

Illinois nature lovers and scientists warn of population declines among native bees and other pollinators

September 12 2023, by Rebecca Johnson, Chicago Tribune



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Barbara Williams zeros in on a patch of yellow wildflowers with her binoculars. She leans in slightly, her beetle earrings jangling, and

proclaims "that's definitive."

Williams has spotted the rusty patched bumblebee. Perched on the petals of the cup plant, the bee is identifiable based on its black and white stripes and the tawny patch on its second abdominal segment.

"She is undoubtedly a she," Williams remarks as the bee flies to a different flower. "The workers, the ones that do all the serious foraging, are females."

The 70-year-old amateur naturalist is relieved to have finally located the elusive bee after 30 minutes of searching at the Carl & Myrna Nygren Wetland Preserve in Rockton, Illinois. Williams, a Rockford resident, has noticed a "disturbing" trend during her weekly trips to the preserve. The populations of some of her favorite insects—from bees to beetles to mosquitoes—appear to be in a "free fall," she said.

Scientists say Williams' observations have merit. While population sizes fluctuate year to year, research shows that there has been a dramatic decrease in the abundance of insects worldwide, specifically pollinators such as bees, flies, butterflies and beetles. Experts attribute some of the declines to [habitat loss](#) or pesticide use but warn that climate change poses new risks.

Paul CaraDonna, a conservation scientist at the Chicago Botanic Garden, said there's quite a bit of evidence demonstrating long-term declines in insect populations. One study published in 2019 in the journal *Biological Conservation* revealed that 40% of the world's insect species are facing extinction within the next few decades.

Another study, published in 2017 in *PLOS ONE*, found an "alarming" and "rapid" 75% decline in flying [insect populations](#) in nature protection areas in Germany during a 27-year time span. Researchers said these

decreases will have widespread consequences for biodiversity and crop production.

CaraDonna compares species loss to a plane losing a bolt. The plane might not crash with the loss of one bolt, but if bolts keep disappearing, the plane will eventually fall out of the sky.

"We're asking these critters to handle a lot and they're being exposed to lots of stressors and [extreme events](#) much more frequently than they used to—that's the concern," he said.

Because many pollinators have an annual life cycle, CaraDonna cautioned that population sizes can shift substantially yearly based on a number of factors, such as weather, potentially contributing to some of the decreases Williams is seeing.

"A lot can happen from one year to the next in terms of a population having a relatively low abundance year, and that could be followed up for a variety of reasons with a really high abundance year," he said. "Or, of course, it could be a signature of something that's happening over and over again."

Extreme weather in Illinois, such as drought, flooding or sweltering heat with temperatures reaching 100 degrees that have amassed attention this summer, can contribute to low abundance, he said.

"Your plants need water to be happy, so when we have these really dry conditions, it usually means the plants are under stress. When plants are under stress they tend to not do as well and one part of that is producing flowers for reproduction," CaraDonna said. "Many pollinators rely on the flowers exclusively for food."

"Extreme heat events can definitely cause some damage, and it can

manifest in all sorts of ways," he added. "Many insects especially in Illinois are probably able to withstand what we deem as a heat wave—they have a good amount of thermal safety margin—but if they're in that environment for a really long time, that might change."

The effects of climate change

Because of climate change, Christopher Dietrich, an entomologist at the University of Illinois at Urbana-Champaign, said the rusty patched bumblebee is in danger of disappearing entirely. Dietrich said the bee, which the U.S. Fish and Wildlife Service listed as endangered in 2017, has narrow habitat tolerances and "it's going to get too hot for them."

It's also been at the center of a legal fight to preserve the Bell Bowl Prairie from the Chicago Rockford International Airport's expansion plans.

The rusty patched bumblebee and other bee species such as the American bumblebee have declined significantly in Illinois during the past 30 years, according to Alan Molumby, a biology professor at the University of Illinois at Chicago. The state was once a mecca for bee diversity, Molumby said, but that abundance is in the past.

He said two species worked to fill the "ecological void"—*bombus impatiens* and *bombus bimaculatus*—better known as the common eastern bumblebee and two-spotted bumblebee, respectively.

"It's something a lot of people wouldn't notice," he said. "Unless you know bumblebees, you wouldn't realize that what was once a lot of different species has now been replaced to just a couple species."

It's fortunate that most bees are generally adaptive and resilient to disturbances, Molumby added. He said bees can find and colonize new

habitats in response to climate change. The problem, he said, is that because of rampant habitat destruction, suitable habitats may not exist.

"If you warm the planet now, a species can't move," he said.

Other pollinators and insects that live in Illinois will respond differently to [climate change](#) because their development requires different temperature and precipitation conditions, according to Dietrich. Mosquitoes, for example, depend on water sources to breed, Dietrich said. Under drought conditions, they won't have enough places to breed and their population will decline.

Population declines are troubling, CaraDonna said, because pollinators are ecologically and economically important. They pollinate crops that humans rely on, as well as plants in the natural ecosystem, he said. According to the U.S. Forest Service, almost 80% of crop plants grown around the world require pollination by animals, meaning humans couldn't survive without pollinators.

"I have a 6-year-old daughter and I wonder about the natural ecosystems that she'll be experiencing when she's in her 20s or 30s," he said. "In terms of nature as we know it, I think the loss of species is important. But for pollinators, because they provide these important pollination services to plants, we stand to lose quite a bit."

Saving native bees in Illinois

There are simple steps everyone can take to protect bees, or as CaraDonna likes to call them, "amazing and magical critters." He suggests building pollinator gardens with [native plants](#) so they have lots to eat, reducing pesticide use or simply appreciating insects—even ones that aren't usually considered pretty.

Even though it might seem counterproductive at first, CaraDonna advises against building honeybee colonies. Honeybees are known to take resources from and carry diseases that can infect native bees, such as the rusty patched or common eastern bumblebees, suppressing their populations.

"If you want to be saving the bees, we do not need more [honeybee colonies](#)," he said.

When Anthony Demma learned about the plight of [native bees](#), he decided to start up the nonprofit Bee Haven in the Chicago area and work to restore their habitats. In two years, Demma said they've installed them at about seven locations, including at farms and a corporate campus.

"From the beginning, we got to pick a site that makes sense. Right now we're looking at a site for example on a retention pond. We're thinking that would be a good site because it would give these native plants room to spread out," Demma said. "Then we get an estimate on the budget, and the first thing we have to do is remove all the weeds that are currently there."

Afterward, Demma said they work with an ecological restoration company to design, install and maintain the habitats. All in all, he said the projects—from one-tenth of an acre to 10 acres—all cost under \$20,000.

"Most of the attention goes toward commercial honeybees because we get honey from them, but there's tons of other species of pollinators out there doing similar or uniquely designed tasks, and they're not getting the attention that the honeybees are getting," Demma said.

Williams doesn't need a push to care about insects—she's been doing it

all her life. As she walks along the confluence of the Rock and Pecatonica rivers searching for mussels, the Natural Land Institute volunteer said she's always gravitated toward the underdogs—the bats, bees and wasps that people are scared of and might not appreciate.

Protecting them, she said, is still important.

"Any of those things that got mistreated and misunderstood, I was like 'I need to save them,'" Williams said.

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Citation: Illinois nature lovers and scientists warn of population declines among native bees and other pollinators (2023, September 12) retrieved 28 April 2024 from <https://phys.org/news/2023-09-illinois-nature-lovers-scientists-population.html>

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