



Milkweed and the Monarch

North America's most well-known butterfly is quickly becoming its most threatened, due to loss of the plant that it can't live without.

- by Heather Doherty

We Americans are lovers of wildlife, though we are selective. We adore fuzzy mammals like dogs and bunnies, and diminutive song birds that visit backyard feeders. Insects, however, don't usually make the list, save for a tiny echelon that by some accident of nature qualify as "cute."

Lightning bugs, lady bugs (before the invasive Asian form started swarming homes), and perhaps dragonflies are in this group, as is the monarch butterfly.

The monarch is the most well-known butterfly in North America, or in some cases, the *only* known butterfly. Young visitors to the BFEC wildlife garden often proclaim "it's a monarch!" anytime a vaguely brown, black, or orange-ish butterfly flutters by.

Why the attention? The monarch is abundant, beautiful, and rather large by butterfly standards, at up to four inches wide. But even more captivating is the amazing feat it pulls-off every fall. It is the longest-migrating butterfly in the world, travelling up to 2,500 miles one-way from as far as southern Canada to central Mexico.

The Monarch is also unique in that it requires a single kind of plant, milkweed (*Asclepias*) to survive, though this same plant is toxic to other animals. Its relationship with the plant, which it uses to lay eggs, has certainly made the monarch successful, but it is now becoming a vulnerability. This winter saw the lowest monarch population levels since record-keeping began twenty years ago, due largely to milkweed's disappearance.

Amazing migration

Monarchs usually appear in Ohio in late summer seeking food (flower nectar), mates, and one of a dozen or so species of North American milkweed to lay eggs. When the eggs hatch, the young caterpillars feed exclusively on the milkweed.

"Common milkweed" is a species that is indeed a common "weed" in Ohio, where it often grows on roadsides. If you break a leaf, you'll encounter a white, sticky sap, which gives the plant its name. It contains compounds that may irritate your skin, but gives monarchs a special advantage.

Caterpillars are usually easy targets for hungry birds, but predators will promptly spit out a monarch caterpillar thanks to its milkweed diet, which makes it unpalatable. The plant compound stays with the caterpillar through metamorphosis and continues to protect the flying adult.

Adults typically live six weeks or so, except for the last brood of the year that matures in early fall. As the days become shorter and nights cooler, monarchs cease egg-laying to begin their southern migration.

A small, mountainous region of central Mexico is the destination for monarchs living east of the Rockies into southern Canada and New England. A smaller population occurring west of the Rockies migrates to over-wintering sites on the coast of Southern California.

Though the predecessors of these butterflies have been to these over-wintering sites before, the individuals who make this journey have not.

The monarchs congregate in ever larger groups as they head south, forming sizeable colonies. Usually by late Octo-

ber they arrive at a spot high in the mountains, about 100 miles west of Mexico City, that has been protected as the Monarch Butterfly Biosphere Reserve.

Their arrival coincides with an important Mexican holiday, Dia de los Muertos, or Day of the Dead, in which spirits of deceased relatives are believed to return home, and are honored with feasts and celebrations. According to local legend, spirits may take the form of the returning monarchs.

The butterflies spend the winter clustered tightly together on trees in the reserve. In late winter they mate and fly the first leg of the spring migration north, making it as far as Texas or Oklahoma. At up to eight months old (ancient in butterfly years) and with perhaps 4,000 miles logged, these butterflies die, but not before laying eggs that will become the butterflies that continue the journey. It is the second, third and fourth generations that return to Ohio and points north and east in July and August.

The year the monarchs didn't come

In 1994, biologists began recording the size of the monarch population at their over-wintering grounds in Mexico by measuring the area that the densely-packed butterfly colonies occupy. The population hit a high point in the winter of 96-97 at nearly 21 hectares (or 8.5 acres), which was covered by hundreds of millions of monarchs.

Fast-forward to last winter (2012-13) and the population measured just 1.19 hectares, much to the horror of monarch enthusiasts. The population had seen a steady decline over a dozen years, but this was a new low.

During the spring that followed, the monarch migration got off to a slow start, with the number moving north in May also at an all-time low. This trend was observed in Ohio, and at the BFEC, where we saw a half-dozen monarchs all summer and no caterpillars. This may be normal for some species that are less common, but unheard of for monarchs, which can seem ubiquitous.

The slow summer rounded to fall and time for the southward migration. But on the Day of the Dead in Mexico last November, the monarchs did not appear¹. They did start to straggle in a week later, but the winter population measured in January of this year was beyond bleak. At just .69 hectares, it represents a 94% reduction from the recorded high.

As with most problems, the contributing factors are many, and include the weather. Monarchs are cold-blooded animals, and need warm conditions to grow, fly, and find food. A cold snap at the wrong time can be fatal to large swaths of the population. Cold rain or freezing temperatures in Mexico during hibernation can cause massive die-offs, which happened most recently in early 2010.

Weather that is too hot and dry can also lead to desiccation of host plants and larvae. Drought that gripped Texas, the central plains states and parts of the Midwestern last summer delivered a very poorly-timed blow to the already small population of monarchs moving north.

Deforestation near over-wintering grounds has also been blamed, but more recently, Americans have focused on problems at home with loss of natural habitats and milkweed.

No milkweed, no monarchs

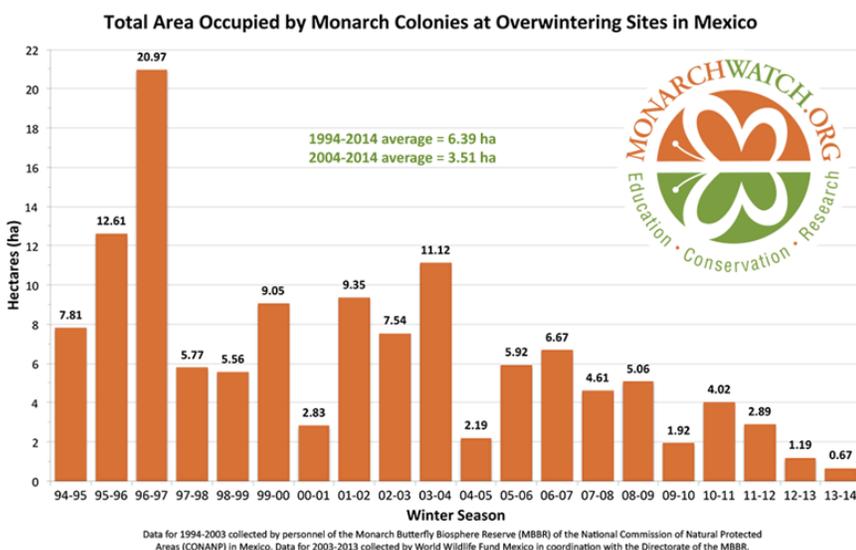
Loss of milkweed is in itself attributed to multiple factors. Urban and suburban growth, for instance, gobbles up massive acreage every year that formerly contained the plant.

Changes in the way that Americans farm has also reduced milkweed availability. The push for biofuels in the U.S. has led to a 10% increase in soybean and corn production since 2007.² With corn prices high, farmers are incentivized to leave smaller and smaller strips of land along roadsides and fence rows, a niche where milkweed formerly thrived.

But perhaps the biggest issue of all was quantified in a study released in early 2012 by researchers at the University of Minnesota and Iowa State University, who studied the use of the herbicide Roundup on farm fields. In the mid-90's, Monsanto, maker of Roundup, introduced corn and soybean seeds that were genetically modified to withstand roundup applications on farm fields. This allowed for the application of Roundup across huge sections of land, leaving crops unharmed while weeds perished.

“Roundup-ready” seeds now account for 94% or all soybeans and 70% of all corn grown in the U.S. According to the researchers, this use corresponds to a 58% decline in milkweed plants growing in the Midwest from 1999 – 2010.

Continued on page 4



This graph, created by MonarchWatch.com, demonstrates the steady decline of monarch populations since the late 90's and the record-low numbers recorded over the past two winters.



Creature Feature: Making it to Spring

by David Heithaus

Does this look like how you spent the winter? In addition to good old-fashioned sleep, favored by the chipmunk, local creatures employ an array of tactics for winter survival.

It may be the spring issue but based on what we all went through this winter (perhaps we are still going through at time of publication...), it seemed appropriate to address how some of our outdoorsy neighbors managed those charming arctic vortices. Not the people down the block with the Subaru; they were fine.

How do Ohio's critters survive the harsh snowscape while we sit inside sipping things from coconuts in our underwear and spinning the thermostat knob like a roulette wheel?

There are several basic ways in which organisms can make adjustments to a wintery environment: migrating, shifting behavioral patterns, bulking up, sleeping it off or a sampler platter of several options.

Migrating, as evidenced by human population densities in South Florida, is debatably the most pleasant but it is also limited to a fairly exclusive group of creatures with wings or frequent flyer miles.

As the days shorten and seasonal cues compound, many of Ohio's bird species fly to the nutrient-rich south. Some fly for thousands of miles. They are joined for some distance by Indiana and Little Brown bats. Lacking the fortitude of the feathered, these furry flyers generally don't make it much further south than Kentucky. Once there, they embark on a cave-themed slumber party for the balance of winter.

As the cardinal shivering at your feeder can attest, simply having wings does not necessarily buy you a trip south. Instead, many creatures knuckle down

and tough it out. Some mammals and birds front load the calories in the fall and then shift their diets for winter availability. Birds that prefer insects during the green times shift to nuts and fall berries. Mammals like foxes contract broad summer diets and focus strictly on mice and other small rodents.

Speaking of rodents, some mice and voles actually rely on a cover of snow by exploiting the subnivean zone. Which sounds too awesome to be a real thing but I promise that it is. The subnivean zone is the insulated area beneath the snow pack. Here, rodents can avoid predators while remaining somewhat buffered from the elements. Temperature sensors placed in the subnivean zone remain warmer and more consistent than ones placed in a simple, unoccupied shelter. Add heat from the rodents' respiration and the subnivean zone is, if not cozy, perfectly acceptable for travel.

Generally speaking, animals try to reduce the amount of time they are active during the winter. Taking refuge in burrows, tree cavities or under rocks and logs can greatly reduce the amount of energy required to maintain a functioning body. Any creature with a social bone will huddle together in a group whenever possible.

For some creatures, the thought of a long, cold winter is enough to drive them to bed all together. The groundhog, a 'true' hibernator, is at the vanguard of the drowsy charge. They will often construct a specialized winter burrow and remain in an inactive state for at least three months. During this time their heart rate slows dramatical-

ly, their body temperature draws down and they slowly consume fat stored from your garden for winter slumber.

Other mid-sized mammals like raccoons, opossums and skunks will enter a temporary hibernation during particularly cold periods but none of them sleep it off like the whistle-pig!

So what about our less attractive animals? Can't they simply freeze to death? Of course not you monster. As cold-blooded creatures, fish, amphibians and reptiles are greatly limited by winter temperatures but they do find ways to survive. As the weather cools and their body processes slow to a crawl, they take shelter wherever they can find it. Once there, they enter a dormant state similar to hibernation until warm spring air coaxes their blood back to flowing.

So where do they find shelter? A good hollow log or mulch pile often does the trick for a snake or lizard. Some snakes even gather together in large communal masses. How's that for your nightmares? Many turtles, frogs and fish take refuge at the bottom of ponds and lakes. Some burrow into the soft sediment for extra protection. With their slowed body processes and cold water's ability to hold more oxygen, turtles and frogs are able to breathe by absorbing it through their skin. And before any sportsmen point it out: yes, there are a number of fish that remain active and delicious under the ice.

There is one creature that is not content to burrow, gather together or hide... As the wind begins to howl and sleet pounds the earth, the wood frog thumbs its nose at old man winter

Continued from page 2...

To add insult to injury, they found that milkweed growing on the edge of farm fields is more productive for monarch breeding than other patches, leading to a disproportionately high decline in monarch egg production, which fell by 81%.

The researchers acknowledged that wide-spread use of herbicides is unlikely to change, which makes conservation and enhancement of non-agricultural habitat more important than ever. Sprawling lawns in front of corporate offices or the miles-upon-miles of mowed grass along interstate highways, for instance, could be put to better use.

Organizations like the Monarch Joint Venture, with partners in federal agencies, nonprofits, and academic institutions, have been created to support project like these, as well as education and research (monarchjointventure.org).

New monarch habitat: your lawn!

There's another habitat in the U.S. that could also support milkweed and butterfly-friendly plants: the ubiquitous residential lawn. Have some open, sunny space that you'd like to stop mowing? Consider planting milkweed, along with other food sources for adult butterflies like coneflower, black-eyed susan, bee-balm, and goldenrod.

Got Milkweed?

Ready to plant milkweed? GOOD! Here are a few things to know about three varieties that grow readily in central Ohio and are good hosts for monarch eggs. In general, milkweeds feature clusters of small, star-shaped flowers, prefer full sun, and are "seldom damaged" by deer.

Common Milkweed (*Asclepias syriaca*) - this is the 3-4' milkweed variety that grows commonly on roadsides and ditches. It's flowers are white and pink (pictured page 1) and have an amazing, lilac-like fragrance. Seed pods release seeds with tiny "parachutes" that float in the breeze. This plant has limited commercial availability, but look for seeds in catalogs, or *purchase seedlings for \$1 at the Earth Day Festival!*

Butterfly Weed (*Asclepias tuberosa*) - this compact milkweed is great for more formal gardens. It grows 2-3' tall, has beautiful, bright orange flowers, and prefers medium to dry soil. It's also the easiest variety to get your hands on - look for it at local nurseries, or *purchase seedlings for \$1 at the Earth Day Festival!*

Swamp Milkweed (*Asclepias incarnate*) - also known as red milkweed, this plant grows wild in wet soils that border ponds and creeks. It grows to about 3', and is adorned with pink flowers. Visit the BFEC's favorite native plant nursery online to purchase plants: prairienursery.com. Best in wet soil.

At the BFEC, we've started extra flats of milkweed in the greenhouse for the Earth Day Festival on April 6th. Stop by our booth to see live monarchs and buy **milkweed seedlings for just \$1!** See additional event information on page 6, and milkweed growing information above.

References

1. Robbins, Jim. "The Year the Monarchs Didn't Appear." Nov. 22, 2013: *The New York Times* Web
2. Taylor, Chip. "Monarch Population Status." Jan. 29, 2014: MonarchWatch.com. Mar. 3, 2014.



Monarch caterpillar on butterfly weed

"Let's hope there are favorable conditions for monarchs over the next several years. While waiting for conditions to improve, let's plant milkweed - lots and lots of it."

- Chip Taylor, MonarchWatch.com



...*"Spring"*, continued from page 3

and (with a sneer I expect) simply freezes solid.

Thanks to some crafty physiology, the wood frog is able to create cryoprotectant chemicals (awesome) that buffer their tissues from the end-of-life damage that freezing and thawing would normally inflict. Yes, the wood frog has super-hero powers.

For some, the winter isn't so bad because, hey: no bugs, right? Well that's kind of a lousy attitude to take towards

the circle of life so now I'm going to tell you what they're up to while you're gloating by the fireplace. Some of them are so saddened by human indifference that they simply lay their eggs in the fall and die. Happy now? Others spend their winters as larvae, waiting patiently underground for spring at which point they will emerge, take adult form and punish your fruits and vegetables. Still others do what everybody else seems to: find a hole, log or other such place to crawl and wait it

out. And just so you know there are actually several insects that share your precious space over winter: winter craneflies and stone flies to name a couple. Oh- Monarchs migrate if you didn't know.

Spring is just around the corner. With longer days and warmer skies, we can all look forward to thawing and crawling back outside... except for any insects that laid eggs and died in the fall. They're pretty much done with winter. As are we all.



Nature's Keepers Camp: what summer is meant to be

Do you remember childhood summers spent running around outside? When time didn't seem to exist, just cool shade and the smell of mowed grass? Unfortunately, fewer kids are growing up with these outdoor experiences, due to busy schedules, lack of green space, safety concerns, or the appeal of indoor electronics.

We're pleased to offer the simple joy of outdoor play at our Nature's Keepers Outdoor Adventure Camp (sorry kids, supervision is included). Kids learn about nature through games, crafts, hiking, and more, and have the opportunity to form personal connections with nature that may last a lifetime.

We are thrilled to **expand our offerings** to younger children this year through a partnership with the Science Play-Space Initiative. Camps will be offered for 5-7 year olds from 9am - noon on June 23-27 & June 30-July 3. Registration is \$50 for week of 6/23 and \$40 for week of 6/30. Camp will be lead by nature enthusiast and Wiggin Street Elementary School teacher Lori Zolman.

We will also offer our tradition full day camp for 8-11 year-olds on July 30- Aug.1. Registration is \$70, and includes a camp t-shirt and Kokosing River tubing expedition. Spaces for both camps are limited; look for registration material in April.



You may have wondered about the massive fort at the foot of the BFEC's fern trail, and so have students in Dr. Hardy's Neanderthal class. They constructed it to investigate if such a structure, similar perhaps to one crafted by a Neanderthal, could actually keep you warm. Temperatures sensors inside may reveal the answer.

Neanderthals vs. the polar vortex

Every other semester, every other year, Professor of Anthropology Dr. Bruce Hardy asks his students a question: "were Neanderthals too stupid to chew gum and walk at the same time?" Those who know Hardy would understand that this question is largely rhetorical. His students however, shin deep in snow and clutching small sharp pieces of stone in increasingly numb fingers take the question both literally and seriously. Then they begin collecting fallen limbs and cutting reeds and tall grasses with their rocks.

Titled simply "Neanderthals", Hardy's class takes advantage of the BFEC's unique resources to allow students a hands-on and practical approach in investigating what the Paleolithic world would have demanded of our cousins in order for them to survive.

Neanderthals existed in some form for over 250 thousand years in Europe. With that kind of staying power, it seems reasonable to question the picture of Neanderthals as dull and brutish - an image shaped perhaps more by historical and cultural factors than data or logical inference.

Over the course of the semester, students travel the frozen wastes of the BFEC thinking practically about how a person with a primitive tool kit could manage to survive. What resources would be available and how could they be exploited? What technologies, behavioral adaptations and social structures would a group of Neanderthals *require* to persist and thrive in a world without Walmarts?

You haven't lived until you've cut down a tree with a rock in a blizzard. And made a spear out of it.

Calendar of Events

All events are free, open to the public, and start from the BFEC Resource Center unless stated otherwise.
9781 Laymon Road | 740-427-5050 | dohertyh@kenyon.edu | http://bfec.kenyon.edu

CELEBRATE EARTH DAY!

Sunday, April 6th - Kenyon Athletic Center

EARTH DAY CHALLENGE Half Marathon & 4 Mile Run/Walk
Celebrate Earth Day with your feet! Participants of all abilities are invited to walk, run or a little of both for a four-mile race or half-marathon, both starting at 8am. Info at hofferberthj@kenyon.edu, registration at www.premierraces.com.



EARTH DAY FESTIVAL: Health People ~ Healthy World

Keep yourself and the planet healthy - goals that go hand-in-hand! This unique, FREE event features over 70 exhibitors and artisans, kids activities, live music, farm marketers, and more from 10am-2pm. Celebrate Earth Day by shopping green, enjoying entertainment, and connecting with groups that support healthy living for ourselves and our world. More information at kenyon.edu/earthday.

Kokosing Miles Trail Running Festival - Sunday, April 27th, 10am. People of all ability levels are welcome to challenge themselves on a 5K or 10K course on beautiful BFEC trails. Stick around afterwards for festive live music provided by Kenyon student bands, plus kids activities. Register at www.premierraces.com.

A Trail of Three Wetlands - Saturday, May 3rd, 1pm, New Gambier Road Trailhead

Join Kenyon Professor of Biology Siobhan Fennessy for a 1.5 mile walk to explore the many shapes and sizes of wetlands on our Bishop's Backbone and Corridor Trails. See unusual "skunk cabbage" that thrives in our wooded wetlands (does it really smell?), a special vernal pool where salamanders are born, and a unique wet meadow wetland that Fennessy has restored and studied. Listen to frogs calling from their wetlands homes and catch spring woodland wildflowers. Some trails may be quite wet - please wear rain boots or old shoes that you don't mind getting soggy.

Breakfast with the Birds - Saturday, May 24th, 9am. Enjoy coffee and donuts before taking a leisurely walk to see some of the seventy-eight bird species that nest in the BFEC preserve. Field guides and binoculars will be available.



Native seven-spotted ladybugs (not to be confused with the Asian multi-colored ladybug) dined on aphids in the BFEC gardens last June; will they appear this year too?

Insect Hunt *Family Adventure Day*

Saturday, June 7th, 1pm. The BFEC wildlife gardens feature over 60 species of native plants that attract butterflies, bees and beetles. See what's hopping with Kenyon Professor Emeritus Ray Heithaus. Take home milkweed seeds to create wildlife habitat at home and support monarch butterflies.

Miller Observatory Open House

Last Fridays, March, April, & June, 9 pm. Enjoy the stars with Kenyon Physics Professor Paula Turner. There will be no open house in May or July. Events are canceled in cloudy weather; email questions to turnerp@kenyon.edu. All ages welcome. From downtown Mt. Vernon, follow SR 229/Gambier St. east 4 miles. Turn left at observatory sign onto an access road prior to SR 308 intersection.

Nature's Keepers Outdoor Adventure Camp *with new expanded dates!*

Our day camps focus on having fun while connecting with and learning about nature. A full day camp for 8-11 year-olds will be held July 30- Aug.1. NEW this year, half-day camps will be offered for 5-7 year olds through a partnership with the Science Play-Space Initiative on June 23-27 & June 30-July 3. More information on page 5.

Thank You to...

Our Members *January-March*

BENEFACTOR

Buffy & Bob Hallinan
David Newell

PATRON

Geoffrey & Lori Brown
Phil & Sheila Jordan
Joseph Lipscomb & Laura Will

FRIEND

Meryl Brott
Jennifer Delahunty
Eric & Kami Diehl
Vincent Becker & Barbara Evans
Tom Hoffman
Judy & Eric Holdener
Rita & Richard Kipp
George & Diane Kopschick
James Kyle & Mark Leggett

Beverly Morse & Brian Miller
Richard Mulligan
Tom Sant
Audrey Spearman

FAMILY

Nancy & Spence Badet
Michael & Margaret Blackledge
Barry & Susan Bowden
Garrett & Carol Brusco
Mike & Bonnie Daily
Jay & Beth Dorsey
Tom & Gloria Edwards
Frederic & Elizabeth Eustis
Jane Huntington
Perry & Jane Lentz
William & Bonnie Lawhon
Bill & Pat McCulloh
Chuck & Jo Rice

Mary Rodstrom
Allen & Mary Rohwer
Inese & Ronald Sharp
Cinda & David Stutzman
David & Christine Widrig
Joseph Adler & Ruth Woehr

INDIVIDUAL

Joe Carter
Ruth Griffing
Dave & Cynthia Harry
Margaret Raasch
Keir Schlatter (IHO Lawrence Schlatter)
Jana Stewart

DONOR

Michael & Theresa McAlpin

Our Volunteers

In the office, classroom, gardens and on the trails: Pam Harman, Kenyon Land Lords. Special thanks to the 20+ volunteers who helped make our *Christmas Bird Count* possible.



Can you find the difference

between this butterfly and the one pictured on the front page?

This **viceroy** sports a black line near the edge of the hind wings that is absent on the monarch on page 1. The line and its slightly smaller size are features that give the viceroy away in an otherwise outstanding job of mimicry. Mimicry is a common tactic in the insect world; in this case, birds who avoid monarchs due to their toxicity will theoretically also avoid the monarch look-a-like.

**Are YOU
a member?**

Membership is based on the calendar year,
so now is the time to join for 2014!

There are many reasons to become a member of the BFEC, including the satisfaction of knowing you're a part of critical education and conservation programs. Receive preferred access to popular workshops, a hard copy of our newsletters, and 10% discount on bird seed. Thank you for your support!

Membership level: Student ___ \$20 Individual ___ \$35 Name _____
 Family ___ \$50 Friend ___ \$100 Patron ___ \$250 Address _____
 Benefactor ___ \$1000 + City _____
Amount enclosed: _____ State, Zip Code _____
 My check, payable to Kenyon College, is enclosed Telephone _____
 Please bill my ___ Visa or ___ MasterCard Email _____
 Card number _____ Exp. date _____

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

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

Brown Family Environmental Center at Kenyon College

9781 Laymon Road, Gambier, Ohio 43022 ~ (740) 427-5050 ~ <http://bfec.kenyon.edu>



Our Mission

The BFEC at Kenyon College exists to engage Central Ohioans of all ages with nature, and to support the goals of Kenyon College by conserving the natural diversity of the Kokosing River valley and providing opportunities for education and research.

Director of Facilities

David Heithaus

Director of Programming

Heather Doherty

Facility & Program Assistant

Jill Kerkhoff

Upcoming Events



Earth Day Festival

Sunday, April 6th | Kenyon Athletic Center | 10am - 2pm

- * Earth Day Challenge 1/2 Marathon & 4 Miler *at 8am* *
- * Over 70 Exhibitors * Live Music by Goslee Reed & Kean *
- * Local Artisans * Farmers Market & Live Farm Animals *
- * Kids' Activity Zone * Free Health Screenings *
- * kenyon.edu/earthday *

Brown Family Environmental Center
at Kenyon College
P.O. Box 508, Gambier, Ohio 43022



