

The Chrysalis

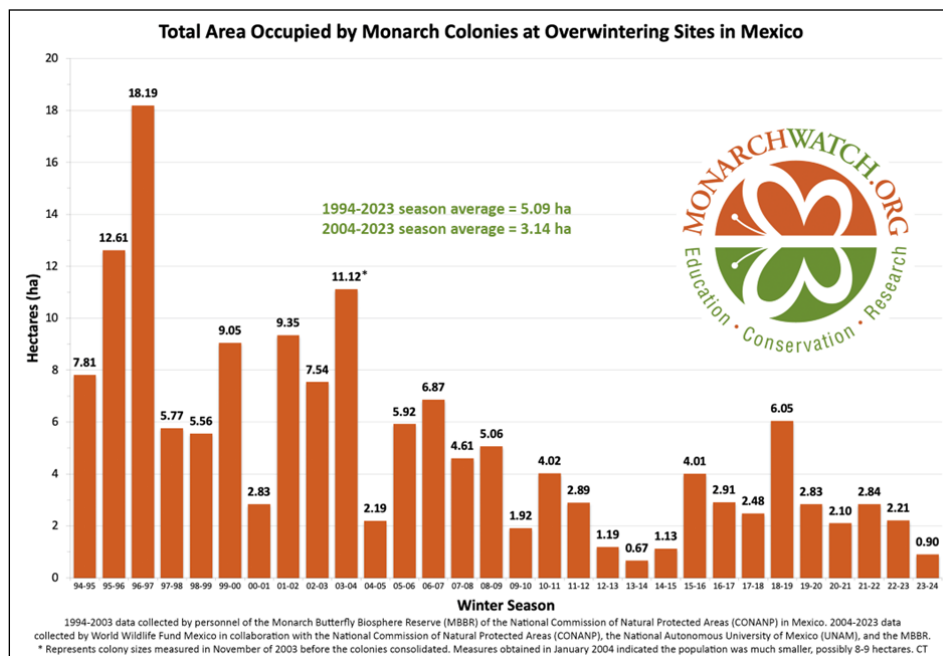
Emerging news from Monarchs Across Georgia

Our mission is to inspire caretakers of the natural environment through monarch and pollinator education



Monarch Winter Population Down

Area occupied in 2023-24 decreased by almost 60 percent



Upcoming Events

MAG Plant Sale

April 26-27, 9 am – 2 pm
E.M.B.A.R.C. Community Youth Farm
1185 Rock Chapel Rd
Lithonia, GA

National Pollinator Week

June 17-23

National Moth Week

July 20-28

Great Southeast Pollinator Census

August 23-24

The total forest area occupied by overwintering monarch colonies was announced February 7, 2024 by the World Wildlife Fund-Telmex Telcel Foundation Alliance (WWF), the National Commission of Protected Natural Areas in Mexico (CONANP), the National Autonomous University of Mexico (UNAM), and the Monarch Butterfly Biosphere Reserve (MBBR).

The overwintering monarchs were in nine colonies and occupied 0.9 hectares of forest area during the winter of 2023-24. This represents a 59.3 percent decrease from the previous season (2.21 ha). The area occupied in 2023-24 is also the second lowest number since monitoring began, with the lowest being 0.67 hectares during the 2013-14 overwintering season.

Over the years, changes have been observed in the location of the largest monarch colonies, and 2023-24 was no exception. The 2023-24 season’s largest colonies were detected outside the MBBR. This means that stronger conservation and restoration efforts are needed within the MBBR and outside of it. Monarchs require a large and healthy forest area to protect them from wind, rain, and low temperatures during hibernation.

The forests at the MBBR and in the surrounding region are important not only to monarchs – they are also vital to support the regional communities, helping improve water quality in the Cutzamala System that provides for more than 6 million people in the Mexico City metropolitan area.

See, “Population,” on page 10

Why Are Butterfly Chrysalises Gold?

Many butterfly chrysalises glimmer in the sunlight with golden studs or leafing, like miniature ornaments decorating the surrounding foliage. “Chrysalis” is derived from the Greek word *chrysos*, meaning gold. Depending on the butterfly, the golden spots could be a pure structure or a combination of structures and pigments.

Gold Studded Monarch Chrysalis

The crown of golden points, called the diadem, doesn’t sparkle until after the first 24 hours of forming the monarch butterfly’s chrysalis. The shimmer of the diadem suggests that it’s at least partially created by a structure. However, the yellow appearance of the diadem after the butterfly emerges indicates the presence of a pigment.

Pigments are molecules that absorb light and maintain the same color from all angles, such as the carotenoids responsible for the gold hue in monarchs. Carotenoids are also what give tree leaves their yellow, orange, or red colors in autumn, and are found in carrots. Monarch caterpillars obtain carotenoids by feeding on milkweed plants. Without this pigment, the golden hue of the chrysalis turns silver.

A structure is responsible for the sheen, unlike pigments which absorb light. Structures consist of complex formations of exoskeleton, water, or air that reflect light. The glimmer of the structure is achieved through changes in viewing angles. In the case of monarch butterflies, their structure involves raised exoskeleton in the diadem area, forming small mountains that reflect light at the peaks, resulting in a sparkling effect.



The raised peaks above the carotenoid yellow pigment in the monarch butterfly chrysalis. (Rothschild et al. 1978)

Fully Gold or Silver Chrysalises

Some butterfly pupae are completely covered in golden or silvery draping. This shimmery coating is challenging to capture in a photograph, often resulting in selfies instead. The glassy hues are produced through a combination of metallic structures and carotenoid pigments, although pigments are not always essential for this effect to occur.

Alternatively, the glassy hues may be formed by Multiple Endocuticular Thin Alternating Layers (METAL). Endocuticular refers to the inner part of an insect’s exoskeleton. That is, an insect’s exoskeleton has two parts – the outside or exocuticle and the inside or endocuticle.

The endocuticle is more flexible and less prone to drying out so its layers are filled with fluid. The multilayer structure of the endocuticle reflects a wide spectrum of wavelengths, creating a stunning hue.

Why Glitter?

One hypothesis is that the glitter or glimmer on chrysalises is for camouflage. The shiny chrysalises might look like water droplets on leaves or might be so shiny that they reflect their surroundings like a mirror.

Another hypothesis is that the glitter might be a way to show that the butterfly is toxic. The glittering display of colors may serve as a means to startle predators. However, without conducting a thorough experiment, it is impossible to definitively determine its impact on predators.

It is also possible that the gold spots are unintentional. The presence of gold may serve as a safeguard for insects against potentially harmful sun rays. As long as the gold does not harm the insects, it will persist within the population.

Source: <https://askentomologists.com/2016/12/08/striking-gold/>

Pollinator Habitat Certification

Do you enjoy seeing caterpillars on their host plants, how about searching for hidden chrysalides, or maybe just watching butterflies and hummingbirds flit from flower to flower?

Does your schoolyard, workplace, or backyard have bushes, trees, and/or flowers that provide host plants, nectar, and protection for pollinators? Is there a source of water or puddling areas for thirsty butterflies? Are there any places for them to roost at night?

If you answered yes to many or most of these questions, consider registering your habitat with MAG's [Pollinator Habitat Program](#). No garden is too big or too small! Certified pollinator habitats that have been maintained for a minimum of three years from their certification date are eligible to be nominated for our [Pollinator Habitat Award](#).

Congratulations to MAG's latest certified gardens:

- The 1505-More Than Pollinator Habitat – Lawrence, KS
- Rockdale County Master Gardener Pollinator Habitat – Conyers, GA
- Elaine Thagard & Tom Avgikos – Smyrna, GA
- Green Gardens Education & Designs – Stockbridge, GA
- Diana Hope Whitlock – Marietta, GA
- 36 Pine Grove Road – Cartersville, GA
- Wesley Woods – Athens, GA
- Native Plant Garden & Monarch Waystation – Macon, GA

Call for Committee Volunteers

IF YOU ARE INTERESTED in volunteering with the Monarchs Across Georgia (MAG) committee, please email mag@eealliance.org and let us know what volunteer opportunities interest you.

Here are some of the many ways you could help:

- Write newsletter articles
- Become a MAG workshop facilitator and co-facilitate workshops
- Review grant applications
- Become part of our speakers bureau
- Post information on our web pages
- Gather news for our Facebook page
- Help with an event (such as a children's craft or answering questions)
- Become an active committee member and coordinate or work on a project, such as...
 - Grant administration
 - Newsletter editor
 - Symbolic Migration
 - Mexico Book Project
 - Plant sales
 - Pollinator habitat certification
 - Volunteer coordination
 - E-blast/email list



The poster features a red border and a background of pink and red flowers. At the top left is the 'MONARCHS ACROSS GEORGIA' logo with a butterfly. At the top right is the 'Environmental Education Alliance of Georgia' logo with a dragonfly. The main text in red reads 'MAG Plant Sale April 26&27 9-2'. Below this, in black, is '1185 Rock Chapel Rd. Lithonia'. Further down, it says 'Rock Park Chappel II Home of the E.M.B.A.R.C. Community Youth Farm'. At the bottom, there are logos for 'DeKalb County RPCA Recreation, Parks & Cultural Affairs' and 'DeKalb County GEORGIA'.

RECOMMENDED RESOURCES

The Milkweed Lands: An Epic Story of One Plant, its Nature and Ecology

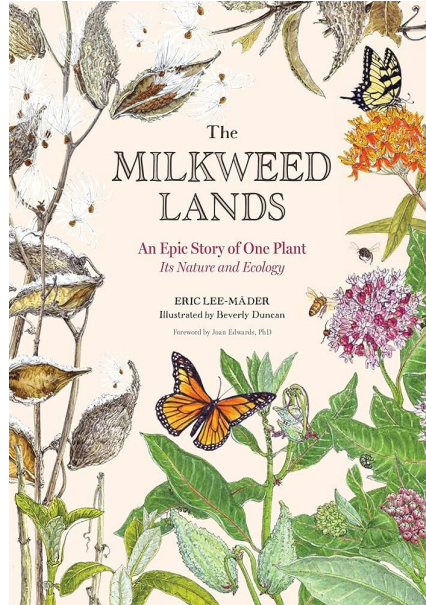
Written by: Eric Lee-Mäder

Illustrated by: Beverly Duncan

The *Milkweed Lands: An Epic Story of One Plant, its Nature and Ecology* by Eric Lee-Mäder, Pollinator and Agricultural Biodiversity Co-Director with the Xerces Society for Invertebrate Conservation is an appreciation of this often underestimated plant. Detailed illustrations by noted botanical artist Beverly Duncan give readers the feeling of browsing an avid naturalist's sketchbook. The book describes the intricate relationship between this remarkable plant and a myriad variety of insects and organisms.

Common milkweed (*Asclepias syriaca*) is popular for being able to inhabit and thrive in disturbed sites. However, this characteristic is an exception among the more than 90 species of North American milkweed, many of which need certain conditions to grow well. "The milkweed is a displaced citizen in its own land," writes Lee-Mäder. "Where once it owned the continent, it's now a kind of vagrant, occupying the botanical equivalent of homeless encampments."

The author highlights a 2012 study by John M. Pleasants of Iowa State University and Karen S. Oberhauser of the University of Minnesota, that revealed a decrease of nearly 60% in the milkweed populations of the Midwestern U.S. since 1999. Lee-Mäder emphasizes that milkweeds, particularly the North American species, are similar to many other meadow and grassland species. They rely on human intervention for their



survival, yet also face numerous challenges and disturbances due to their coexistence with humans.

Monarch butterflies rely on their sense of smell to detect milkweed plants. Female monarchs lay their eggs on milkweed leaves, which are the only food their larvae can consume. In return, adult butterflies may pick up pollen from the milkweed flowers. While the plant's relationship with monarchs is a significant one, the community and ecosystem supported by milkweeds are remarkable for their diversity.

More than 40 insects and invertebrates, such as slugs, snails, and spider mites, feed on milkweed leaves, along with rabbits and ground squirrels. Butterflies, moths, bees, and wasps are sustained by the nectar from the flowers. Even if the common milkweed-visiting aphid (non-native oleander aphid, which eats only milkweed) may be seen on the plant, they are likely to

be eaten by beneficial insects such as lady beetles and lacewing insects, which are in turn food for birds. Commonly overlooked as a roadside weed, milkweed is a remarkable plant that supports a complex ecosystem comprising an amazing range of insects and organisms

Through a combination of detailed illustrations and informative text, the author and illustrator take readers on a journey through the various stages of the milkweed's life cycle, from germination to seed development, highlighting its significance in supporting a diverse ecosystem. Readers get in-depth information about different milkweed species, including propagation, industrial uses of the plant, and interesting milkweed relatives.

Through the book, the author is calling for milkweed and other native plants to be grown and featured prominently in gardens all over the country. Start by finding out which milkweed would be suitable for you, using the Xerces Society's [Project Milkweed and its region-specific plant lists](#).

Sources:

<https://www.nytimes.com/2023/10/25/realestate/gardening-milkweed-plants-butterflies.html>





<https://www.goodreads.com/book/show/58328378-the-milkweed-lands>

Do You Have this Year’s Pollinator Plants in Your Garden?

Four plants are chosen annually: *Spring Bloomer*, *Summer Bloomer*, *Fall Bloomer*, and *Georgia Native*

Each year, the [Georgia Pollinator Plants of the Year](#) program recognizes four landscape plants as “top performers” that support pollinators and look beautiful in gardens. The plants include one Georgia native and three seasonal selections, which may or may not be native. Plant lovers and gardeners in Georgia can [nominate their favorites](#), based on which plants perform well in their gardens and support high pollinator diversity.

The nominated plants are then evaluated based on their horticultural value, ease of propagation, and ecological significance. The State Botanical Garden of Georgia (SBG) calls on growers and gardeners to grow more of the winning plants. The SBG also serves as a seed source for difficult-to-find plant selections. The 2024 Pollinator Plants of the Year are:

Name	Description	Propagation	Growing Conditions	Conservation Value
Spring Bloomer: Robin’s Fleabane <i>Erigeron pulchellus</i> ‘Lynnhaven Carpet’ 	A perennial requiring minimal maintenance, it provides drought-tolerant ground cover and weed suppression throughout the year. The 6- to 12-inch flowering stems produce an evergreen, carpet-like ground cover with textured foliage that blooms in the spring with small white to light purple, daisy-like flowers.	Spreads readily via rhizomes; easily propagated through division	Prefers full to part sun; can grow in diverse soil conditions	Supports many native pollinators, including bees, butterflies, and songbirds
Summer Bloomer: Spotted Horsemint <i>Monarda punctata</i> 	This biennial in the mint family requires minimal maintenance and blooms on and off for several weeks from early- to mid-summer. Known for its aromatic foliage and intriguing flowers, it grows up to 3 feet tall. Its blooms are complex, yellow-spotted flowers with pink bracts.	Easy to propagate from seed	Full- to part-sun; average soil conditions	Provides resources for pollinators, including bees, butterflies, moths, and hummingbirds. A host plant for the gray marvel and snout moths, it also supports several specialized bees. Stems are used as nesting material for overwintering insects.
Fall Bloomer: White Wood Aster <i>Eurybia divaricata</i> 	This perennial in the aster family tolerates shade, deer, and drought and its abundant blooms create a beautiful fall display. Typically grows up to 3 feet tall with attractive, heart-shaped leaves and showy white flowers late summer through fall. After pollination, the flower’s center turns from yellow to red.	Easy to propagate from seed and by division	Part sun to deep shade; various soils	Supports pollinators like bees and butterflies. Larval host for the pearl crescent butterfly. Birds and small mammals eat the seeds.
Georgia Native: American Witchhazel <i>Hamamelis virginiana</i> 	This shrub or small tree averages 15 feet tall, but can grow up to 35 feet. It explodes into a display of bright yellow, firework-like flowers in mid-fall to early winter. This makes it unique in winter when other plants are dormant.	Relatively easy via seed and cuttings.	Full sun to part shade in moist to medium soil.	Can flower in late autumn and early winter, which helps insects in a time of otherwise low resource availability. Its flowers attract noctuid moths and other beneficial insects, while its fruits are a favorite of birds and mammals.

Symbolic Monarch Migration 2024

By Susan Meyers

The 28th season of the Symbolic Monarch Migration is nearing its completion. To date, Estela Romero has visited 33 schools surrounding the Monarch Butterfly Biosphere Reserve and delivered more than 1,000 Ambassador butterflies to Mexican students. School visits will continue into March until 'late migrants' reach their resting place.

Romero's environmental lesson this year concerned water – how it is vital for life, how it can become polluted, and what actions can be taken to keep it clean. In a classroom activity (similar to the [Enviroscape's Watershed/Nonpoint Source Model's](#) interactive demonstration), students were prompted to pollute water containing plastic models of their endemic [ajolote \(axolotl\)](#). (This endearing creature is featured on the Mexican 50 peso note. Watch the animal come alive with the [BilletesMx](#) app, developed by Banco de Mexico.)

Books and posters on the topic were purchased through a small grant from the Monarch Butterfly Fund (MBF). We are thankful for MBF's continued support! This is the fourth year we have received funds for our [Beyond the Mexico Book Project](#).

Letters from the students in Mexico, along with assorted life-sized butterflies created by participating groups, are being stuffed into the spring return envelopes. Our goal is to have them mailed by mid-March. This year's participants came from 41 U.S. states, two Canadian provinces, and one homeschool in Mumbai, India.

The new Leader Packet will be posted in May 2024 with a final postmark deadline of October 18, 2024. We hope that you can join us!



Top left: Estela Romero hands letters from Mexican students to Susan Meyers. Top right: Student working on a letter. Middle: Students receiving Ambassadors. Bottom left: Learning about water pollution. Bottom right: The new Ambassador template.

The Symbolic Monarch Migration project is a partnership project between Journey North (a program of the University of Wisconsin-Madison Arboretum) and Monarchs Across Georgia (a committee of the non-profit organization, the Environmental Education Alliance).

[Journey North](#) manages the interactive Symbolic Monarch Migration Participant Maps and hosts educational materials on its website.

[Monarchs Across Georgia](#) administers the project, including coordinating the exchange of symbolic butterflies among 2,000+ classrooms in three countries, engaging a contract worker to provide lessons and deliver materials in Mexico and raising funds for the project's continuation.

Please consider donating to the [Symbolic Monarch Migration](#) and/or the [Mexico Book Project](#).

Spotlights for Your Pollinator Garden

Virginia Creeper (*Parthenocissus quinquefolia*)

It is certainly difficult to walk by without pulling up Virginia creeper, but wait a minute — it really should have a place in the pollinator garden being a host plant to numerous moths, including many in the Sphinx family. The plant is a colorful addition to the fall landscape and produces berries for birds (but not kids).

A woody, deciduous vine, its tendrils end in an adhesive tip that helps it carpet an area or climb as much as 40 feet (note that the tip doesn't cause damage to structures).

Its leaves, with five leaflets (occasionally three or seven) are coarsely-toothed, with a pointed tip, tapered to the base, and up to 6 inches long. Virginia creeper is often confused with poison ivy, but most creepers have leaves in sets of five — not the three of poison ivy.

Your best bet, should you see leaves of three, is to “leaf” it alone or closely eyeball the rest of the vine.

Nessus Sphinx Moth (*Amphion floridensis*)

The Nessus sphinx moth can be found east of the Rockies, from Nova Scotia to Florida. It can be seen flying in the day and dusk, and its caterpillars pupate in shallow underground chambers.

The adult body is stout. The abdomen has two bright yellow bands with a tuft at the end. The upper side of the wings is dark red-brown. The hindwing has a red-orange median band. They are 1 7/16 - 2 3/16 inches long. Adult moths take nectar from a variety of



Clockwise from top left: *Nessus sphinx* moth; photo by Donna Brunet. Virginia creeper fall leaves; photo by George H. Brusco. Virginia creeper berries; photo by Lee Page.

flowers at dusk and also during the day.

Caterpillars look different at each stage. The earliest stage is nearly transparent. Middle stages are green with tiny white dots and a lengthwise pale stripe along each side. Spiracles and the tail “horn” are black. The last stage before pupation is brown. Larval food plants include members of the grape family, including peppervine and raccoon grape (*Ampelopsis* spp.), *Virginia creeper* (*Parthenocissus quinquefolia*), and other grapes (*Vitis* spp.).

According to the Missouri Department of Conservation, “An earlier scientific name for this moth was *Sphinx nessus*. Even though the scientific name changed, the common name “*Nessus sphinx*” remained. The name “*floridensis*” means “from Florida,” and it was originally used for a proposed subspecies. When

the scientific name changed, it became the new specific epithet.”

In Greek mythology, Nessus was a centaur (a creature having the upper body of a human and the lower body of a horse) who figured in the legends of Hercules. The character also appeared in Dante's *Inferno*. In the 1990s, the name Nessus was given to a newly discovered minor planet in our solar system orbiting beyond Saturn.

Sources:

<https://usinggeorgianativeplants.blogspot.com/2018/08/virginia-creeper-is-worth-it.html>

https://www.wildflower.org/plants/result.php?id_plant=pagu2

<https://mdc.mo.gov/discover-nature/field-guide/nessus-sphinx>

<https://www.butterfliesandmoths.org/species/Amphion-floridensis>

IUCN Changes Monarch Conservation Status to Vulnerable

Revision not due to change in current population

The International Union for Conservation of Nature (IUCN) revised its conservation status of the migratory monarch butterfly (*Danaus plexippus*) in December 2023 from endangered to vulnerable.

Change Highlights Need for Data Collection and Evaluation

The change was made after deliberations following a petition challenging the appropriateness of population models used in the previous assessment. Various complex methods are available to analyze population trends over time, particularly for a migratory insect with a wide geographic range. The criteria specified by the IUCN are based on the extent of population decline over the past 10 years or three generations, whichever is longer. The initial review revealed a long-term decline in the population of migratory monarchs spanning several decades.

However, when re-evaluated according to the IUCN criteria, the decline observed in the last 10 years did not align with the longer-term trend. Consequently, the review justified changing the IUCN status to align with its evaluation criteria. Both methods employed for population evaluation were scientifically valid. This change to the IUCN status of monarchs underscores the dynamic nature of scientific knowledge and emphasizes the importance of continuous data collection/evaluation.

Revision Not Due to Change in Current Population

The IUCN status change is not due to a change in the current population, and concerns remain about the sustainability of the monarch migration.

The Eastern and Western migratory monarch populations are still at risk. Researchers estimate that the Eastern monarch population has declined by more than 80 percent since the mid-1990s, and the Western monarch population has decreased by more than 95 percent since the 1980s.

Threats to Monarchs

The primary threat to monarchs is loss of habitat, which creates challenges in breeding, migrating, and overwintering. The shifting climate is also rendering certain habitats less hospitable and necessitating alterations in migratory routes. The widespread use of chemicals to manage insects and weeds can inadvertently harm monarchs. They also contend with various dangers posed by natural adversaries, including predators, parasitoids, and diseases, further exacerbating the already precarious situation faced by these iconic butterflies.

How to Support Monarchs

Supporting monarchs requires a collective effort through habitat development, participation in community science projects, information sharing, advocacy, and supporting conservation organizations. Explore opportunities to contribute to nationwide efforts to protect monarchs at <https://monarchjointventure.org/get-involved>.

Source:

<https://monarchjointventure.org/blog/iucn-changes-migratory-monarch-status-from-endangered-to-vulnerable>

Canada: Monarch Is Endangered

The Canadian government formally listed the monarch butterfly as endangered in December 2023, providing the species with legal protection on federal lands.

In partnership with Mexico and the U.S., Canada has taken actions to aid in the recovery of the monarch population, including efforts to enhance both the quantity and quality of breeding habitat within its borders. This involves preserving existing habitat and restoring additional meadow habitat.

To combat the significant threat posed by habitat loss, the Canadian Wildlife Federation (CWF) has established networks of rights-of-way across eastern and southern Ontario. Working with various stakeholders, including agricultural producers, roadside and energy transmission managers, municipalities, and conservation authorities, the CWF aims to create meadow habitat that benefits not only the monarch, but also other pollinators. The goal is to expand the initiative nationwide, establishing a comprehensive pollinator pathway across Canada.

Monarchs have a geographical range from Prince Edward Island to British Columbia. They feed only on milkweed, of which 14 species grow in Canada. To contribute to the conservation of the monarch, the public can play a crucial role by planting nectar-rich native wildflowers, including native milkweed species.

Source: <https://financialpost.com/globe-newswire/cwf-supports-expanded-efforts-for-monarch-butterfly-conservation-as-canada-lists-species-as-endangered>

Four Universal Landscape Goals

Adapted from an article by Doug Tallamy

There are four ecological functions every landscape must perform to help us achieve a sustainable relationship with the natural world. These ecological functions are crucial for landscapes to perform as ecosystems that sustain life on Earth.

Four Landscape Ecological Goals

1. They must support a diverse community of pollinators throughout the growing season.
2. They must provide energy for the local food web.
3. They must manage the watershed in which they lie.
4. They must remove carbon from the atmosphere where it is wreaking havoc on the earth's climate.

How well a landscape accomplishes these goals depends on how well we, as landscape managers, choose and deploy the plants on our landscapes.

Lawns Fail at These Four Goals

None of the four goals will be met by planting most or all of our property with lawn grass.

Lawns have detrimental effects on the local watershed. By discouraging infiltration and promoting storm-water runoff, lawns contribute to the degradation of the watershed. Moreover, the use of lawn grass introduces harmful substances such as nitrogen, phosphorous, herbicides, and insecticides into nearby streams and rivers.

This not only disrupts the delicate balance of the ecosystem but also poses a threat to the health of aquatic life. Moreover, the use of lawn grass introduces harmful substances such as nitrogen, phosphorous, herbicides, and insecticides into

nearby streams and rivers. This not only disrupts the delicate balance of the ecosystem but also poses a threat to the health of aquatic life.

The cultural preference for lawns, devoid of pollinators and insects, fails to support the reproduction of various species including birds, reptiles, amphibians, and mammals. Furthermore, when it comes to carbon capture, turf grass is the least effective choice.

Although lawn grasses initially absorb carbon from the atmosphere, the act of mowing releases it back into the air. In comparison to other plant species, grass roots are relatively short and contribute less carbon to the surrounding soil. Lastly, the use of fossil fuels during lawn mowing further exacerbates carbon emissions, contributing to environmental pollution.

Native Plants Succeed at These Four Goals

One way to ensure that our yards are fulfilling their ecological responsibilities is by selecting plants that are beneficial for pollinators, capable of benefitting local wildlife, adept at storing carbon within their structures for extended periods, and proficient at producing glomalin on root hairs to enrich the soil with carbon.

Opting for plants with expansive canopies can also help mitigate the effects of heavy rainfall by softening its impact, while plants with extensive root systems can promote rainwater infiltration, leading to the retention of significant amounts of water on-site after a storm event.

The process of transforming our yards into ecological havens is a gradual one, spanning months,

years, or even decades. Planting native perennials that provide sustenance for specialist bees not only helps these pollinators, but also benefit generalist bees that can use these plants.

The introduction of native trees such as oaks, willows, cherries, birches, cottonwoods, alders, and maples into our yards also helps reduce the ecological dead zone represented by our lawns. These trees serve as host plants for caterpillars, which are crucial for the survival of breeding birds. These plantings also enhance the watershed management and carbon sequestration potential of yards.

Impacts Created Can Serve as Motivation

Rough estimates can provide a measure of the changes made, such as the amount of lawn replaced, and the number of trees added. Other simple changes can include creating new flowerbeds, enriching beds with leaf litter, and removing invasive plants.

Observing the presence of birds, butterflies, and bees that have taken up residence in our yards serves as a testament to the positive impacts we make. These milestones serve as motivation to continue our efforts and do even more for the environment and our communities.

Doug Tallamy is an author and the T.A. Baker Professor of Agriculture in the Department of Entomology and Wildlife Ecology at the University of Delaware. His books include: *Bringing Nature Home*; *The Living Landscape*, co-authored with Rick Darke; *Nature's Best Hope*; and *Nature of Oaks*.

Source: <https://homegrownnationalpark.org/4-universal-landscape-goals/>

USDA Releases Updated Plant Hardiness Zone Map

The U.S. Department of Agriculture (USDA) released a new version of its [Plant Hardiness Zone Map](#) in November 2023 providing updated information to help determine which plants are most likely to thrive in a location. The new map offers enhanced accuracy and provides more comprehensive information than previous versions. A new section, “Tips for Growers,” also offers valuable information about programs from USDA’s Agricultural Research Service.

Plant hardiness zone designations indicate the “average annual extreme minimum temperature” experienced at a specific location over 30 years. These designations do not represent the absolute coldest temperature ever recorded or expected to occur at that location, but rather reflect the average lowest winter temperature for the area during a specified period. The lowest temperature for winter is a vital factor in the survival of plants at specific locations.

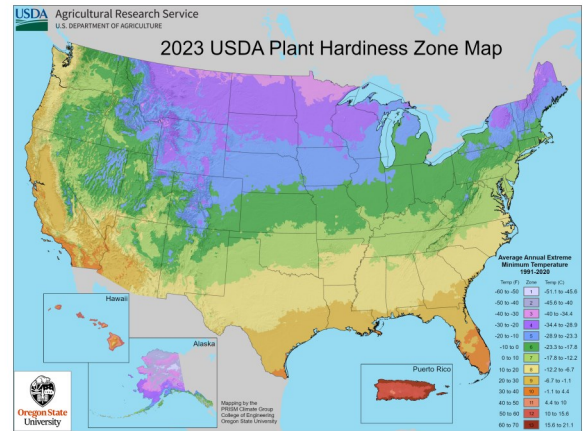
The new map, like the previous 2012 edition, consists of 13 zones that cover the U.S. and its territories. Each zone is further divided into half zones, labeled as “a” and “b.” For instance, zone 7 is divided into 7a and 7b. A comparison between the 2012 and 2023 maps reveals that ap-

proximately half of the U.S. has transitioned to the next warmer half zone, while the other half remains in the same half zone.

This shift indicates that those areas have experienced a temperature increase ranging from 0-5° Fahrenheit. However, some locations have also witnessed a temperature rise within the same half zone, without moving to another one. Some changes in zonal boundaries are also the result of using increasingly sophisticated mapping methods and the inclusion of data from more weather stations.

These variations in zonal boundaries across the nation primarily stem from the inclusion of temperature data from a more recent period. The new map incorporates data collected from weather stations between 1991 and 2020.

The new map is based on 30-year averages of the lowest annual winter temperatures at specific locations, divided into 10° Fahrenheit zones and further divided into 5° Fahrenheit half-zones. The web version offers a GIS-based interactive format and is specifically designed



to be user-friendly. The new map incorporates data from 13,412 weather stations compared to the 7,983 for the previous version.

Approximately 80 million American gardeners and growers represent the most frequent users of the map. USDA’s Risk Management Agency uses the map to set certain crop insurance standards. Scientists use the zones as a data layer in research models, such as those used to study the spread of exotic weeds and insects.

Although a paper version of the new map is not available for purchase, anyone may download the new map free of charge and print copies as needed.

The new map is based on 30-year averages of the lowest annual winter temperatures at specific locations, divided into 10° Fahrenheit zones and further divided into 5° Fahrenheit half-zones. The web version offers a GIS-based interactive format and is specifically designed

Population

Continued from page 1

The 2023-24 overwintering population was so low that few monarchs will likely be seen in summer 2024 in many parts of the U.S. and Canada. Scientists believe that climatic variations in the breeding areas in Canada and the U.S. resulted in high temperatures and drought, which reduced the

abundance of milkweed. Drought conditions extending from Oklahoma deep into central Mexico could also have caused a decrease in flowering plants.

Reduced plant population means lesser nectar production, and monarchs need the sugars in the nectar to fuel the migration and develop fat reserves that aid in hibernation.

Scientists have pointed out that catastrophic mortality due to extreme weather events is part of the monarchs’ history. Monarchs are resilient and have recovered from low populations in the past. It is important to remain hopeful and intensify the planting of milkweed and nectar plants to help the monarchs recover.

Source: <https://monarchwatch.org/blog/>

Tracking My Namesake Monarch

By Meg Hedeem
U.S. Fish and Wildlife Service

As a budding naturalist just out of college, an internship chasing monarch butterflies was a dream. The New Jersey Audubon's Monarch Monitoring Project was started in 1990 and I joined the team as an intern in 1999. For 33 years, monarchs have been counted, measured, assessed, and adorned with a tiny sticker that allows each individual to be identified and tracked. This past fall is when all of that changed.

Cellular Tracking Technologies (CTT), in collaboration with the Cape May Point Science Center, deployed solar-powered tags on monarchs that operate on the Bluetooth frequency for the first time ever. CTT has been designing, creating, and manufacturing wildlife tracking devices since 2007. In the summer of 2023, after decades of research, engineers at CTT designed a tag that weighed about as much as a grain of rice; light enough to affix to an insect!

The tags weigh about 0.06 grams, which is roughly one-tenth of the weight of a monarch butterfly; generally accepted as an appropriate weight for a tagging device. Each tag is carefully attached to a monarch butterfly using a strong, but delicate glue designed for cosmetics. (It's eyelash glue!)

The miniature solar panel is attached to the thorax of the butterfly, allowing the short antennae to lay parallel to the abdomen. When the monarch flaps its wings and closes its wings over its abdomen, the tag can barely be seen, if at all.

These incredibly powerful and tiny tags emit data over the Bluetooth network. CTT created a mobile



Clockwise from top left: Mark Garland, director emeritus of the Monarch Monitoring Project, holds a monarch fitted with a small tracking device. Monarch with CTT tag resting in an eastern red cedar. Photos by Meg Hedeem. Tagged monarch takes flight. Photo by Lindsay Brendel.

phone application called "Project Monarch" that allows any person with the app to collect data from one of these tagged monarch butterflies. Location data can be acquired on any smartphone using the free application.

When in use, the application will record the location of each tagged monarch within range. In fall 2023, more than 100 monarch butterflies were tagged in Cape May. Each tagged monarch was named for a person who has been a part of the Monarch Monitoring Project (MMP) or Project Monarch.

One evening at sunset, a monarch was fitted with one of these brand-new tracking devices and given the name Meg, my namesake monarch! Meg the monarch was carefully tagged by Mark Garland, director emeritus of the MMP. Once the glue was dry and Meg was ready to continue on her way, she was gently placed on my nose as a perch for her departure.

Around 6:30 p.m. (EST) on October 2, 2023, a monarch that was given the name "Meg" was tagged in the dunes of Cape May Point, NJ along the Delaware Bay. Meg was detected the next morning shortly after 7 a.m. before the sun was even above the horizon. Just after 8 a.m., Meg appeared to take off across the bay to start the next leg of her migration! Meg the monarch flew up above me and then settled in the dunes that face the Delaware Bay.

Now that the night was nearly upon us, we knew that Meg would settle in an Eastern Baccharis or a Northern Bayberry bush in the dunes. Knowing exactly where Meg would be in the morning, I set out to the dune just before the first light. A few minutes after 7 a.m., with the Project Monarch app open on my phone, I heard a "ping." I looked down at my phone and saw that I was picking up Meg's tag! She was still here.

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Meg

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Meg's tag continued to ping on and off for the next hour or so as the sun slowly rose over the horizon. About an hour later, one monarch alighted from the dunes and flew over my head. The monarch flew over the dunes and toward the neighborhood where it would likely find some nectar.

Meg was still "pinging" in the app. Meg was still in the dunes. A second monarch took flight and wandered up the beach. But my phone was still picking up Meg's signal. Then, right from the area that Meg settled the night before, a monarch lifted up, gained height, and flew toward the bay.

My phone continued to pick up Meg's tag. As the monarch got closer to the bay, it gained a bit more height and continued out over the water. I watched as the monarch

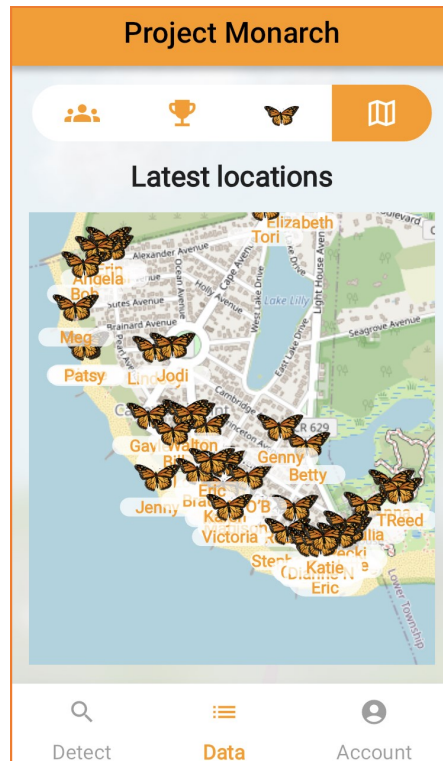


Image showing tagged monarchs from Project Monarch tracking app.

continued its journey south and left Cape May over the Delaware Bay. I looked at my phone. Meg was now out of range. I had just watched



Top: Tagged monarch Meg perching after being tagged; photo by Michael O'Brien. Above: Tagged Monarch Meg taking her test flight after being tagged; photo by Meg Hedeon.



Meg migrate across the bay in hopes of making it to the safety of her wintering grounds. ¡Buen viaje, Mariposa!

Some Butterflies Hear through their Wings

Have you ever tried to talk to butterflies? Or wish you could talk to them as they flutter about in your garden? They may not be able to understand you, but they can certainly hear you! Not only that, they listen to us with their wings! It's been known for some time that many groups of butterflies hear through little holes at the base of their wings — small cavities covered with membranes that function much like our own eardrums.

Researchers led by Dr. Jayne Yack, biology professor and neuroethologist at Carleton University, has discovered that at least one family of butterfly hears with structures on the wings themselves.

This family, the Nymphalid group (about 2,500 species), has swollen-looking veins on their forewings that help them hear. Butterfly wings are covered in thin, air-filled veins that can provide stability to the delicate structures. The puffed-up vein is on each of the top wings near the ear cavity in Nymphalid butterflies. This can be spotted in commonly seen butterflies, such as monarchs, morphos, emperors, and admirals.

Dr. Yack hypothesized that these veins assisted with hearing since they were located so close to the ear. The researchers played sounds for the butterflies around the same frequency as a human voice while imaging their wings with lasers.

The puffy wing vein of all 30 common wood nymph (*Cercyonis pegala*) butterflies studied responded to the sound. Making small incisions in the veins seemed to hamper their ability to hear, indicating that the structures were part of the butterfly's ears.

The researchers are uncertain about the function of these unique auditory organs, but there is a possibility that they help this particular species detect a broad range of low-frequency noises.

Source: <https://animals.howstuffworks.com/insects/some-butterflies-hear-through-wings.htm>