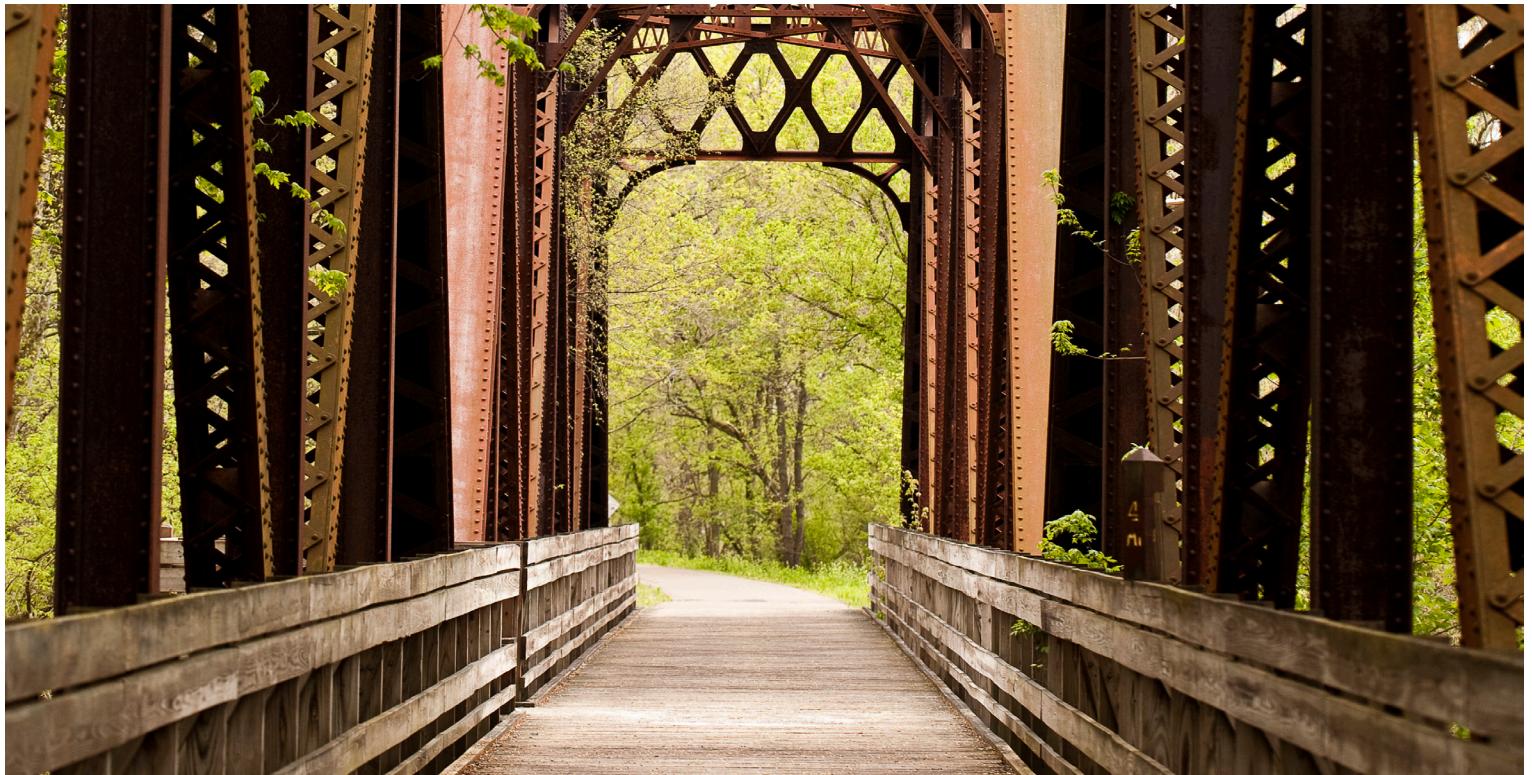
A relatively tall plant, wingstem can reach heights of three to 10 feet. It is named for its unique stem, which sports "wings" in the form of vertical ridges that run up and down the stem. Its other nickname, yellow ironweed, refers to its similarity in appearance to the plant ironweed (*Vernonia fasciculata*), which displays bright purple flowers.

Wingstem prefers moist, fertile conditions, which it finds in damp woodlands, partially shaded areas by rivers, roadside ditches, prairies and floodplains. You can typically find the plant around sycamores, hackberries, elms and silver maple trees, which are moisture-loving trees. It can be found throughout the eastern half of the United States, with the exception of a few areas in New England.

Its bitter leaves deter deer, rabbits and other herbivores from consuming them, yet its flowers are a favorite of the summer azure and silvery checkerspot butterflies, the gold moth, and long-tongued bees like our native bumblebees. The long tubes of the flowers make it difficult for insects with shorter tongues to access the nectar.

As fall turns the reins over to winter, wingstem plants will begin the process of reseeding themselves. The seeds will take flight on the sails of strong winds to find a place to grow next spring.





**Photo:** One of the BFEC's trails in early fall

# FINDING YOUR TRAIL

By Maddie Morgan '18, BFEC Post-Baccalaureate Fellow

I started reading a book called “On Trails: An Exploration” by Robert Moor after a suggestion of my cousin, who recently visited. It wasn’t long before I became addicted to Moor’s understanding of trails and our relationship to them.

Exactly 50 years ago, the National Trail Systems Act was established to promote the use and enjoyment of trails by the American public. The act has four classifications of trails: National Scenic Trails, National Recreational Trails, National Historic Trails, and Connecting and Side Trails. Almost 1,300 trails are recognized today across all 50 states. Trails have become an integral part of outdoor recreation and connecting people to the outdoors.

At Kenyon, and now in my post-grad life, there are so many decisions and choices to make. Suddenly, there are no classes to attend, no tests to study for, no papers to write. The world of academia, which I lived in for nearly 17 years, no longer binds my schedule and demands my time. Like a lot of post-grad students, I found myself stuck in the middle of the metaphorical woods with no clearly defined trail laid out in front of me. I could turn around and see the well-marked path and milestones of my primary school, high school and college experiences. But in front of me there lay only hints at trails — some with tall grasses reaching my shoulders and some with trees swooning over the suggested paths.

It is in moments like these that I really appreciate the well-marked and defined trail. There is something comforting in being able to escape the uncertainties of life for a second and letting a simple dirt path determine your direction — to be able to let go of worrying about where your next foot will land. As Moor wrote, “Lost in the howling landscapes of life, most people

will choose the confinement of a path to the dizzying freedom of an unmarked wilderness.”

When first traversing the southern BFEC trails as a befuddled sophomore lost without her pack of cross country runners, I constantly questioned my direction and whether I would be able to return to my dorm before dark. I had ventured out one afternoon on a solo run looking to explore the BFEC trails and take a break from pounding pavement. I convinced myself that I remembered the lefts and rights we took as a group only the week before.

Of course, I got lost. I took one of the fern spur trails to discover the pine plantation. Temporarily forgetting I was lost, I weaved in and out of the solemn pines until the falling sun began to pull a blanket over the suddenly ominous grove. Running around the edge of the pines, I found another trail that headed downhill. I hustled down the dirt path until it began to run parallel to the Kokosing Gap Trail below me, and I started to get my bearings again.

While I was lost in the sense that I could not picture where I was or what trails I could use to get home, I was still held in the safety of the trail, its creators and its many editors. I knew that if I just kept running down a path, I would eventually recognize a landmark that would pull me home. I had the freedom to explore and discover new places in the security of the trail’s design and purpose.

After spending more time traversing the BFEC trails, I have better learned the twists and turns of the landscape. In addition, I now recognize plants and trees that call the BFEC home. What was once a green blur to me is now a patch of wingstem, jewelweed and poison ivy speckled with the taupe trunks of sycamore, hickory and oak trees. My position at the BFEC has strengthened my connection to the land, its trails and its inhabitants through the knowledge I have gained about this special place.

I once looked into a dense forest with only whispers of trails speckled with unknown vegetation laid out before me. Now I can begin to see suggestions of a dirt path. Hulking shrubs recede from the trail’s edge, and plants and trees have grown familiar. A known trail has begun to form, and I am excited to see where it leads.

# FREEZING FROGS, BUTT BREATHERS AND FEARLESS FISH: HOW AQUATIC WILDLIFE SURVIVES WINTER

by Shane McGuire, BFEC Land Manager/Naturalist

If you've spent time at the BFEC this summer, you may have noticed all the frogs singing in the ponds or maybe even caught a glimpse of some baby painted turtles sunning themselves on a log. Perhaps you spent time near the river and spotted turtles or fish in the shallow water. As the cold air starts to move in and winter approaches, you will find that the frogs are no longer singing, and the turtles and fish are missing from the shallow water.

Where have they gone? You probably suspect that they go through some type of dormancy, but there is a lot more to their survival than just hibernation.

Aquatic wildlife are able to survive the winter months because of the way ponds and lakes freeze. When cold weather moves in, the temperature of the water surface starts to drop. When the water on the surface reaches 39.2 F, water becomes very dense and settles to the bottom of the pond or lake. As the cold water drops, it pushes the relatively warmer water at the bottom up to the surface. This process, called turnover, continues until the surface water temperature drops below 39.2 degrees. Eventually, ice will cover the surface of the pond and act as an insulating blanket, preventing the water below from freezing solid — helping wildlife survive.

Frogs hibernate during the winter months. Some species settle at the bottom of a pond to burrow into the mud, while others will stay near the surface of the water and can completely freeze. Bullfrogs, northern leopard frogs and green frogs work their way to the bottom of the ponds and burrow under the leaf litter or into the mud. Although frogs have lungs, they have the ability to absorb oxygen and release carbon dioxide through their skin. During hibernation, their metabolic rates slow, allowing them to burn less energy, which in turn requires less oxygen. Frogs can live under water for months, slowly burning fat that is stored in their bodies. When spring arrives and water temperatures rise, they become active again, and return to the surface.

Wood frogs and spring peepers hibernate a little differently. As temperatures drop, they will find a spot to hibernate close to the water's surface. When their body temperature is close to the freezing point, they produce a natural antifreeze. When the freezing weather finally hits and ice covers the ponds, they will also freeze but their natural antifreeze protects their cells and organs. Since wood frogs and spring peepers hibernate at the surface of ponds and lakes, they are the first to become active again in the spring and start their mating songs.

Turtles become less active as the days grow shorter and colder. When this happens, they will move to deeper water and crawl into the mud or under the leaf litter at the bottom of the pond or river. Their metabolism slows down, and they enter a state of hibernation. Although turtles have lungs and need oxygen to survive, like frogs, their slower metabolism re-

duces the demand for oxygen. Turtles also absorb oxygen through parts of their bodies that have a lot of blood vessels. One area that is especially full of blood vessels is — you guessed it — their butts. Finally, turtles can produce glycogen and store it in their organs. Toward the end of winter, when most of the oxygen in the frozen pond has been used, turtles can break down the glycogen without using oxygen. Turtles can stay in this state for three or four months during winter. When spring arrives, the water warms, their metabolism speeds up, and they emerge from hibernation.

Fish, on the other hand, do not hibernate during the winter. Instead, when temperatures start to drop, they move to deeper water. When ice forms over the body of water, it not only acts as an insulator to prevent the water below from freezing, but it also blocks the wind from oxygenating the water. When snow covers the ice, it blocks sunlight from reaching the aquatic plants limiting photosynthesis and the amount of oxygen in the water. Because fish — just like amphibians and reptiles — become much less active when it is cold, their respiration and digestion slow down, reducing their need for oxygen. Fish can live for months in this winter rest.

This winter, when we are all warm and cozy in our heated homes, let's take a moment to remember our aquatic animal friends bravely battling the cold.



Photo: Wood frog frozen in ice  
(inset: Wood frog in the spring)



Left to right: Maddie Morgan, Eden Stephey, Malcolm MacDonell, Mia Fox and Bjorn Nilsson

## *The Green Corner*

# MANAGING FOR INVASIVE SPECIES AT KOKOSING NATURE PRESERVE

by Amy Henricksen, Kokosing Nature Preserve Steward

The summer growing season is the perfect time to enjoy the sights and sounds of the Kokosing Nature Preserve, Kenyon's green burial cemetery located at 10620 Quarry Chapel Road. In addition to the glorious wildflowers, however, there are also various species of invasive plants that would like to gain a foothold, if allowed. Efforts to control these invasive species are critical to maintaining the overall health and diversity of the prairie. The staff of Kokosing Nature Preserve partnered with the BFEC summer interns and volunteers in June, July and August, working together to keep the invasive species under control.

For three hours every Tuesday afternoon, a team of up to seven student interns and volunteers worked tirelessly to remove Canada thistle, bull

thistle, teasel, pokeweed, burdock, marestail/horseweed, multiflora rose and wild berries from the 23-acre preserve. BFEC student interns included Mia Fox '19, Bjorn Nilsson '20, and Eden Stephey '21. Kira Lancz '21, student intern in the Office of Green Initiatives, and Madeleine Morgan '18, BFEC post-baccalaureate fellow, also lent a helping hand over the summer. Volunteer workers included local high school students Owen Decatur, Duncan Hardy, Malcolm MacDonell and Logan Meyer.

We at the Kokosing Nature Preserve greatly appreciate the hard work of this crew. The results of their efforts can be enjoyed by all when walking the paths at Kokosing Nature Preserve!

# UPCOMING PROGRAMS AND EVENTS

## Knox County Nature Photography Contest - Submit your photos now

Submit your photo entries for the 21st Annual Knox County Nature Photography Contest! Deadline to enter is October 15th. The Resource Center is open Monday through Friday, 8am to 4pm. Entries will be displayed at the Fall Harvest Festival on October 20. Details at [bfec.kenyon.edu](http://bfec.kenyon.edu).

## Family Nature Quest: Hibernate, Migrate, Tolerate October 6, 10:30-11:30 a.m.

Participate in a shelter scavenger hunt to explore the BFEC forests and prairie and learn how animals prepare for the long winter ahead. Then create your own mini-shelter based on what you discovered! In the event of inclement weather, program will be held in the Resource Center. **Meet at the BFEC picnic pavilion.**

## River Ramble October 6, 2 p.m.

Join Shane McGuire, BFEC's land manager and naturalist, on this easy stroll along the River Trail. Enjoy the autumn colors of our large sycamore tree, and learn about some of our conservation initiatives through the riparian corridor and along the Kokosing River. This is an easy one-mile hike. **Meet at the BFEC Resource Center.**

## Family Nature Quest: Leaf an Impression October 13, 10:30-11:30 a.m.

It's finally autumn! The leaves have begun to change color to create a beautiful fall landscape. Come collect a variety of leaves, and learn about their trees and seasonal cycles. Complete leaf rubbings and leaf paintings to create your own autumn masterpiece. In the event of inclement weather, program will be held in the Resource Center. **Meet at the BFEC Picnic Pavilion.**

## Kokosing River Run (5K/10K) October 20, 9:30 a.m.

Run or walk this 5K/10K that will loop through BFEC's southern trail system. Advance register at [racepenguin.com/events/kenyon-family-weekend-5k](http://racepenguin.com/events/kenyon-family-weekend-5k), or register on race day beginning at 8 a.m. The race will begin at 9:30 a.m. **Participation fees are \$10 for the 5K and \$20 for the 10K.**

## Fall Harvest Festival October 20, Noon-4 p.m.

This free family event includes hayrides, live music, children's activities, farm animals, campfire, cider press, pumpkin decorating, the Knox County Nature Photography Contest show and so much more.

## Family Nature Quest: Trick or Tree October 27, 5:30-7:30 p.m.

It's almost Halloween! Bring your spooky spirit to venture on a tree scavenger hunt and explore the BFEC's many trails to collect prizes from our native trees. We'll have a campfire, hot chocolate and s'mores for you to warm up by after the scavenger hunt. In the event of inclement weather, we will have a costume party in the Resource Center! **Meet at the BFEC Picnic Pavilion.**

## Forest Foray November 3, 2 p.m.

Join Dave Heithaus, Kenyon's director of green initiatives to enjoy the last of the falling leaves. This moderately challenging hike will take participants past Walker's Pond to parts of the New Gambier Loop, the Bishop's Backbone and the Corridor Trail. Dave, with his usual wit and great humor, will share stories of the blood, sweat, and tears that went into forging these trails. The hike is approximately two miles. **Meet at the Franklin Miller Observatory.**

## Southern Scramble November 17, 2 p.m.

Join Maddie Morgan, BFEC post-baccalaureate fellow, to hike the Fern Trail. Maddie will talk about the trail's history, design, flora and fauna while hiking around the Pine Plantation and then back down again to parallel the Kokosing Gap Trail. This is a moderately challenging one-mile hike. **Meet at the BFEC Resource Center.**

## Tree Diseases November 29, 6:30 p.m.

This program will cover some of the diseases and tree-killing insects that are attacking Ohio trees. Jake Peer, wildlife specialist at Knox County Soil and Water, will discuss the latest problems with beech trees, as well as the plight of white ash, walnut, hemlock and other trees. **Meet at the BFEC Resource Center.**

## Holiday Wreath Workshop December 8, 1-4 p.m.

Celebrate the season while making your very own holiday wreath. All materials will be provided. Space is limited; contact 740-427-5052 or email [jordan2@kenyon.edu](mailto:jordan2@kenyon.edu) to register. Materials fee for Members \$20, Non-members \$25. **Meet at the BFEC Resource Center.**

## Christmas Bird Count December 16, 7 a.m.-4 p.m.

Join this century-old national initiative and help count birds in Mount Vernon, Gambier, Apple Valley and Fredericktown. Volunteers are needed at home feeders and in the field along roads and trails. Volunteers don't have to count the entire day. Lunch will be provided at noon at the BFEC for all participants. Call 740-427-5052 or email [jordan2@kenyon.edu](mailto:jordan2@kenyon.edu) to register.

## Solstice Stroll: Labyrinth Walk December 21, 7:30 a.m.

Celebrate sunrise on the shortest day of the year. BFEC Manager Noelle Jordan, will spend a few minutes talking about the BFEC's labyrinth, and then you can enjoy some solitude and moving meditation at your own pace. The total walk is approximately one mile and lasts 90 minutes. **Meet at the Kokosing Gap Trail lot on Laymon Road.**

# Thank you to our **volunteers.**

**We extend our heartfelt appreciation to the following volunteers** who gave so willingly of their time, energy and enthusiasm in July, August and September. Collectively, these dedicated volunteers gave over 750 hours assisting with conservation efforts on the property, collecting data on our bluebird trail, helping in the Wildlife Garden, conducting research (plant survey and aquatic animal survey) and leading field trips for local school children.

Al-Ummah students (97 of them!)  
*high school students from all over the U.S.*  
 Alex Levy, Kenyon student  
 Angus Soderberg, Kenyon student  
 Bella Stevens, Kenyon student  
 Ben Nutter, Kenyon student  
 Brian Miller, community volunteer  
 Chloe Shane, Kenyon student  
 Claire Hanke, Kenyon student  
 Coby Fielding, community volunteer  
 Dianne Mack, community volunteer  
 Drew Kerkhoff, Kenyon Faculty  
 Dylan Hartman, Kenyon student  
 Ellen Beller, community volunteer  
 Ellie Roman, Kenyon student  
 Emma Coffman, Kenyon student  
 Emma Garschagen, Kenyon student  
 Estelle Parker, community volunteer  
 Hadley Seymour, Kenyon student  
 Hannah Bachman, Kenyon student  
 Hannah Wedig, Kenyon student

Hulda Geng, Kenyon student  
 Jess Dannery, Kenyon student  
 Kayla Alcaide, Kenyon student  
 Kara Morrison, Kenyon student  
 Kendra Mosher,  
*Coach of the Ladies volleyball team*  
 Kenyon's Ladies Volleyball Team  
 Lara Hoffer, Kenyon student  
 Logan Meyer, *high school student*  
 Maggie Murphree, Kenyon student  
 Malcolm MacDonell, *high school student*  
 Mary Gerhardinger, Kenyon student  
 Maya McDonald, College of the Atlantic student  
 Nicolas Pulido, Kenyon student  
 Owen Decatur, *high school student*  
 Sarah Goslee-Reed, community volunteer  
 Sophia Silberman, Kenyon student  
 Terri Hieronymus, community volunteer  
 Zach Statler, Wittenberg University student  
 Zoe Kleeman, Kenyon student

## BFEC MEMBERS

### June-August

#### BENEFATOR

Joe and Kimberlee Klesner

#### PATRON

Geoff and Lori Brown  
 Jennifer McMahon  
 Gene Bailey

#### FRIEND

Caroline Detmer and Stanley Holmes  
 Noelle Jordan

#### FAMILY

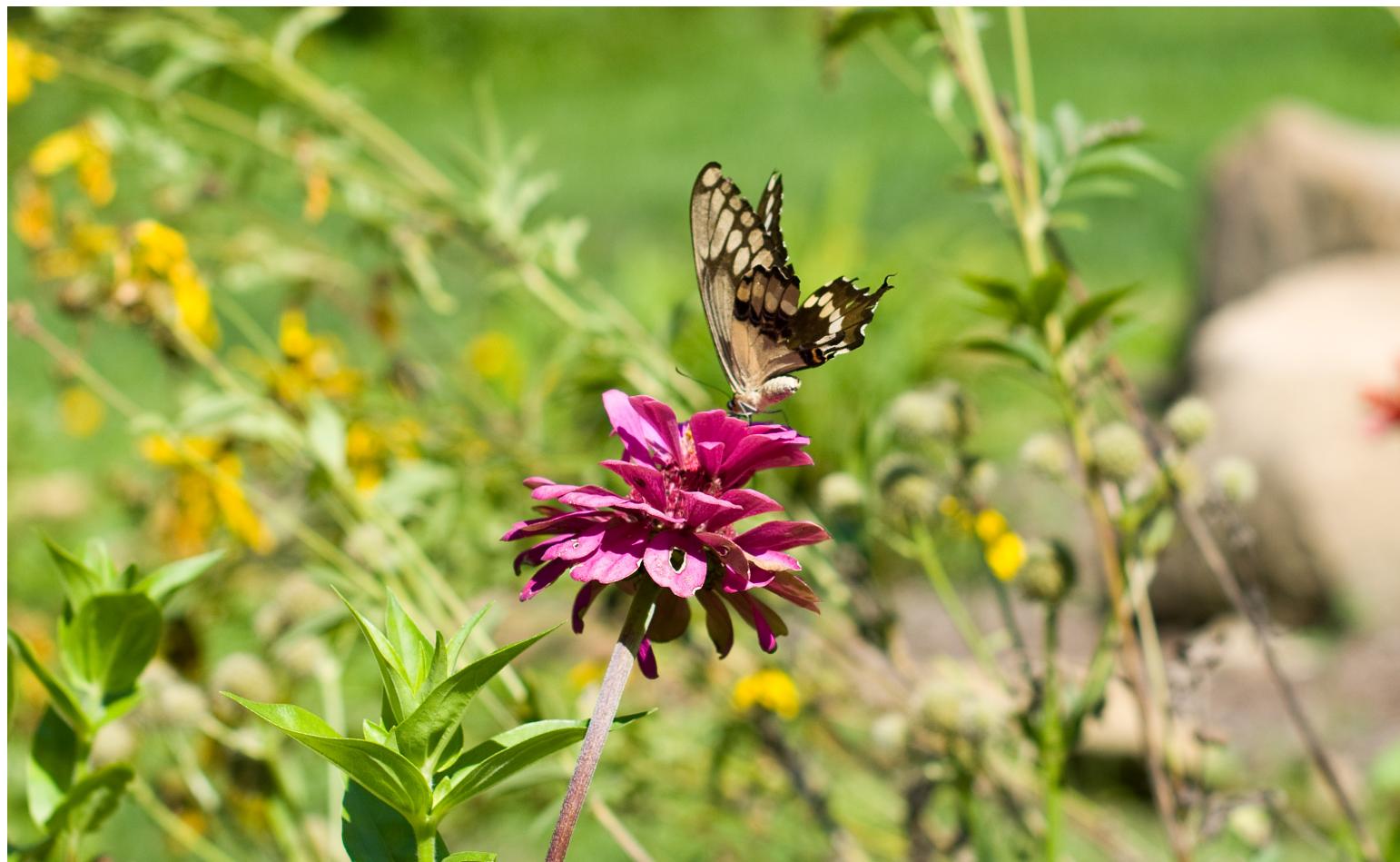
Jake and Jenny Armstrong  
 Chris Bickford and Karen Bagne  
 Perry and Erin Leatherman  
 Laura Whalen

#### INDIVIDUAL

Jean Coe  
 Charles and Patricia Leech  
 Peter Lind

#### DONOR

Geoff Akie  
 Avery Baldwin  
 Jon and Alyssa Lawrence





# Brown Family Environmental Center

at Kenyon College

bfec.kenyon.edu | 740-427-5050

## 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

**Madeleine Morgan**, Post Baccalaureate Fellow  
**Jill Kerkhoff**, Facilities Coordinator and Office Administrator  
**Shane McGuire**, Land Manager Naturalist  
**Noelle Jordan**, Manager

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

# INVEST IN NATURE

TO MAKE A GIFT, PLEASE FILL OUT THE INFORMATION BELOW, DETACH THE SHEET AND SEE MAILING INSTRUCTIONS.

There are many reasons to give, including the satisfaction of knowing you're a part of critical environmental education and conservation programs. Receive preferred access to workshops, a hard copy of our newsletters, and a discount on bird seed. *Use the form below to send your contribution today.*

NAME (FIRST, MIDDLE, LAST)

ADDRESS

CITY STATE ZIP/POSTAL CODE COUNTRY

(\_\_\_\_\_) MOBILE PHONE

EMAIL ADDRESS

Your donation is tax deductible as allowed by law. The Brown Family Environmental Center at Kenyon College is a 501c(3) nonprofit organization.

**Membership level:**

Student \$20    Individual \$35    Family \$50  
 Friend \$100    Patron \$250    Benefactor \$1000+

**Amount enclosed:** \_\_\_\_\_

My check, payable to Kenyon College, is enclosed  
 Please bill my \_\_\_\_\_ Visa or \_\_\_\_\_ Mastercard  
Card number \_\_\_\_\_ Exp. date \_\_\_\_\_

**Mail to:** BFEC, P.O. Box 508, Gambier, Ohio 43022