

Conservation Matters: Contributions from the Conservation Committee**North American butterflies:
are once common species in trouble?**

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This month the Conservation Committee wanted to share Scott Black's recent article from *Wings* (Spring 2016: 5-9) on the decline of widespread and previously common species of butterflies. The message in his article is an important one, and, alarming, it echoes recent reports from other regions of the globe. There is a (bigger) worry that insect biomass across many terrestrials ecosystems is in decline. *David Wagner*



Many rare endemics, like this Uncompahgre fritillary (*Boloria acrocneuma*) from the San Juan Mountains in Colorado, are imperiled. It is, however, becoming apparent that many common species are declining as well, though such declines are hard to track. Photograph by Scott H. Black.

I grew up during the heyday of the American muscle car and have teenage memories of rocketing down Nebraska country roads in my 1971 Ford Mustang Mach 1. Back then even a short drive resulted in hundreds of dead bugs splattered across the grille, so I was always washing my car to keep it clean and shiny. When I returned to the Midwest last year with my wife and two kids—now driving a much more sensible and fuel-efficient rental car—I was struck by the paucity of bugs. These days you can drive the entire four hundred miles across the broad state of Nebraska and your car will be practically spotless when you get to the other side.

The situation was even more noticeable when I stepped out of the car. In many areas, there were shockingly few insects. Where I might once have seen thousands of monarchs in the fields, yards, and roadsides, I now saw perhaps a dozen. Butterflies are disappearing, along with countless other creatures.

With more than eighteen thousand species of butterflies and ten times as many species of moths gracing our planet, we know relatively little about the status of each one, but the information we do have is not encouraging. Recent reports from practically every continent document unprecedented declines in a broad array of butterflies.

Studies in Europe reveal that on average the continent's grassland butterfly species have had population losses of almost 50 percent since the early 1990s. Similarly, three-quarters of Britain's butterfly species are in decline. The situation is just as disturbing in the United States, where at least five butterflies have gone extinct since 1950, another twenty-five are presently listed as endangered nationwide, and four more are listed as threatened. NatureServe, one of the leading sources of information about rare and endangered species, assessed all of the roughly eight

hundred butterfly species in the United States and found that 17 percent are at risk of extinction.

Much of my career has been spent focusing on conservation of the rarest of the rare—those butterflies and other animals that are on the brink of extinction. Such butterflies are often called “rare endemics”—that is, species that are found only in particular places, either in a limited geographic area or occupying a very specific type of habitat. For a population living within such tight constraints, the advent of a housing development in or adjacent to its habitat, or the invasion of that habitat by weedy plants, can lead to decline and endangerment. Indeed, most of the butterflies listed by NatureServe as being at risk of extinction are rare endemics.

It is, however, becoming apparent that many of the common species are disappearing as well, though such declines were hard to notice at first. These common species were historically the most populous butterflies that you would find in your yard or notice along the side of the road. They are the ones we expect to see regularly—and, although we now see them less frequently or in scores rather than hundreds, the fact that we continue to see them at all further masks their decline. It is often hard to spot this type of slow, incremental erosion of butterfly populations, especially when our focus is on rare species or on those that are

already known to be threatened. Who was even counting the common or garden butterflies?

The realization that broadly distributed species are declining was brought home to me a few years ago when I was invited to give a keynote talk, at the Butterfly Conservation Symposium in England, on the status of butterflies in North America. It was a big topic and one where I felt I needed some feedback from colleagues to make sure that I covered it adequately. In preparing for the presentation, I asked a number of entomologists a series of questions, the last one being, "What is your take-home message about the status of butterflies in North America?" What amazed me was the similarity among the responses. The answer from Dr. Jaret Daniels of the University of Florida sums up the thinking of most of the scientists I queried: "There is no doubt that the rate of decline for at-risk butterfly populations continues to accelerate. . . . What should be most alarming to all of us is that this downward trend has now spilled over to include many previously more wide-ranging and common butterflies."

This precipitous decline is epitomized by the monarch butterfly (*Danaus plexippus*), whose population has fallen by over 70 percent across North America since monitoring efforts began in the mid-1990s. Another victim of this trend is the regal fritillary (*Speyeria idalia*), a striking butterfly that lives in the tallgrass and mixed-grass prairies of eastern and central North America. Historically it was found in thirty-two U. S. states and the Canadian province of Manitoba, but now Kansas is the only place where it is apparently secure. NatureServe lists the regal fritillary as extirpated from Manitoba and fourteen states, and as critically imperiled, imperiled, or vulnerable in fifteen; the other two states in its historic range have not tracked it. And the regal fritillary is not the only prairie species that is in decline; whole groups of butterflies that rely on open grasslands, such as grass skippers, appear to be in trouble throughout the Midwest and Pacific Northwest.



The regal fritillary (*Speyeria idalia*) was at one time found in thirty-two U. S. states, and now appears to be secure in only one. Photograph by Bryan E. Reynolds

One problem with determining the status of many species is that there are few long-term data sets that record butterfly numbers in the United States, but there are a couple that are worth noting. The first of these is an analysis by Greg Breed, Sharon Stichter, and Elizabeth Crone of two decades of observational data gathered by the Massachusetts Butterfly Club, compiled over the course of nearly twenty thousand one-day surveys covering a hundred butterfly species common in the state. The analysis revealed that the abundance of southerly distributed species increased while at the same time those species with a more northern distribution decreased. This finding corresponds with other climate studies demonstrating that butterfly populations may be moving northward and to higher elevations, but the study also showed something new: species that overwinter as eggs or as newly hatched larvae experienced greater declines than did those that overwinter at later stages.

The second investigation is ongoing and is now North America's longest-running butterfly study. Dr. Arthur Shapiro, a professor at the University of California at Davis, has been monitoring butterflies across northern California for nearly forty-five years. He began in 1972 with a single site near San Francisco, and over the next two decades added more sites; his regular transect now stretches from sea level on the San Francisco Bay to the crest of the Sierra Nevada near Lake Tahoe.

Dr. Shapiro and his colleagues, including Dr. Matthew Forister at the University of Nevada at Reno, monitor these sites every year, and though each of the locations is a natural or seminatural area that has not been directly impacted by urban or agricultural development, they have found that butterflies are declining at every one of the sites. Their study shows that these changes are occurring across all butterflies: every family has species that are in decline. The data also revealed that population losses are more severe at lower elevations; consistent with the results of other studies, some butterfly species seem to be moving to higher elevations. One of the most interesting findings is that endemic butterfly species appear to be in only slightly more severe decline than more-wide-ranging butterflies. At one site, for example, the western pygmy-blue (*Brephidium exilis*), a small, relatively localized species, is showing a similar decline to the cabbage white (*Pieris rapae*), one of the most common butterflies in North America.

Across the board, the information we have leads to the conclusion that a huge number of butterfly species, including many that we would consider common, are indeed in decline. What is happening in our landscapes to cause such alarming change? Loss of habitat and habitat degradation are important drivers. Urban landscapes increasingly displace natural ones, and those formerly green spaces that are not completely paved over are fragmented. For its part, agriculture favors fewer types of crops, leaves fewer edges

unplowed or untrampled, and tolerates ever fewer “pests.” Insecticides and herbicides used on all of these landscapes directly kill both the butterflies and the plants that they rely on. The wild places that do remain suffer the effects of invasive species and climate uncertainty, as well as the destructive impacts of mining, logging, and other forms of resource extraction.

The fact is that we have created a fully human-dominated world, with devastating results for the other inhabitants of this planet, including butterflies and moths. But our lives would be greatly impoverished without these winged creatures. They are of vital importance to ecosystems, inspire poetry and art, provide livelihoods, offer a window into the natural world, and bring beauty into our cities and neighborhoods. We must do whatever we can to restore their populations to health.

The situation poses an enormous challenge, yet despite the biodiversity crisis unfolding all around us, we at the Xerces Society believe that butterflies and other animals can have a secure future. Continuing research is, of course, imperative, since the more we know the more effective we can be in our conservation efforts. There are a lot of data sets that can help answer these larger questions, but a coordinated effort must be made to compile and assess all of the data available.

Even so, we cannot wait until we have assembled “perfect” information to move forward, because by then it will be too late. We already know that the future health of the planet requires a thoughtful and sensitive reconciliation between the human environment and the more natural one. Policies that could accelerate that reconciliation are desperately needed; at the same time there is much that we can do, as individuals, while we as a society work for those policies to be enacted.



Moths make up the larger portion of Lepidoptera. We know even less about how well they are faring in North America than we do about the state of butterflies. Photograph by Bryan E. Reynolds; Sad Underwing (*Catocala maestosa*).

We must actively protect, enhance, and restore resilient habitats, in which both plants and butterflies can flourish. Many butterfly species require quality habitat connected by corridors to allow populations to move across the landscape; larger natural areas can serve as the anchors, but interstitial areas of habitat are vital if we hope to protect butterflies as well as other pollinators. We also need to reduce stressors, and in particular we must minimize the use of pesticides.

Farms, roadsides, and your own garden all have a critical role to play. Whether you live in California’s Central Valley, upstate New York, or the panhandle of Texas, you can act right now to help save the earth’s butterflies. Your efforts will support countless other creatures as well, from lady beetles to songbirds—and, in the end, humanity itself will be a major beneficiary of a more conservation-minded approach.

Scott Hoffman Black, executive director of the Xerces Society, has been involved with butterfly conservation for more than two decades. He serves as chair of the International Union for Conservation of Nature (IUCN) Butterfly Specialist Group and as co-chair of the Monarch Joint Venture, and his several awards include the U. S. Forest Service Wings Across the Americas 2012 Butterfly Conservation Award.



From the Editor’s Desk

James K. Adams

Thanks to all of you who have sent me contributions for the News. I have a couple of “Formative Experiences” articles in the queue, so be looking for that in the next issue. Also, let me reiterate that I now have backlog of nearly an issue by the time one gets published. That means that even if you meet the deadline for a particular issue, that is not a guarantee that your article will make it into that issue. So don’t be surprised when I tell you that your article will appear in one or maybe even two issues down the road.

I have one fantastic recent lep experience to share. Larry Gall, from the Peabody Museum, Yale University, came to north Georgia this past weekend (Aug. 20) looking to extend the known range of the recently described *Catocala myristica*, that feeds on Nutmeg Hickory, a very local and least common *Carya*, found in a few locations in the SE U.S. There is one known area in Georgia for the tree, near Rome, GA, just a hop, skip and a jump from where I live. With the help of local botanist Richard Ware, we located the trees, and the moth! A new Georgia record!