The End of the Monarch Butterfly?

BY THERESA GAWLAS MEDOFF

According to the "Butterfly Effect," the flutter of a butterfly's wings in China could affect weather patterns in New York City, thousands of miles away. It is possible, then, that a very small occurrence – like the beating of butterfly wings – can produce unpredictable and sometimes drastic results by triggering a series of increasingly significant events. So what lies ahead for us, if the monarchs disappear?

IMAGINE WALKING into a fir tree forest in central Mexico and encountering a wall of orange and black—millions of monarch butterflies festooning the trees for acre upon acre. The sun comes out, and the butterflies fly about and then reform their clusters. "It's absolutely one of the most beautiful sights you can see in the natural world," says Lincoln Brower, a monarch expert at

Monarchs on hardy ageratum.

LORENE J. ATHEY

Sweet Briar College in Virginia. Unfortunately, these days all you can do is imagine the scene, because the number of monarchs in North America has dropped precipitously in the past two decades, and even over the past three years.

As recently as 1996, monarchs covered more than 54 acres of Mexican forest each fall; last year, they covered a mere 2.4 acres.

And this year? "If it's any smaller than it was last year, we're in trouble," Brower says.

In Delaware, at Brandywine Creek State Park near Greenville, the news is bleak. "Over the last two years, the number of monarchs has declined drastically both here and at other parks," says Lisa Watt, the park's Nature Center and programs manager. The park has an annual tag and release program every September, and staff also manage the park's meadows to help monarchs by providing two monarch way stations. These provide vital habitat for the monarchs from egg to hatching, and as they migrate. Watt says the monarch decline is so bad that they have not had any monarchs hatched and available to tag. "We have had to alter the program from releasing monarchs to educating the public about the importance of native plants like milkweed, to increase the number of monarchs," Watt says.

Wondrous Natural Phenomenon Upended

The news is the same in all the parks, according to Rob Line, ecologist with DNREC's Division of Parks and Recreation. Line works in all the state parks and wild properties throughout Delaware, "and we didn't see monarchs this year," he says.

The Delaware Nature Society participates in the annual North American Butterfly Association Fourth of July Butterfly Count. This year's results were "schizophrenic," says Sheila Vincent, group programs coordinator at the Nature Society's Ashland Nature Center. In a "normal" year, Delaware's butterfly counters would tally between 50 and 100 monarchs in an area the size of Ashland Nature Center. This year, Vincent counted just one monarch at the center on a cool, rainy morning, while 28 monarchs were seen at Coverdale Farm Preserve on a warm, sunny afternoon. She called the results of the count at Coverdale "encouraging, though hardly spectacular, given the large area covered."

The great migration

The monarch migration is one of nature's greatest phenomena. The same delicate monarchs that flutter around our gardens in late summer and early fall fly all the way to Mexico to overwinter, typically arriving in early November. In March, they begin to make their way back north, flying as far as Texas, Louisiana and North Florida before laying the eggs for a new generation of butterflies that will head north to the prairies of the Midwest and the fields of the East. In contrast to that one remarkable, long-lived generation, there will typically be two to three generations of butterflies throughout the summer. So the monarchs that migrate to Mexico in the fall have never been there

LORENE J. ATHEY

Monarch caterpillar on butterflyweed.

before. They are migrating and finding their way purely by instinct.

But we might be in danger of losing the natural phenomenon of this amazing migration. A dramatic loss of habitat—of milkweed, which is the only plant that the monarch caterpillars feed on, and of the nectar plants [see sidebar on page 16] that nourish the butterflies—has led to a correspondingly dramatic drop in the number of monarchs, and that drop has biologists and conservationists attempting to raise the public alarm, so far without receiving the level of response needed.

"Ornithologists ought to be screaming bloody murder about what's happening out there," says Chip Taylor, founder of Monarch Watch, a nonprofit education, conservation, and research program based at the University of Kansas, which focuses on the monarch butterfly, its habitat, and its spectacular fall migration. That's not only because the migrating monarch could die out in North America, but also because monarch caterpillars are a food source for numerous bird

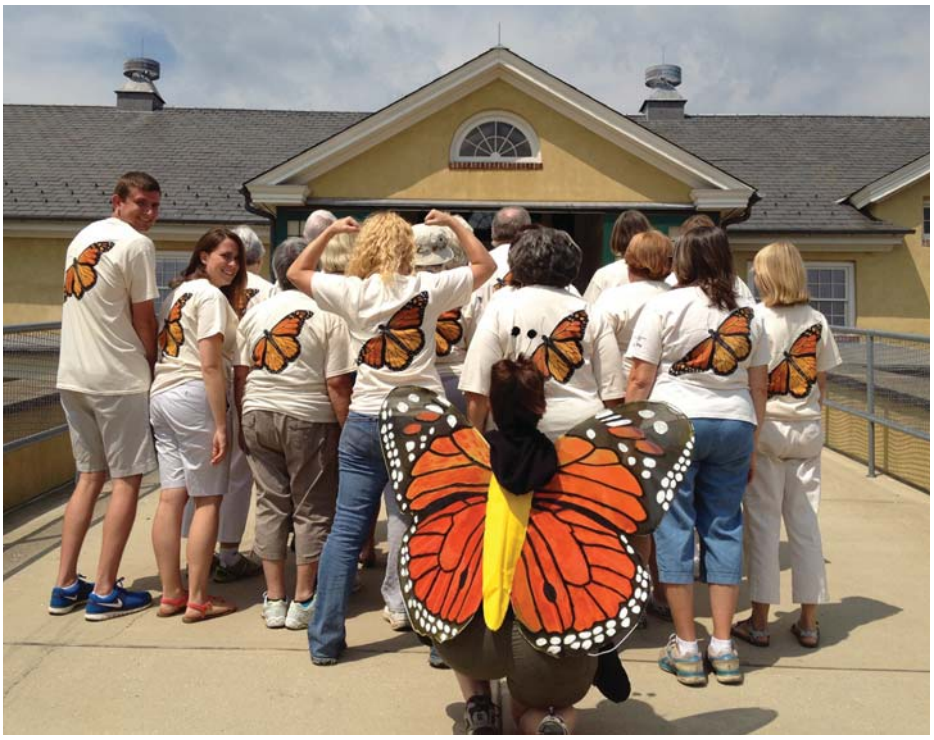
LORENE J. ATHEY

Monarch on purple coneflower, also known as echinacea.

species. Just as significantly, monarchs are an indicator species—"the canary in the coal mine," as Brower calls them. If we're losing monarchs, we're also losing other insects that birds feed on as well as other pollinating species, like honey bees.

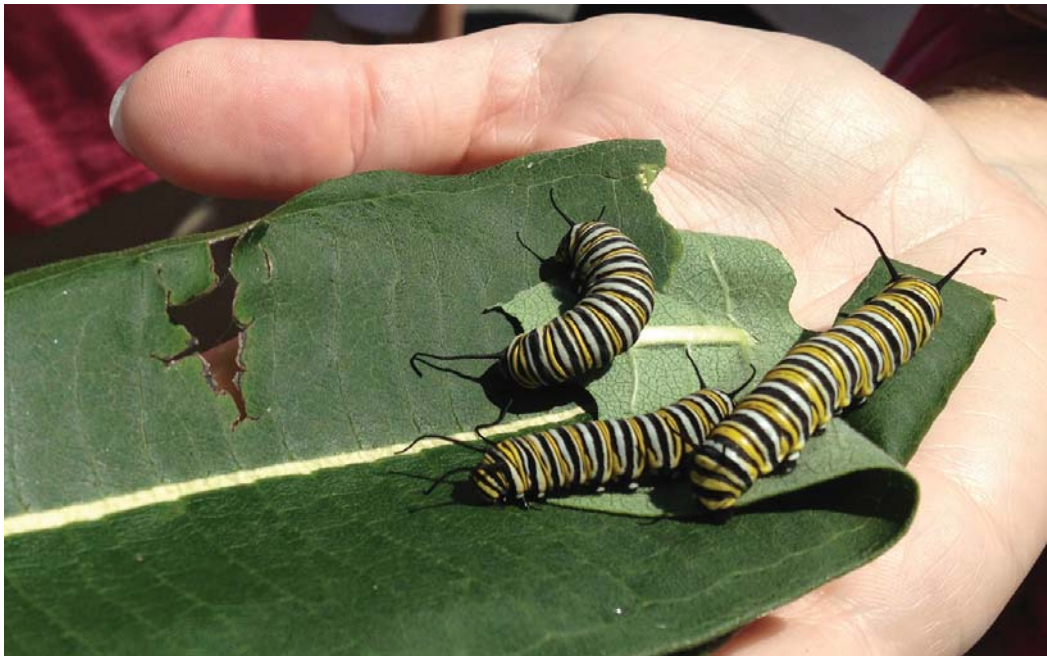
"We have 4,000 species of native bees, and they all feed on the same types of plants that the monarchs do. If our agricultural practices are eliminating the monarch, they are also eliminating other species," says Doug Tallamy, professor of entomology and wildlife ecology at the University of Delaware.

A recent article in the journal *Science* warned that we are in the middle of a "mass extinction" of life on Earth. Mass extinctions have taken place five times before, scientists



ALAPOCAS RUN AND WILMINGTON STATE PARKS.

Above and below: Alapocas Run and Wilmington State Parks, in partnership with teachers from the Red Clay School District, Delaware Master Gardeners, the Delaware Nature Society and the U.S. Fish and Wildlife Service, hosts a two-day workshop each summer for formal and informal educators covering monarchs, their migration and the cultures they touch.



say, but previous ones—the most well-known being the extinction 66 million years ago that killed off the dinosaurs, and three out of four species on Earth—were caused by natural conditions. The current mass extinction is attributable to one cause: humans, the article's lead author, Rodolfo Dirzo of Stanford University, told *USA Today*.

Causes...

The most serious of the contributors to the monarch's decline is the loss of habitat caused—to a large degree—by the proliferating use of herbicides, primarily glyphosate, active ingredient in the well-known Monsanto product Roundup.

When the large farms of the Mid-

west—and that is where monarchs are concentrated—spray herbicides on the crops, they are affecting all the plants that border the fields, resulting in "the wholesale killing off of the larval food plant and the nectar sources. Millions of acres of land have been sterilized basically," Brower says. He points to one study, by University of Minnesota researcher Karen Oberhauser, showing that 80 percent of the milkweed in Iowa has been eliminated in the last decade.

"Delaware never has had many swaths of milkweed as you would see in the Midwest," says Vincent. "Nevertheless, it's still a problem here. What makes it maybe worse in Delaware is that what little we have is disappearing."

Biofuels are also to blame for the monarch's troubles. Federal subsidies that go to farmers who grow corn—the "bio" in bio fuels—have led farmers to plant ever increasing acreages with corn, wiping out land that used to be full of milkweed and other plants that insects need to live.

But it's not just farms that are contributing. If you're a longtime Delaware resident, you know how much land use has changed in the past decade or so, as new housing developments have sprung up and new businesses and shopping malls have been built. Land once occupied by farms or fields has now been paved over or given way to suburban lawns. All of that development takes a heavy toll on the wildlife that once lived on those lands. And what's happening in Delaware is happening all over the country.

"It's very simple," Tallamy says. "Life starts with plants, and when you eliminate plants from the landscape, you eliminate the life that depends on it. If you do enough of that, we're going to eliminate ourselves. We just can't do [what we're doing] over the long term and call any of that sustainable."

And Solutions

But just as the loss of the monarch is a symbol of how we are treating the land, so too can it be a symbol of resuscitation. It's not too late, the experts say. "The good news is that the monarch is an insect, and insects have high birth rates… [T]hey have a capacity to come back pretty fast if conditions are optimal," Brower points out.

One important step that's already being taken is the reforestation of central Mexico, where the monarchs overwinter. There had been a dramatic loss of fir trees to logging, but the government and private conservation organizations are beginning to turn that situation around.

There are other hopeful signs. On June 20, President Obama released a presidential memorandum creating a federal strategy to promote the health of honey bees and other pollinators. The memorandum created a Pollinator Health Task Force to be co-chaired by the Secretary of Agriculture and the Administrator of the Environmental Protection Agency.

Governments can help in the move to preserve monarchs and other pollinators by mowing roadsides less frequently—just once a year, recommends Brower. Lands where there are power lines and pipeline rights could also be mowed less frequently.

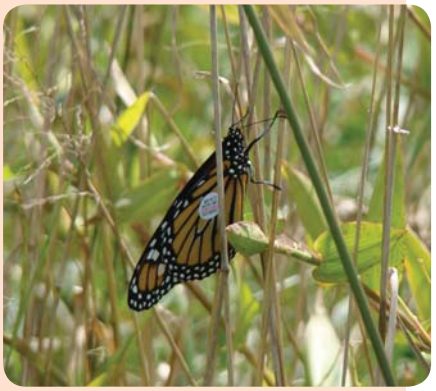
Farmers could help by spraying insecticides more discriminately. And Monsanto could help, Tallamy says, by instituting a widespread education program that warns farmers about the problem and makes recommendations for how to mitigate it. "This is a

Monarch Tagging

TAGGING MONARCHS requires a lot of care. At Brandywine Creek State Park, the tags are ordered from Monarch Watch. Small stickers – each bearing a number - are attached under the wing, in a mitten-shaped area, so as not to bother the monarch. The tags do not weigh it down. They are very sticky and small, so it helps for staff to use a toothpick (or something similar) to place it on the wing. You can see tagged monarchs when they rest on a flower because they rest with their wings folded up.

The numbers are tracked and reported to Monarch Watch. If any of the monarchs tagged at Brandywine Creek are found in Mexico, they will show up on a tracking database. When that number is reported, staff can gather specific information, such as where the monarch was tagged, when, and in what weather conditions. The tag includes instructions on how to report when a monarch is found (usually after it dies). When that butterfly is found and reported, staff can then gather scientific data that can help them understand crucial data such as:

- **How far they travel in a few hours, days or weeks;**
- **How fast they travel;**
- **Whether they travel along the same pathways as previous migrations;**
- **Whether a butterfly will fly over mountains and oceans;**
- **Whether it survived and reached the overwintering site in Mexico, or if it was discovered somewhere else.**



BRANDYWINE CREEK STATE PARK

ALAPOCAS RUN AND WILMINGTON STATE PARKS.

golden opportunity for [Monsanto] to put a big star next to their name, a big green label and say, 'Hey, we're making this product but use it responsibly. Don't do this, don't do that. Leave a big strip of milkweed along all of your fields.' This is something that farmers could do without any loss of yield at all," Tallamy says.

Delaware's State Parks: providing a local solution

At Brandywine Creek State Park, near Greenville, park staffers have been managing its meadows primarily for grassland birds, but also for insects including monarchs. "We manage our meadows in a way that supports both the birds and the monarchs," says Park Superintendent Angel Burns. "We do have a good amount of milkweed in the park, and we've generally seen a good number of monarchs." Burns says the way the meadows are managed can promote milkweed growth. "One of our goals is to cut down on invasive woody plants in the meadows. If we do that, it should help more milkweed to return."

Burns says staff members are careful about mowing at the park, making sure enough milkweed is left in areas not mowed to offset areas that are mowed. "There is one patch that has great milkweed in it that we have specifically not mowed yet to keep it up for monarchs."

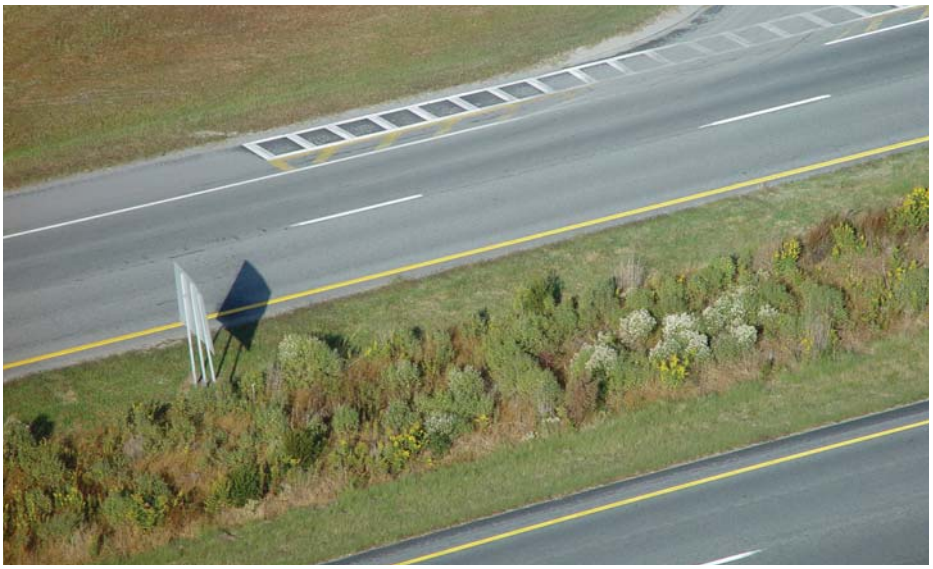
In addition, the park works with a volunteer master gardener to collect milkweed seeds to distribute. And, Burns says, staff collect caterpillars and raise them to butterflies to increase the number of caterpillars that make it to adulthood. "When they are adults we tag them and release them," Burns says.

"At Bellevue State Park, we do an educational program each September for the public about monarchs," says Park Interpreter Claire Mickletz. "We also have a plan to manage mowing to help promote milkweed and other beneficial meadow plants."

Similarly, a small patch of milkweed is planted outside of the Wilmington State Parks, according to Liz Andreskaut, programs manager for Alapocas Run and Wilmington State Parks. "Alapocas/Wilmington State Parks, in partnership with teachers from the Red Clay School District, Delaware Master Gardeners, the Delaware Nature Society and the U.S. Fish and Wildlife Service, host a two-day workshop in the summer for formal and informal educators covering monarchs, their migration and the cultures they touch," Andreskaut says.

LORENE J. ATHEY

Monarch on native perennial sunflower.



DELAWARE DEPARTMENT OF TRANSPORTATION

DelDOT has had in place for many years a policy of reduced mowing in medians, interchanges and side slopes. The median meadows allow growth of wildflowers and grasses that provide food and habitat for pollinators.

Welcoming Butterflies to Your Garden

Transforming your backyard, school or business into an environment friendly to butterflies, other insects, birds and small animals is relatively simple, says Lori Athey, habitat outreach coordinator at the Delaware Nature Society.

"When you have a lot of lawn—which really doesn't support much except Japanese beetles—the birds and the foxes, and the butterflies and all the cool wildlife don't have anywhere to go," Athey says. Unlike deer, a generalist species that eats a wide variety of things, some birds and butterflies are dependent on one or two specific species. For monarchs, that's the milkweed on which they lay their eggs and the caterpillars feed.

So, if you want to help butterflies and draw them to your property, the first thing to do is plant milkweed. While common milkweed doesn't make a good garden plant (it's actually a roadside weed), butterfly weed, a milkweed

Monarch on Joe Pye weed.

variety, is extremely attractive, with "gorgeous orange flowers," Athey says. Swamp milkweed is especially suited to wet spots. It's especially pretty, with delicate pink flowers, and is very attractive to monarchs.

The milkweed supports the egg-laying and caterpillars, but monarchs (and other pollinators) also need nectar plants to feed on later in the life cycle. For monarchs, that means late-summer and early-fall blooming flowers like asters, goldenrods and perennial sunflowers. In spring and earlier in the summer, other pollinators can feed on viburnums and flowers in the Joe Pye family.

You needn't have a large garden area to make a difference. "Even just a small area of your yard, or just adding one really good native tree, a maple or an oak, or if you have a wild cherry, leave it there," Athey says. "They all support lots and lots of pollinators and different kinds of wildlife. Something like 96 percent of songbirds eat insects or feed insects to their babies," she adds.

The Delaware Nature Society website (www.delnature.org) has a wealth of information on creating a wildlife habitat and can certify your yard as a wildlife habitat through the National Wildlife Federation, if you want to make it official.

LORENE J. ATHEY

DANIELLE QUIGLEY, UNIVERSITY OF DELAWARE

Monarch caterpillar.

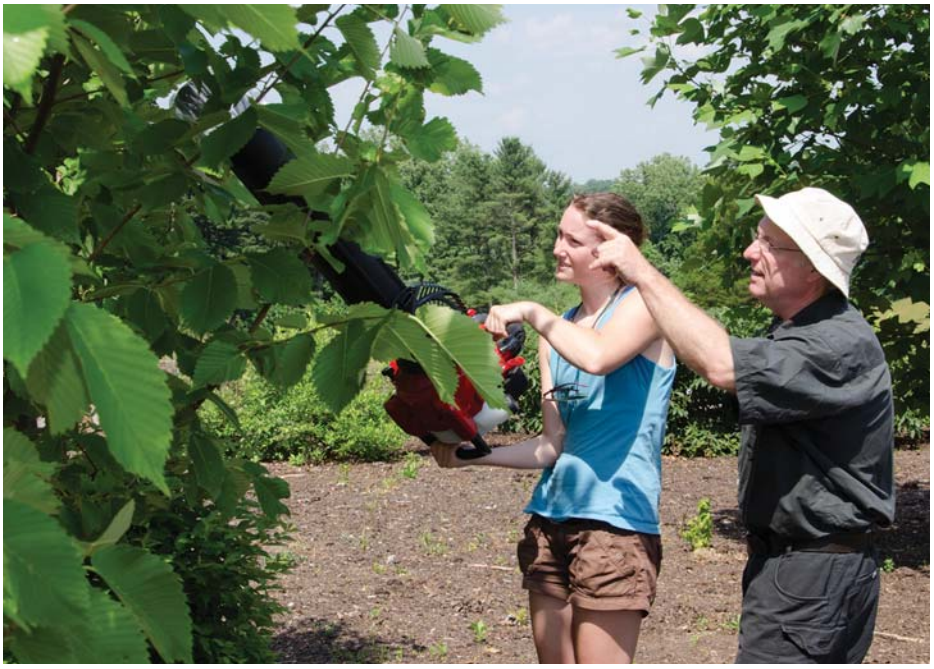
Rachael Phillos, Nature Center manager at Killens Pond State Park near Felton, says the park has historically ordered monarch caterpillars from Monarchwatch.org, and offered public programs in September on monarchs. "However, for the past two years, we have just tried to find caterpillars locally, and have offered a program on them, Phillos says. "We offered a homeschool class this year that covered the lifecycle and the migration of the monarchs to Mexico. "Additionally," Phillos says, "the park usually tries not to mow the meadows until late October or early November to make sure that monarchs have left the area."

Other efforts by state agencies

Similarly, the Delaware Department of Transportation is taking action to benefit the monarchs and other pollinators. According to DelDOT Environmental Scientist Marianne Walch, DelDOT has had in place for many years a policy of reduced mowing in medians, interchanges and side slopes. "When medians are wide enough, we generally mow only a six-foot 'beauty strip' along the edges and allow the rest to be meadow for the summer. Then, once a year, the entire area is mowed to reduce growth of woody vegetation. This saves the state money, yet still keeps a neat appearance that the public demands," Walch says.

While not intended for this purpose, the median meadows allow growth of wildflowers and grasses that provide food and habitat for pollinators. In addition, DelDOT's "Enhancing Delaware Highways" (EDH) program, a joint venture between the DelDOT and the University of Delaware, provides guidance for more sustainable, integrated roadside vegetation management, including the incorporation of native plants. The EDH Concept and Planning Manual states that "when sound horticultural and ecological principles are brought to bear on vegetation management, roadside rights-of-way also serve as regional nature preserves, maximizing biodiversity while minimizing routine maintenance requirements."

One of the Delaware Department of Agriculture's projects is the "Planting Hope in Delaware Garden," which includes a monarch waystation. Established in 2010, the garden is a public-private partnership designed to enhance the well-being and improve the health of the greater Herman Holloway Campus community in Wilmington/New Castle.



DANIELLE QUIGLEY, UNIVERSITY OF DELAWARE

Doug Tallamy and Emily Baisden of the University of Delaware, collect insects from a garden at Mt. Cuba Center with a leaf blower converted to a vacuum machine.

It's up to you, too

From the federal to state to local levels, efforts are underway to help the monarch butterflies. But individuals can make a difference, too, by planting milkweed and nectar plants in their home gardens and by encouraging local schools and businesses to do the same (see page 16).

With a coordinated effort, it is possible for the monarch migration to be the dramatic sight it once was—and to improve the environment for other insects and birds at the same time.

For more information:

MonarchWatch.org

MonarchButterflyFund.org

fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/do/index.shtml

NABA.org

Delnature.org

OD

THERESA GAWLAS MEDOFF IS A FREQUENT CONTRIBUTOR TO *OUTDOOR DELAWARE*.