CONSERVATION

Solar Farms Shine a Ray of Hope on Bees and Butterflies

A trend of planting wildflowers on solar sites could maintain habitat for disappearing bees and butterflies

By Jodi Helmer on January 14, 2019 أعرض هذا باللغة العربية

NREL scientist Jordan Macknick and Jake Janski, from Minnesota Native Landscapes survey a pollinator test plot planted underneath the photovoltaic array at the Chisago Solar Site, part of the Aurora Solar Project in Minnesota. Credit: Dennis Schroeder National Renewable Energy Lab *Flickr* (CC BY-NC-ND 2.0)

The tidy rows of gleaming solar panels at Pine Gate Renewables facility in southwestern Oregon originally sat amid the squat grasses of a former cattle pasture. But in 2017 the company started sowing the 41-acre site with a colorful riot of native wildflowers. The shift was not merely aesthetic; similar projects at a growing number of solar farms around the country aim to help reverse the worrying declines in bees, butterflies and other key pollinating species observed in recent years.

Up to $577 billion in annual global food production relies on pollination by insects and other animals such as hummingbirds and bats, according to the United Nations. But more than half of native bee species (pdf) in the U.S. have seen their numbers drop

sharply since 2005, with almost 25 percent now at risk of extinction. Meanwhile the North American monarch butterfly population has declined 68 percent over the past two decades, the nonprofit Center for Biological Diversity says. Suspected factors include climate change, pesticide use and parasites—along with shrinking habitat, largely blamed on natural landscapes (such as scrublands or wetlands) being converted for agricultural use.

And as pollinator habitat wanes, solar installations are taking up ever more land. The U.S. is expected to convert six million acres of land to such facilities before 2050, according to the National Renewable Energy Laboratory (NREL). Some researchers see this as an opportunity to reclaim land for pollinating species by replacing the usual grass or gravel at these sites with wildflowers that need insects to pollinate them, and that produce the nectar those insects eat. “If we can create some habitat where there wasn’t habitat before, like on solar farms, we can likely have a positive impact,” says Scott McArt, an entomologist at Cornell University.

A monarch Butterfly feeds on flowers being grown for seed at Minnesota Native Landscapes in Foley, Minn. Credit: Dennis Schroeder National Renewable Energy Lab *Flickr* (CC BY-NC-ND 2.0)

MORE PLANTS = MORE POLLINATORS?

Minnesota-based Great River Energy (pdf) has also introduced pollinator-supporting plants—such as purple prairie clover and wild lupine—at several of its solar sites, as has SoCore Energy at some of its outfits in Wisconsin. In 2018 the NREL identified 1,350 square miles of land near existing and planned utility-scale solar energy facilities around the country that could be similarly converted. Although no national statistics are available, in Minnesota alone it is estimated that half of the 4,000 acres of commercial solar projects installed in 2016 and 2017 included pollinator habitat.

Designing such habitat is not a matter of simply scattering some wildflower seeds, though. The right mix of a broad range of native plants is needed to attract and support the hundreds of pollinator species, from bees to birds, that can be found in some areas. A number of them have adapted to specific plants—such as monarch butterflies that feed on milkweed—or are extremely imperiled, as is the case with native bumblebees, says Sarah Foltz Jordan, a senior pollinator conservation specialist for the nonprofit

environmental organization Xerces Society for Invertebrate Conservation. “A common issue with pollinator habitat is that the seed mixes aren’t very diverse,” she says. “So they may look pretty, but when you don’t have a highly diverse plant community, you don’t support a highly diverse pollinator community.”

There is some limited evidence (pdf) solar farms with mixed plant life can support a wider array of bee and butterfly communities than those with grass or gravel beds can, but researchers are still investigating just how much this can affect the insects’ long-term survival. “We don’t have the data to say whether meaningful changes occur at a broad scale just due to solar sites,” McArt says. “We don’t know if this is going to have a substantial impact.” But he hopes to change that. In July, through a partnership between Cornell and North Carolina–based solar developer Cypress Creek Renewables, McArt launched a three-year study to determine whether—and how much—establishing habitat on solar sites benefits pollinator populations.

The team will compare the abundance and diversity of wild bee species at a solar site planted with native wildflowers with an installation that has turfgrass growing beneath its panels. Then the researchers will test which seed mixes are most effective at attracting wild bees over longer periods. “Maybe it’s not the seed mix that looks fantastic and attracts a lot of bees in the first year,” he notes. “Maybe the better seed mix is the one that takes longer to establish but is much more resilient over time.”

Minnesota bee keeper, Jim Degiovanni, inspects "BareHoney" hives outside IMS Solar, a pollinator-friendly photovoltaic array site in St. Joseph, Minn. Credit: Dennis Schroeder National Renewable Energy Lab *Flickr* (CC BY-NC-ND 2.0)

BOOST TO FARMS AND BUSINESS

When solar developers consider planting pollinator habitat, they also look at the bottom line, notes Lee Walston, an ecologist at Argonne National Laboratory outside Chicago. Despite a higher upfront cost to purchase and plant seed mixes, Walston contends this can actually offer long-term savings. For example, a field of wildflowers requires less mowing and pesticides than conventional grass does. And gravel absorbs heat whereas plants can help keep panels cool, improving energy efficiency.

Moreover, Walston believes planting wildflowers can help garner support in rural communities that might be resistant to leasing productive farmland to solar developers. New research has found raising pollinator numbers can bring higher yields of crops such as fruits and nuts, offering an obvious boon to farmers.

But one problem with siting insect-friendly solar installations next to pesticide-using farms is the chemicals can drift onto the wildflowers. Pesticides have been shown to impair various pollinating insects' foraging ability, decrease their immune responses, interfere with their absorption of nutrients and shorten their life spans. Mandatory buffer zones could help protect habitat from pesticide drift, Foltz Jordan says. Ultimately, she adds, converting some farmland to solar sites could also reduce overall pesticide use.

Still, experts warn such projects are hardly a panacea. "Establishing pollinator habitat on solar facilities is not the answer to pollinator decline," says Argonne ecologist Ihor Hlohowskyj—but he believes it is still one valuable way to prop up imperiled species. "With the large surface areas that solar facilities occupy," he says, "they offer a pretty unique opportunity to plant and establish pollinator habitat that could help conserve pollinator diversity."

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