

What bees can teach us about the real value of protecting nature

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Earning its wages. | (Shutterstock)

If you ask bee experts why we should worry about all those honeybees and wild bees **that are famously dying off**, they'll often give a simple answer: because bees pollinate so many of our crops.

Without bees flitting from flower to flower, spreading pollen as they go, we wouldn't have bountiful harvests of apples, berries, melons, almonds, and cherries each year. Bees are worth **literally billions of dollars**. If they vanished, our grocery aisles would suffer greatly.

It's a compelling reason to care. Except, as it turns out, that's also not the *whole* story. In

a fascinating 2015 **paper** published in *Nature Communications*, a team of scientists discovered that only a small fraction of bee species do most of the pollinating that's so crucial to our food supply.

That doesn't mean all those other endangered bee species aren't valuable — they are. There's more to the value of bees than dollars and cents. We just have to think a little harder about a question that has occupied conservationists for decades: What makes a species worth saving?

Only a small fraction of wild bees actually pollinate our crops



Not all bees. (Shutterstock)

Broadly speaking, farmers around the world rely on two types of bees to pollinate their agricultural crops. First, there are **domesticated honeybees**, managed by beekeepers and often transported from field to field to provide pollination services. In the United States, honeybees have gotten a lot of attention because they've been **dying off at elevated rates** — likely due to a mix of parasites, pesticides, and poor diets — and

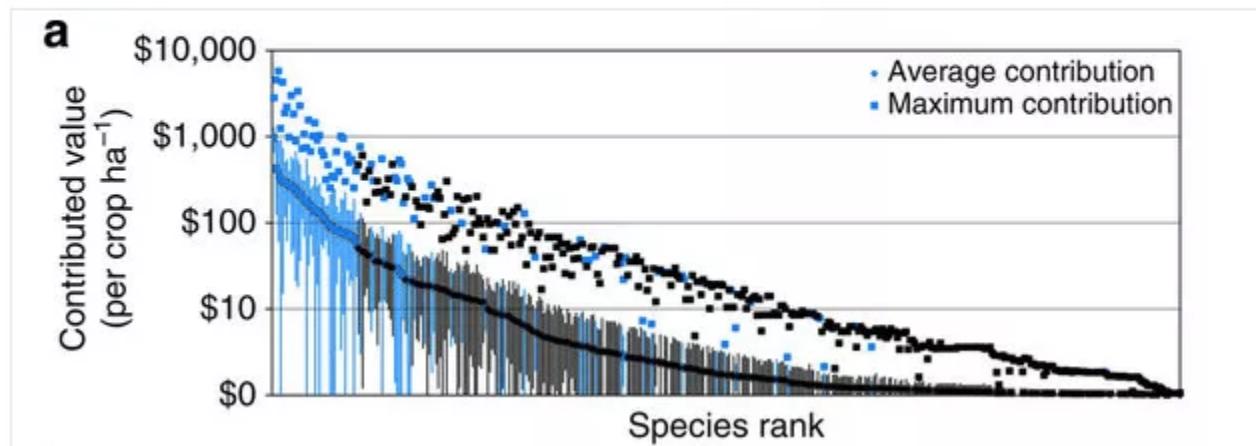
beekeepers have had to work furiously to rebuild hives each year.

Second, there are thousands of species of *wild* bees out there, such as bumblebees, that also pollinate flowers and crops all over the world. These bee species aren't as well studied, but they appear to be just as crucial for pollination. Unfortunately, they're also dying off, because of shrinking habitats and other stresses.

This *Nature Communications* **study** is about wild bees. A team of researchers, led by David Kleijn of the Center for Ecosystem Studies in the Netherlands, looked at 90 studies on wild bees spanning five continents and 1,400 agricultural fields. Intriguingly, they found that these wild bees are just as valuable for crop pollination as managed honeybees are — contributing \$3,215 per hectare to the production of crops, on average.

But here's the catch: The researchers *also* found that only a small number of wild bee species were doing most of the work here. Just 12.6 percent of the thousands of wild bee species out there were even visiting farms and crop fields to begin with. (The rest stayed in the wild, foraging among native plants.) What's more, just 2 percent of wild bee species accounted for 80 percent of crop visits.

Figure 1: The relative contribution of individual species in wild bee communities to crop pollination.



Kleijn et al, 2015

In other words, wild bees are valuable for our crops. But it's only a handful of species that account for most of that economic value.

Why bees are worth saving — even when their economic value is

unclear

So how should we think about this study? One possibility is that if we're worried about our food supply, we only *really* need to worry about protecting a handful of wild bee species — that 12.6 percent or so that are doing all the work. Maybe we should focus on saving those species, and not worry too much about the rest.

Well, no. The authors of the paper argue that this view would be incredibly shortsighted.

It's true that only a small number of wild bee species appeared to be crucial for pollinating the 40 crops under study. But this study is only looking at present-day conditions. In the future, having a more diverse array of bee species could help provide insurance for crop pollination. If some key bee species decline — say, because their ranges shrink due to climate change — then others could step in and take their place. Greater bee biodiversity can make the whole system more resilient.

What's more, even those wild bees that aren't pollinating crops at all may still be providing valuable services in the wild — we just haven't studied those services yet, or slapped a dollar value on it.

"If you lost all those pollinators that aren't pollinating crops, we'd start losing a lot of native plants across Europe and North America," says Rachel Winfree, an ecologist at Rutgers University and a co-author of the *Nature Communications* study. "If you start losing a lot of plant species, ecosystems can start collapsing. That can have all sorts of very negative effects, even if we can't estimate it exactly. We're only at the beginning of this quantification process."

Therein lies one lesson of this wild bee study. We can put a dollar value on some of the "ecosystem services" wild bees provide, like pollination. That might help motivate people to take action to save bee habitats. But it can't be the whole story. If you only focused on the dollar value of pollination, you'd assume that most wild bees out there just aren't that valuable — a dangerous assumption.

"We don't want to define ecosystem services too narrowly," says Winfree.

A big debate in conservation: Why is nature worth protecting?





Valuable in itself — or valuable to us? (Shutterstock)

This brings us to a very basic question that ecologists and conservationists have been pondering for more than a century: Why should we protect nature?

Some conservationists have long held that we should protect nature because it's valuable in and of itself. In an influential 1985 essay titled "**What is Conservation Biology?**" biologist Michael Soulé argued that biodiversity "has intrinsic value, irrespective of its instrumental ... value." That is, we should safeguard endangered ecosystems because it's the ethical thing to do.

More recently, some ecologists have criticized this approach. See, for instance, this 2012 **essay** by Peter Kareiva and Michelle Marvier, which argues that ethical arguments alone haven't been able to stem the rising tide of deforestation and extinctions. If conservationists want to make better progress, they need to appeal more forcefully to humanity's self-interest. In other words, we should focus more on conserving nature because it's useful to *us*.

One possibility is by focusing on the "ecosystem services" that nature provides — the fact that bees pollinate our crops, or wetlands help stem floods, or coral reefs help

sustain fisheries. By putting a dollar value on these services, we can make a more powerful case for conservation.

So how do bees fit into this debate? On the one hand, there's no question that those economic arguments for conservation are powerful. President Obama has taken a personal interest in the plight of the honeybee — and in **his plan to help pollinators**, he highlighted the fact that they provide billions of dollars' worth of crop services. No doubt that was a major motivation.

Yet as this wild bee study shows, economic arguments alone can only go so far. The authors concluded that for species that *don't* have obvious economic value, ecologists and conservationists will have to rely on moral appeals — in much the same way we use moral arguments to justify taking care of the elderly or preserving artwork. We're back at the idea that nature is intrinsically valuable in some way.

"Some people got excited that the 'ecosystem services' argument would come to the rescue and finally give us a workable, airtight argument for conserving nature," says Taylor Ricketts, director of the Gund Institute for Ecological Economics at the University of Vermont (and a co-author of the *Nature Communications* study).

"But I've always thought of it as just one of the many motivations and justifications for conserving nature," Ricketts says. "Some people respond to moral arguments, some to utilitarian ones. These seem to be complementary arguments. We don't have to pick just one."

Further reading:

- Here's [a closer look](#) at what's killing both honeybees and wild bees.
- For much more depth on the recent debates within conservation biology over (among other things) the value of nature, see this essay on "**The Battle for the Soul of Conservation Science**" by Keith Kloor. Or [see this shorter piece](#) in the New Yorker by Michelle Nijhuis.