BALANCING

Gardens are key to protecting and promoting biodiversity in a changing world.

ACTS

by SCOTT MEYER

Native trees, such as oaks, support a vast food chain that includes garter snakes, wood thrushes, and red admiral butterflies.

Your garden, whether it's a big plot or a few containers, is home to more than just plants. It's a source of food and shelter for populations of microscopic soil-dwellers, insects like butterflies and bees, assorted birds and mammals, and many other creatures. As a gardener, you're managing an ecosystem that's connected to the world around it. By encouraging and protecting biodiversity, you help maintain the natural balance that supports the well-being of you, your family, and every other living thing.

PHOTOS BY AGAMI PHOTO AGENCY/SHUTTERSTOCK (THRUSH) AND ROB CARDILLO

Entomologist Doug Tallamy urges gardeners to see so-called "pests" like locust borer and goldenrod as well as asters and other wildflowers as essential to healthy ecosystems.

"EVERYONE WHO CARES FOR A LANDSCAPE IS A STEWARD OF BIODIVERSITY."

This flower-filled native plant entry garden near Lancaster was designed by Larry Weaner Landscape Associates.

PHOTOS BY JULIA BOULTON/GAP PHOTOS (WINDOW BOX) AND ROB CARDILLO

WHY BIODIVERSITY MATTERS

"Biological communities rich in species are substantially healthier and more productive than those depleted of species." That was the finding of extensive research by the U.S. Geological Survey published in 2016. "This study shows that you cannot have sustainable, productive ecosystems without maintaining biodiversity in the landscape," wrote James Grace, PhD, a USGS research ecologist.

We need a healthy environment as much as it needs us. "The ecosystem provides us with essential services, like clean air and water," says Doug Tallamy, PhD, an entomology professor at the University of Delaware. "We rely on specialist native bees to play an essential role in pollinating many crops." On an even wider scale, biodiversity can have a positive impact on the problem of climate change by reducing the amount of carbon dioxide in the atmosphere. "Recent studies have shown that biodiversity increases soil organic carbon storage," according to a 2018 report to the National Academy of Sciences.

As built landscapes proliferate around us, uncultivated spaces are paved over or replaced with turfgrass and a limited list of trees, shrubs, and flowers, most of which are not native to the region. Some are even invasive plants that crowd out other species. This ongoing transformation is degrading the habitat of native plants and wildlife and eroding biodiversity.

Gardens can become havens for many types of insects in the food chain, including bugs that fill crucial roles such as preying on destructive pests. This is particularly true where the human population is dense, says Natalie Cohen, conservation programs coordinator for the National Wildlife Federation mid-Atlantic region. "People often think of urban areas as biological deserts, but cities and suburbs are home to nearly two-thirds of all wildlife species in North America." (The PHS Philadelphia LandCare team has worked with the National Wildlife Federation to add pollinator gardens to "cleaned and greened" lots around the city.)

Gardeners also benefit from more variety in their spaces. "Biodiverse landscapes are not static—they are alive with movement and activity, sights, smells, and sounds that deliver us daily doses of joy, wonder, and curiosity, reminding us that nature is right outside our window," says Jeff Lorenz of Refugia, a Narberth, Pennsylvania, design firm that specializes in natural landscapes.

REDUCING THE 40 MILLION ACRES OF LAWNS WOULD DRAMATICALLY INCREASE SPACE FOR NATIVE PLANTS.

A diverse selection of native perennials and grasses light up this front-yard garden designed by Jeff Lorenz.

A window box with a few herbs will attract pollinators passing by.

NATIVES IN THE CITY

A small window box in the city provides migrating and local pollinators with food and shelter. My planter is graced with visits from many local bird species, and last year it became the nursery for a population of swallowtail butterfly larvae. Here's how to create your own.

Seek sun. Most pollinators rely on nectar from flowers that thrive in the sun, so pick a spot that receives at least six hours of direct sunlight a day and is protected from possible wind damage.

Pick a pot. Window boxes can be hung under windows or on walls, balcony railings, and fences. You can choose wood, plastic, wrought iron, or any other type of container, but make sure it drains well. Fill it with light, organic potting soil.

Vary the plants. Many native plants, such as goldenrods, coneflowers, and asters, thrive in window boxes. Mix in flowering herbs, like parsley, dill, and basil, for you and the pollinators. To attract different kinds of pollinators, include as many varieties of plants and colors as you can. The ideal mix blooms continuously from spring to fall.

Feed and refresh. Feed your window box plants with liquid organic fertilizer once or twice a month. Remove faded flowers and leaves to make room for fresh growth.

Observe and report. You can help researchers by taking photos of the pollinators that stop by and posting them on the phone app iNaturalist, which gathers data from thousands of citizen scientists. *—Ellen Martin*

Ellen Martin teaches science to elementary and middle school students at Girard College in Philadelphia.

HOW TO HELP

Everyone who cares for a landscape is a "steward of biodiversity," Tallamy says. That gives all of us, as gardeners, the opportunity and responsibility to help bring balance to our region's ecosystem. You can grow plants that "are simultaneously beautiful and productive and that can pass some of their energy on to the insect herbivores that then support a vibrant community of other species," Tallamy explains. The choices you make when caring for your landscape can make a significant difference for all of the species that spend time in it.

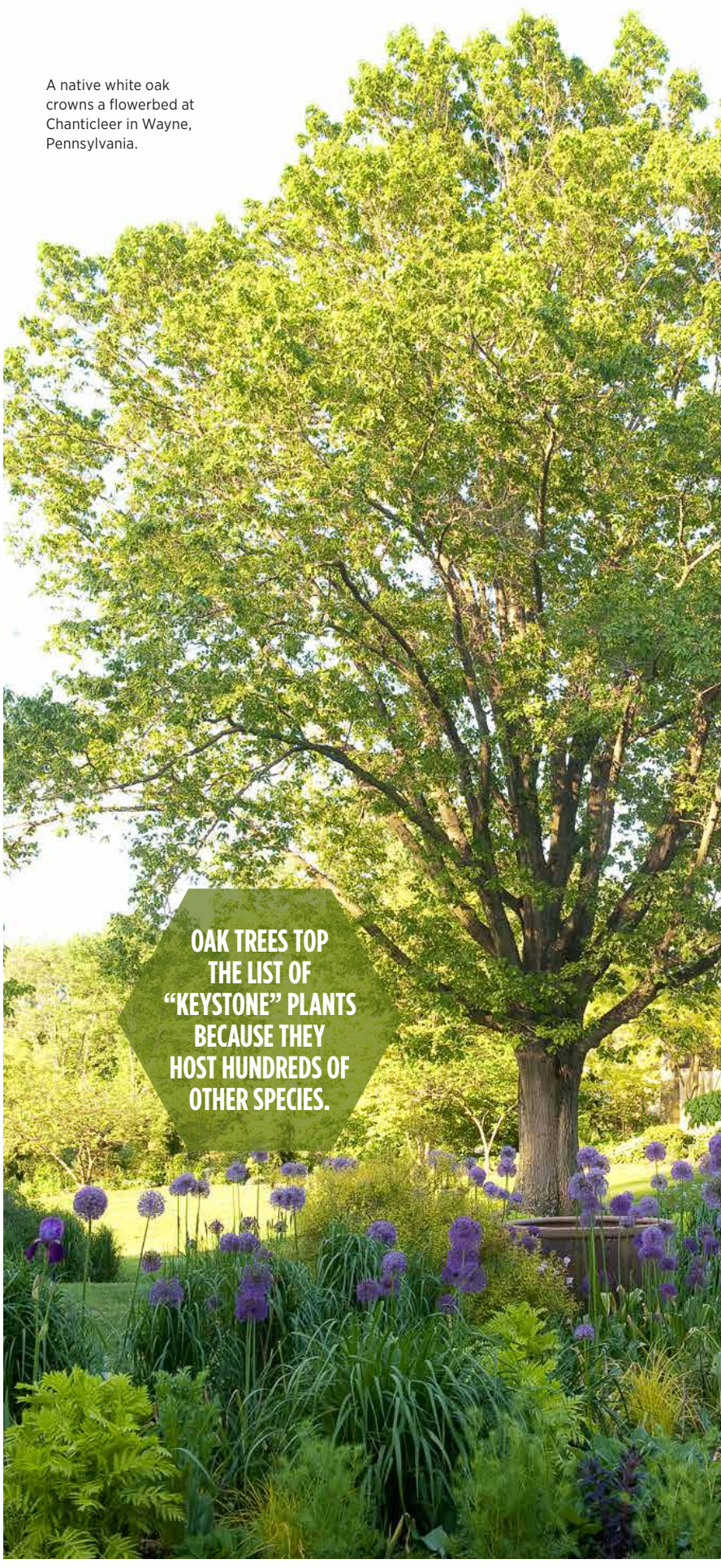
Cut the lawn. More than 40 million acres of land in America are managed as lawns; that's about the collective size of the six New England states. "If we would reduce the total area devoted to lawns by half and fill those spaces with native plants, we could add 20 million acres of more biodiverse landscape," Tallamy says.

Most lawns consist of just a few types of grasses and are typically treated with herbicides, insecticides, and petroleum-based fertilizers throughout the growing season. "The biggest and most effective change we can each make is shifting lawn culture," Lorenz says. "The constant need to weed, feed, and cut is a needless drain on time, energy, and resources. During heavy rainfall, fertilizers used to achieve the perfect shade of monoculture green flow directly into our storm sewers and rivers, where the excess nutrients wreak havoc with our ecosystems, including our drinking water."

Lorenz advocates for mowing less frequently and raising the mowing blade to a higher setting so that a wider variety of low-growing plants, such as clover, can thrive in the lawn. Even better, he suggests, would be to "replace grass in low-to-moderate-traffic areas with a no-mow seed mix or native sedge like *Carex leavenworthii*."

Let it be. An ungroomed corner of your yard will become a haven for all kinds of wildlife, especially insects and other invertebrates, small mammals, and reptiles (such as small snakes and toads). This is especially critical in fall and winter, when other food sources and shelter may be limited, Cohen says. Leave spent plants, leaf litter, and other natural debris in place when the growing season ends, so wildlife will stay in your yard during their dormant period and raise the next generation there when they reappear in spring.

Grow native plants. "When species interact over long periods of time, a balance among plants, herbivores, and natural enemies (predators, parasites,



A native white oak crowns a flowerbed at Chanticleer in Wayne, Pennsylvania.

PHOTOS BY ROB CARDILLO

Fragrant spicebush is a colorful native that fits the home landscapes Jeff Lorenz designs for Refugia's Greenway Network.

"GARDENS CAN BECOME STEPPING-STONES WITHIN LARGER ECOLOGICAL CORRIDORS."

parasitoids, and diseases) emerges and typically keeps any one species from eliminating the others," Tallamy says. "Native plants support dozens of species of insect herbivores that become food for the hundreds of species that are the natural enemies of those insects." These predators also become residents in the landscape and keep pest populations below the level that would cause aesthetic damage to the plants.

A few native plants have been found to play an especially critical part in sustaining a diverse ecosystem in the mid-Atlantic region. These are what Tallamy calls "keystone plants." At the top of the list are oak trees, including white, post, and chestnut oaks, which host as many as 527 different species of caterpillars, according to his research. While gardeners often think of caterpillars as plant-munching pests, Tallamy points out that they "transfer more energy from plants to the food web" than any other creature. Other important keystone plants that support a wide range of specialist pollinators are goldenrods, native asters, evening primroses, and violets.

You can choose plants that are as attractive as they are functional. Consider putting in spicebush (*Lindera benzoin*), for instance, in place of forsythia, Lorenz says. "It's a native shrub with fall color plus all edible parts, including fruits, that support butterflies, birds, and mammals. Now that's beauty with purpose!"

For a comprehensive list of native plants for your garden, check the National Wildlife Federation's Native Plant Finder database (nwf.org/nativeplantfinder), which you can search by zip code.

Say no to chemicals. Many commonly used lawn and garden chemicals are toxic to wildlife. Synthetic fertilizers gradually raise the soil's salt content, which kills off microbes in the soil. Broad-spectrum insecticides don't discriminate between beneficial insects and pests. Even organic treatments may disrupt the predator-prey balance that keeps gardens healthy.

Join the web. Habitat fragmentation is the obstacle to maintaining biodiversity in densely populated areas. Gardens can become "stepping-stones within larger ecological corridors, amplifying the overall effect a single property can have," Lorenz says. In 2016, Refugia established a "Greenway Network" to build a web of native habitats. "Within 5 miles of our home base in Narberth, for example, there are now 66 overlapping native habitat gardens, which are creating an ecological corridor in greater Philadelphia that will support and build more resilient species populations for years to come."

Scott Meyer is the editorial director of GROW. *Go to homegrownnationalpark.org to learn more about Tallamy's work. Find out about Refugia's landscape designs and Greenway Network at refugiadesign.com.*