



Brown Family Environmental Center

FIELD NOTES

Springtime Oasis: A Vernal Pool Story

BY LUKE HESTER '20,
BFEC POST-BACCALAUREATE FELLOW

Here's the scene: it's spring, you're hiking, and, lo and behold, you've made it to the edge of a forest. The forested upland stretches a good distance, and as you traverse you hear loud, distinctive peeping sounds. You keep moving closer to it and by golly you hear a muffled quacking — but there shouldn't be any ducks nearby!

All guesses point to your coming across one of nature's hidden wonders, a vernal pool. These pools, so-called because of their frequent appearance in the spring, are ephemeral bodies of water that can harbor especially diverse flora and fauna due to repetitive states of inundation and desiccation. Over the fall, winter, and early spring, rain and snow accumulate in the area and transform it into a shallow wetland. It then holds the water for varying amounts of time before drying out by mid-to late-summer.

The amount of time that the pool holds water depends on many factors. Precipitation is the first element. Some vernal pools will hold water until an especially dry year or drought, at which time it dries up, and its ephemeral nature is revealed. The soil type below the actual body of water determines how long the water remains inundated. If the underlying earth includes a clay layer, or hardpan, then water takes a longer time to filter through, much like pouring water through superfine coffee versus a coarser grind. Clay or silt loam in the earth below will allow the water to stay around for much longer amounts of time, and the diversity of the pool equally depends on this delicate timing.

The cycle of filling and emptying prevents fish from living in these pools — and fish are the major predators that prevent certain types of vertebrates and invertebrates from thriving

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If you want to find a vernal pool — including along trails on the north side of the BFEC — start looking in late February or early March.

in permanent ponds. You might be wondering, how would a small fish eat an entire frog or salamander? Well, they actually eat the eggs of the amphibians and other creatures who would otherwise be happy residents in permanent ponds.

These amphibians and invertebrates, therefore, have higher success rates by making full use of vernal pools, turning them into veritable oases of diversity. The presence of certain macroinvertebrates — invertebrates large enough to be seen with the naked eye — indicate the quality of the vernal pool, similar to the process of judging stream quality. Many of these macroinvertebrates will use the vernal pool as a breeding ground, even when it is covered by a thin layer of ice. Others, such as the fairy shrimp, will conduct their entire lives in the pool.

Fairy shrimp are specifically evolved to live in ephemeral waters, with an incredible ability to survive harsh conditions. They have been found in deserts, on mountains, and even in the Antarctic peninsula. Fairy shrimp survive in harsh conditions by entering a biologically dormant state when still an egg, or cyst. During this time, growth and metabolism stop. This cyst can get carried by miscellaneous environmental factors to new locations, remaining viable for centuries. When the eggs enter suitable environmental conditions, they will hatch and take their adult form in the watery environment, possibly becoming food for a larger organism.

These interconnected, complex food webs are a major part of what allows for such a diverse collection of organisms to thrive in vernal pools. The macroinvertebrates, along with the plethora of small vertebrates, will break down all of the leaf litter and other detritus. All of this energy gets converted through the trophic levels and allows for larger organisms both within and outside of the vernal pool to develop.

Some amphibians actually require a vernal pool's existence to survive, and many others make use of their resources. The characteristic peeps and quacking sounds belong to spring peepers and wood frogs, which live and breed in the vernal waters. These frogs thrive especially in these locations due to their eggs and tadpoles remaining unaffected by predatory fish. Wood frogs are more dependent on these ephemeral wetlands, seeming to require them more so than spring peepers, which readily inhabit swamps and other bodies of water.

Perhaps even more dependent on these types of pools are salamanders. They make use of the vernal pool for a short amount of time, but that time is critical for the success of the species. As with the frogs, undisturbed egg masses are vital for successful reproduction and propagation. The spotted salamander, the most common salamander in our region, is especially tied to vernal pools. In Ohio, many of these ephemeral bodies of water are surrounded by woods and upland forests, creating perfect habitat for these creatures. Spotted salamanders spend most of their lives underground, living beneath the leaf litter and in shallow burrows. The forested area offers plenty of this leafy layer for the salamanders to live in. They can travel quite a long way from their breeding center at the vernal pool but will almost always return to the same pool every year. Sadly, this means that even when a vernal pool dries up or is drained, spotted salamanders are not able to breed.

When reading the introductory scene at the beginning of this piece of writing, you might have been reminded of walking on the BFEC's Bishops Backbone Trail along Wolf Run Creek, on the north side of the property. That is exactly what it was drawn from! Following Bishop's Backbone will eventually lead you to dramatic bends of the creek, in the middle which is our very own vernal pool system.

The BFEC vernal pool presents an interesting case, and mostly leads to more questions for future study. Our land manager and naturalist, Shane McGuire, observed only one salamander egg mass appeared to his knowledge there last year. We aren't sure why this is. It's possible the pool's proximity to the stream allows some fish to enter during flood events and prey on eggs. A study of the macroinvertebrate diversity is also in order; at the

time of writing, they have yet to appear. Another factor would be the soil type. Shane reports that the vernal pool has not held water into late summer in recent years. This could be for many reasons, but a loose soil type might allow water to filter through more quickly. This sounds like a great opportunity for a Kenyon class to explore!

During my studies of our vernal pool, I have had the luxury of existing knowledge of its location. Others might not be so lucky. If you'd like to find a vernal pool, start looking in late February or early March. The early-spring-blooming skunk cabbage can be a sign of flowing groundwater, which suggests that a vernal pool could be nearby. The area around Wolf Run Creek has many skunk cabbage plants in bloom in late February and early March. A variety of trees can also indicate wetter ground, such as the sycamore, pin oak, green ash, red and silver maples, and swamp white oak. Trees in a vernal pool might have a characteristic trunk. Much like the fortifying buttresses of incredibly large cathedrals built by human hands, trees that live in a watery environment will naturally grow buttresses and flare out toward the ground, adding stability.

After seeing how vital these ephemeral wetlands are for many organisms, one might ask about the potential for humans constructing them. There are wildly mixed opinions on this, with many believing that constructed vernal pools simply

cannot imitate their complex nature. However, there are also guides on how to successfully build an entire ephemeral pool. The major shortcomings are that built pools usually become too deep or steep from the edge for the majority of organisms that breed there. Either way, the difficulty with constructing and restoring these natural features indicates just how important it is to conserve and protect them. The major way to protect these habitats is simply not to disturb them, leaving a large area around the pool unaffected by construction or agriculture, both of which affect the physical land and hydrology of the pool.

What lesson can we learn from these fleeting pools? One lesson could be the taming of the human desire to “tame” nature. Human attempts to master nature often come back around to bite us, and, with ephemeral features, especially so. We have a tendency to establish permanent fixtures, such as buildings and farms, but we often ignore nature's solutions to the so-called problems of an overly wet environment. The common view of land as something that must provide something for humans perhaps clouds our eyes to the full admiration of something as simple as a vernal pool. Perhaps “mastery over nature” does mean turning all of it into usable resources. Or maybe this mastery is recognizing the good that already exists, and doing everything we can to preserve it.

Going All-Natural with Naturescaping

BY EMMA RENEE COFFMAN '22, BFEC STUDENT MANAGER

When you think of gardening, what comes to mind? Mulch, fertilizer and weeding? Expensive flowers and seeds? Hard work and long days in the sun?

Gardening traditionally can be a back-breaking task, but it doesn't need to be. What if there were a way to grow plants that are easy to take care of, great for the environment, and beautiful, too?

These plants really do exist, and they're easier to find than you might think. In fact, April is a month devoted to them: it's Ohio Native Plant Month.

Native plants are plants that are known to grow naturally in the given environment. In Ohio, this can include anything from trees, to grasses, to wildflowers — just as long as they are plants that have historically grown here. Planting and cultivating these plants in your yard or garden is called native gardening or simply naturescaping, and it is a great way to take advantage of the natural beauty of our state.

Besides the natural beauty of your local wildflowers and plants, this technique has a lot of added benefits that you don't get from traditional gardens. Native plants are best suited to survive in the region's climate, so they don't need nearly as many added pesticides or herbicides to grow. This also means the plants are acclimated to the seasonal rainfall, which means less watering for you. Less mowing, weeding, watering, and fertilizing means more time for you to enjoy the outdoors.

Native gardening is great for the environment, too. The root systems of native plants help hold soil in place, preventing erosion and holding more water for the plants. Birds,

butterflies, bees and other wildlife will love the new space you've created for them, full of the plants and flowers they rely on to live.

So, how do you get started? In order to properly naturescape, you will need to rethink everything you know about gardening. All those traditional techniques — like weeding and fertilizing — need to be exchanged for an understanding of local ecology. Instead of asking yourself, “What would look prettiest here?” you need to ask yourself, “What would naturally grow here?”

It is very important to consider the conditions of the site you choose. Pay attention to the kinds of plants that grow nearby, and do plenty of research before you start planting. And remember to be patient. It will take a while for the natives to establish themselves once they are planted. Although they are low maintenance, they will still need care. Before you get started, make sure you are familiar with the specific needs of your plants.

To see the beauty of native plants in action, visit the garden at the Brown Family Environmental Center. As the snow melts away and spring is in full bloom, the garden is full of life, color and sounds that are wonderful to enjoy. Abby Navin's article on wildflowers in this issue will also give you different ideas of where to begin in your native gardening. Ohio wildlife is beautiful, so why not welcome it into your own yard?

For more information on how to make your own native plant garden, including a helpful list of native Ohio plants, check out OhioNativePlantMonth.org.

Spring and Summer Wildflowers

BY ABBY NAVIN '23, BFEC STUDENT MANAGER

It's once again that time of year when the Earth breaks free of winter's constraints and enters full bloom. There is nothing sweeter than seeing the natural beauty of Ohio's spring wildflowers. If you get the chance to visit the BFEC in these coming months, keep an eye out for the following species of flowers.

If you wish to plant any of these flowers in a naturescaping project of your own, please remember not to harvest from the wild, but instead to visit one of the many local nurseries that specialize in wildflowers: Natives in Harmony, Groovy Plants Ranch, or Ohio Prairie Nursery, just to name a few. I wish you a successful spring season, full of good smells and gorgeous flowers.

Black-eyed Susan *Rudbeckia hirta*

The black-eyed susan is one of Ohio's most common native wildflowers, with yellow daisy-like petals around a domed brown center. You will find these flowers in many open spaces due mainly to their resilience and ability to adapt to various environments and soil types. While they are beautiful to look at, they also hold medicinal properties. Historically, the Ojibwa tribe would use these flowers to make tea or juice that eases colds and swelling.



Queen Anne's Lace *Daucus carota*

Another gorgeous flower to look for this spring is Queen Anne's lace, which stands tall among the rest with its long stem and clustered small white flowers. The plant is said to have been named after Queen Anne of England, who was an expert lace maker. This lovely flower is not native to the U.S., but it is now considered naturalized. While the plant is edible when young and can be used as a carrot substitute, it does have a deadly look-alike: poison hemlock. The big differences are that poison hemlock smells rancid and has a smooth stem, unlike the carrot smell and hairy stem of Queen Anne's lace. Unless you know the plant well, you should admire it from afar.



Illustrations: Katelyn Ratajczak

Morning Glories *Ipomoea pandurata*

Finally, look for small white morning glories during your wildflower adventures. These native flowers resemble a trumpet in shape and are white in color. They grow on a vine and have heart-shaped leaves surrounding them. They can grow in a variety of habitats, but you will often see them in more undisturbed areas where they can amass. While the plant was used by the Aztecs in various ways, not many still use the plant for eating or medicinal purposes. However, this is no shame since they provide the important service of beauty.



The Return of Ohio's Bobcats

BY SHANE MCGUIRE, BFEC LAND MANAGER AND NATURALIST

I am sure most of you know that the bobcat population is currently on the rise in Ohio, but do you know their history? How did a cat that used to be present all throughout Ohio become extirpated? How are they making a comeback?

Bobcats did in fact roam all of Ohio before European settlement, when Ohio was estimated to be about 95% forest. Once settlement took place, forests were cut down and swamps were drained to make way for crop fields. With bobcat habitat virtually destroyed, and their populations in danger from over-hunting, bobcats were on the move. By 1850, records indicate there were no longer bobcats in Ohio.

Around the year 1906, Ohio started to reestablish forests, especially in the southern and southeastern part of the state. These changes brought suitable habitat for the bobcat once again. During this time, Pennsylvania, West Virginia, and Kentucky all had bobcat populations that were starting to push west and north back toward Ohio. From that time through the 1960's, there were rumors that the cats had returned to Ohio, but there were no confirmed sightings. That changed in 1971 when a bobcat sighting was confirmed in Guernsey County. A second sighting was confirmed a few years later in Scioto County. The bobcats had officially made their way back home to Ohio.

In 1974, the Ohio Department of Natural Resources (ODNR) placed the bobcat on the endangered species list. From 1971 through 1999, confirmed sightings of the cat still remained very low — maybe four confirmed sightings a year. As more and more counties in the south and southeastern parts of the state kept reporting confirmed sightings, ODNR expected that a small population was reproducing in the state.

It wasn't until the early 2000's when the bobcat population really started to take off. In 2004, almost all southeastern counties had bobcats present. From 2004 through 2019, the population and, consequently, sightings rose significantly. In 2004 there were 10 confirmed sightings; by 2019, 511 sightings, in various counties, were confirmed. ODNR conducted a genetic research study and found that Ohio had two genetically different bobcat populations: one in the Noble County area, the other in the Jackson and Vinton County area.

In 2012, ODNR took the bobcat off the endangered species list and moved them to the threatened list. Just two years later, they were removed from the threatened list. Today, while no longer listed as threatened, they remain protected in Ohio.

Knox County had its first confirmed sighting in Liberty Township in 2013. Every year more sightings are reported, with 16 confirmed sightings to date in eight different townships: Liberty, Butler, Union, Jackson, Jefferson, Pleasant, Brown and Morgan.

The history of bobcats in Ohio is truly a remarkable comeback story. Today, 71 of Ohio's 88 counties have had at least one confirmed bobcat sighting. Reporting bobcat sightings is very important for ODNR. As sightings become more and more common people tend to stop sending reports, thinking they are pointless for ODNR, since everyone knows there are bobcats in the area. However, every piece of data is important to help determine the future for bobcats. No matter where you live in Ohio, if you're lucky enough to see one of these cats in the wild, try to take pictures and then report your sighting to ODNR. But most importantly, enjoy seeing one of Ohio's species that made a remarkable comeback.

Nocturnal Pollinators: Moths in Spring

BY LUCY WHITE '22, BFEC STUDENT MANAGER

In a season permeated by loud chirping animals and brightly colored flowers, it's easy to forget about the organisms that remain in the shadows, the ones that do not always grab attention. Moths are one of these mysterious and often overlooked organisms. They get a bad reputation for eating clothes and gathering in lights, but there is so much more to these distinctly special creatures. I like to think of them as butterflies' emo counterpart, but perhaps that doesn't do them enough justice.

Recent research out of Boston College suggests that moths may have existed over 150 million years ago, meaning they are something of a living fossil. Not only does this speak to their resilience, but they can provide insight into the ancient natural world. Moreover, similar to butterflies, moths play one of the most important roles in the ecosystem: pollination. As moths feed on the nectar of flowers, they transfer pollen into the plant's stigma, helping the plant to reproduce and ensuring that our most fundamental energy and oxygen source continues to survive.

What is even more impressive is that, unlike butterflies, most moths are nocturnal. As a result, most moths pollinate

during the night, which is no easy feat given the lack of light. Luckily, moths have developed fascinating adaptations that allow them to navigate in the dark. It is believed that they use the moon and stars as a compass, positioning themselves at a specific angle and then using the celestial light as a frame of reference in order to navigate.

Though moths may not be as eye-catching as butterflies, they are worth looking out for on an evening spring walk. With over 11,000 species in the U.S., and 160,000 in the world, each species has its own unique characteristics and idiosyncrasies, ranging in color, shape, size and wing pattern. Some of the most fascinating moths that can be found in Ohio include the imperial moth, the isabella tiger moth, the regal moth and the luna moth. In general, moths tend to be attracted to dull colored or white flowers, many of which only open after dusk, or, like honeysuckles and creeping buttercups, emit a fragrance to attract the moths in the dark. Moth's long tongue allows them to reach nectar that is deep within flowers like morning glory, tobacco, yucca and gardenias. Next time you come across one of these plants, look around for a nearby moth. You might be in for a delightful surprise!

GREEN CORNER

Kokosing Nature Preserve: A Respite in a Time of Crisis

BY AMY HENRICKSEN, KOKOSING NATURE PRESERVE STEWARD

Throughout the COVID-19 pandemic, Kokosing Nature Preserve has continued its operation as a green burial cemetery, grateful to be able to serve the community's needs. While natural, green burial has remained a safe and viable option during the pandemic, we have had to alter some of our practices according to the necessary requirements of social distancing. In spite of these adjustments, services at Kokosing Nature Preserve have remained intimate, personal and meaningful, and the beautiful surroundings at the preserve have lent a sense of peace and healing to the families and loved ones who are wrestling with their grief in a time of forced social distancing.

For the local community, Kokosing Nature Preserve has also provided a welcome space for outdoor activity and safe, appropriately distanced social interaction. We have encountered caregivers leading schoolchildren on scavenger hunts at the preserve, using nature exploration as a fun activity to fill their days during a time of remote learning. Individuals and groups have continued to meet in increasing numbers at the preserve to walk and talk, often accompanied by their canine companions. For some, the beauty of Kokosing Nature Preserve has served as an inspiration for the creation of various forms of art. Some have put pen to paper, others have captured beautiful photographs, and some have brought their easels and painting supplies to the preserve.

It is our honor and privilege to provide an important service to families who are seeking the option of a green burial in a beautiful, natural setting. Equally, it is a privilege to offer a thriving nature preserve for the community to enjoy and benefit from the positive boost to health and wellbeing that time spent in nature can provide.





PROGRAMS AND EVENTS

We will be offering public programs again this summer. Check our website, bfec.kenyon.edu, or join our email list to receive notifications.

In the meantime, the BFEC trail system is open. Get some exercise and fresh air on our nine miles of trails through a variety of ecosystems.

Bob Handelman

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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

Luke Hester '20, *Post Baccalaureate Fellow*
Mabel Jones '21, *Student Newsletter Editor*
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