

# Want to Save the Bees?

## Focus on Habitat, Not Honey Bees

*Rich Hatfield and Matthew Shepherd*

A steady stream of stories about declining bee populations has appeared in newspapers, on TV screens, and in our social-media feeds over the last couple of decades. In response, there has been an amazing groundswell of support for bees, motivating people everywhere to act—creating pollinator gardens, planting habitat in parks and on farms, reducing pesticide use or campaigning for citywide bans, holding plant sales to raise funds and increase engagement. It is clear that people care, and many have rallied around this issue.

For some, a tangible goal has been to get a honey bee hive. As a result, hives have appeared in gardens and backyards, on rooftops, and in parks and nature reserves. On the surface, this makes sense—if bees are declining, it would seem that more bees in more places will help. Yet, when we look deeper, efforts to increase the number of honey bees on the landscape may be doing more harm than good. If we want to make the most difference to help declining pollinators, where should we focus our efforts?

The honey bee that is widely found



Getting a couple of backyard hives might seem like a good response to pollinator declines, but honey bees can be direct competitors to native bees. Photograph by Maja Dumat / Flickr.



**Honey bees are excellent pollinators of some crops, but not all. Native species such as this mining bee are more efficient pollinators of blueberries. Photograph by Nancy Lee Adamson.**

in North America is the western or European honey bee, *Apis mellifera*. It is native to Europe, Africa, and parts of Asia, and thanks to the value of such hive products as honey and wax, has been transported to many other parts of the world, including North America. The first recorded arrivals to this continent were brought by European colonists to Jamestown (in what is now Virginia) in the 1620s; by the 1850s, honey bees had reached the West Coast. For the first three hundred years on this continent, hives were kept mostly for the honey and wax they produce. It wasn't until the early twentieth century that honey bees were widely adopted for agricultural pollination; they became increasingly important in later decades, with the advent of larger monocultures and the use of broad-spectrum insecticides.

And there is no question that honey bees are excellent pollinators of many crops. While native bees contribute significantly to crop pollination—indeed, they may be more effective pol-

linators of some crops (such as squash and blueberries) or even make honey bees become better pollinators (in sunflower fields, the presence of native species causes honey bees to move between rows more frequently)—honey bees are vital for crops such as almonds. To fulfill the demand for crop pollination, millions of hives are managed in and trucked all over North America, with scores of millions elsewhere in the world. Although we have seen colony losses, especially over the last fifteen years, and despite the fact that some bee keepers are struggling to maintain hives, honey bees are *not* at risk of extinction: it is estimated that there are more honey bees on the planet now than at any time in human history.

In contrast, there are more than thirty-six hundred bee species native to North America, some of which are facing a real risk of extinction. According to the International Union for Conservation of Nature's Red List of Threatened Species, 28 percent of bumble bee



**Honey bees mix pollen and nectar into a moist paste that they carry on their rear legs back to the hive. Photograph by Bryan E. Reynolds.**

species in North America are considered threatened. Further, the United Nations Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services found that more than 40 percent of invertebrate pollinator species (particularly bees and butterflies) may face extinction in the coming decades. To date, two species of bee in the continental United States and seven in Hawai'i are listed as endangered by the U. S. Fish and Wildlife Service, and several additional species await further analysis for possible protection under the Endangered Species Act.

Our native bees come in all shapes, sizes, and colors, and can be found in almost all terrestrial environments. Native bees coevolved with our native plants and often have behavioral adaptations that make them better pollinators than honey bees. For example, buzz-pollination, in which a bee grasps a flower and shakes the pollen loose, is a behavior at which bumble bees and other large-bodied native bees excel, and one that honey bees lack. So flow-

ers that require buzz-pollination, such as shooting stars, flax lilies, and manzanita, are not served by visits by honey bees. Agricultural plants such as tomatoes, bell peppers, and blueberries also benefit from buzz-pollination, and therefore rely mostly on visits by native bees to maximize fruit production.

The way that honey bees interact with flowers means that they sometimes contribute little or nothing to pollination. One reason for this is that honey bees groom their pollen and carry it in neat pollen cakes, moistened with nectar and safely tucked into the baskets on their hind legs. By contrast, many of our native bees tend to be messier, carrying pollen as dry grains, often all over their bodies. This messiness means that the pollen they carry is more likely to contact the stigma of another flower and pollinate the plant. So, while both honey bees and native bees are good at extracting pollen, in a bee-to-bee comparison our native bees tend to be more efficient at spreading that pollen around. In addition, honey bees

are known “nectar robbers” of many plants, accessing their nectar in a way that means they don’t touch the pollen, often by biting a hole in the base of the flower. An example is provided in a recently published study from researchers at the University of California, Davis, who found that when honey bees foraged on camas lilies their visits seldom resulted in pollination. The effect was compounded by the fact that the honey bees removed both nectar and pollen, which meant that there was less of them available to attract bumble bees and other native bees that are good pollinators of camas lilies.

It is, of course, true that honey bees are well-suited for large agricultural systems. Their colony sizes and ability to communicate allows them to find crop fields efficiently and to take advantage of a hyperabundant floral resource during a brief period of bloom, and in those systems their sheer numbers make up for their relative inefficiency per visit.

But, when it comes to our wild and natural areas, there is no one-size-fits-all solution to pollination; a diversity of native plants requires a diversity of native bees, and vice versa. Certainly, bringing in large numbers of non-native bees is no answer to the conservation needs of these lands.

As more research is done on pollination networks, we’re learning that honey bees can negatively impact our natural areas. Introducing a single honey bee hive means fifteen thousand to fifty thousand additional mouths to feed in an area that may already lack sufficient flowering resources. This increases competition with our native bees and raises the energy costs of foraging, which can be significant. Illustrating the scale of this situation, Jim Cane and Vince Tepedino of the USDA’s Pollinating Insect-Biology, Management, Systematics Research unit in Logan, Utah, calculated that over a period of three months, a single hive collects as



The majority of native bees carry pollen as dry grains packed between stiff hairs for transport. Some pollen is lost as they visit further flowers. Photograph by Bryan E. Reynolds.

much pollen as could support the development of a hundred thousand native solitary bees. Moreover, evidence shows that honey bees can spread diseases to our native bees—deformed wing virus, for example, can be passed from honey bees to bumble bees—and can also amplify and distribute diseases within a bee community. Both competition and disease transfer are very real threats with the potential for lasting impacts on native bee species.

Concerningly, there are many existing and proposed efforts to pasture honey bees on public lands, particularly in the western United States. Native bees are better pollinators of native plant communities, meaning that the ecosystems on these public lands would not benefit from the pollination services provided by honey bees. Moreover, honey bees would compete with native bees and alter pollination networks. All of this suggests that these projects have

the potential to become a tragedy of the commons, in which the ecological integrity of our natural areas are compromised in ways that benefit only honey bees. This could profoundly impact a large number of pollinating insects that need these lands to survive, places that for many species serve as their last refuge from existing threats. As many of our public lands are already degraded from a long history of overgrazing and fire suppression, we should focus our efforts on habitat restoration, not on practices that benefit honey bees at the cost of ecological integrity.

There is also an ever-expanding body of evidence demonstrating the negative impacts in towns and cities from the presence of honey bees. A recent study from Montreal, for example, showed that the number of species of native bees found in an area decreased when the number of honey bees went up. Even in Europe, where honey bees



**A single honey bee hive can include tens of thousands of individuals, which are often in direct competition with wild bees for nectar and pollen. Photograph by Susy Morris / Flickr.**



**Adding honey bee hives will not help bumble bees or the thousands of other species of bees native to North America. Photograph by Bryan E. Reynolds.**

are native, there is growing concern about the density of hives in urban areas. Researchers in Switzerland compared the known number of hives to the availability of forage plants in several cities, and concluded that there were more hives than the plants could sustain. In Britain, the London Beekeepers Association found that some parts of that city had four times as many hives as the city's gardens and parks could support. Noting that honey bees "are not in decline—not globally, nor in the United Kingdom," the Association encouraged Londoners to plant flowers and work to prevent further habitat loss. Also in Britain, the conservation organization Buglife recommends creating two hectares (five acres) of habitat for each hive, several times the size of an average residential lot in the United States.

The number of ways in which honey bees compete with or harm native bees is an excellent illustration of the complexity involved in conservation. Given the numerous other threats fac-

ing native bees—habitat loss, insecticide use, climate change, disease transmission, and more—how much should we worry about the impacts of honey bees? At the Xerces Society, we believe that our primary goal must be to reduce the threats that face all bees. It is absolutely true that honey bees don't always harm native bees: when resources are plentiful, honey bees are present at low densities, and hives are well tended, the risks are smaller. Yet, with a changing climate and a growing human population, such places are increasingly rare, and the evidence is clear that honey bees can impact native bees.

In short, beekeeping is not bee conservation. If you are thinking of getting a hive, we encourage you to consider carefully why you want to do so. Managed honey bees are domesticated livestock, and not only will their care and husbandry not help native species, their very presence has the potential to harm them. Fortunately, there are alternate actions you can take that will help both



The best solution to bee declines is to address the underlying causes, particularly habitat loss and pesticide use. Flower-rich gardens have the ability to support all bees. Photograph by the Xerces Society / Kelly Gill.

honey bees and the thousands of native pollinators that call North America home. The core components of bee conservation are providing food through flower-rich habitat, offering places where bees can nest and overwinter, and maintaining an environment free of pesticides and exposure to amplified or introduced pathogens. Creating pollinator habitat, or even just one component of it, has broad benefits from increasing biodiversity to combating climate change, and such habitat can be situated anywhere—in backyards, on balconies and porches, on rooftops, in office landscapes, in local parks and community gardens. Check out the “Bring Back the Pollinators” page on the Xerces website for more information.

Honey bees are fascinating to ob-

serve and manage, and can inspire people to learn more about insects. But a preferable approach to bee conservation is to focus on habitat. We all long to see our backyards and gardens full of buzzing bees: know that if you build good habitat, they will come!

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