Steep drop in 4 bumble bee species is a ‘wake-up’ call

By: Amanda Peterka, Greenwire
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For a handful of scientists in the country, a study published earlier this month detailing the drastic decline of four North American bumble bee species was confirmation of a trend they have been observing for years.

The three-year study, published in the Proceedings of the National Academy of Sciences, found that the populations of four common species of bumble bees have declined by up to 96 percent in North America. And not only have the populations gone down in number, but their geographic ranges have also become smaller.

Bumble bee scientists have observed declines among individual species for about a decade now, but this is among the first long-term studies on a national scope and among the first to gain strong media attention.

The study’s lead author, Sydney Cameron, said she hopes the results serve as a “wake-up call to be observant toward our wild bees and to pay attention to our wild bees.”

For the most part, long-term research and funding has focused on commercially raised honey bees and their decline, termed “colony collapse disorder” for lack of a clear understanding of its cause. The honey bee industry has the backing of lobbyists, almond boards and much U.S. Department of Agriculture funding due to its multibillion-dollar economy, Cameron said.

Meanwhile, there are perhaps fewer than 20 scientific researchers working with the approximately 50 North American wild bumble bee species, according to David Inouye, one of those researchers and a professor of biology at the University of Maryland.

Interest, however, is growing. Scientists credit Robbin Thorp, a professor emeritus of entomology at the University of California, Davis.

In 1998, USDA was investigating whether a species known as Franklin’s bumble bee should be listed as endangered, and Thorp began monitoring the species found only in Northern California and southern Oregon.

“I found it everywhere I looked,” Thorp said.

In a couple of years, though, the numbers began to drop off precipitously, as did the population of the Western bumble bee, one of the study’s declining species. Other species were doing well.

“It began to occur to me that this was a problem that was kind of unique to those two species, and they happened to be very closely related, and they’re very closely related to the one in Europe that is being used commercially for greenhouse pollination,” Thorp said.

Thorp’s hypothesis is that U.S. queen bees caught a bug from European bees when USDA shipped bees to Europe to rear them there in the early 1990s because the United States did not have commercial rearing facilities.

Researchers now advocate for bans on overseas and cross-country shipments of bumble bees and support local commercial bumble bee production. USDA’s Animal and Plant Health Protection Service has already prohibited the importation of foreign bumble bees, something that Inouye called “shutting the barn door after the horses are out.”

Only one Franklin’s bumble bee has been found in the past four years, according to Scott Hoffman Black, executive director of the Xerces Society, an invertebrate conservation organization. Xerces is petitioning the U.S Fish and Wildlife Service to list the species under the Endangered Species Act.

“Robbin Thorp has potentially watched and studied as Franklin’s bumble bee has gone extinct,” Black said. “Although we are hopeful there are some resilient populations we don’t know about out there, at this point, this bumble bee is on the verge of extinction.”

Thorp’s work spurred interest in the U.S. bumble bee community, and researchers began observing declines in other species. But, “for the vast majority of our bumble bees, we have no knowledge of what their populations are doing at all because nobody’s out there looking at them,” Thorp said.

Meanwhile, declines in England have been well-documented, where there is much more readily available information about the distribution, diversity and abundance of bumble bees, Inouye said. He attributes that information to a wealth of historical data.

“I think there’s a growing interest here in the United States in terms of that kind of natural history, but it’s a relatively recent change here whereas in England there’s just a long tradition of people being interested in that kind of thing,” Inouye said.

‘Potentially catastrophic’ losses seen

The report released this month studied eight different species and compared more than 73,000 museum records to nationwide surveys of living bumble bees. Some of the species were chosen because researchers had previously observed declines, and others were chosen because they showed signs of expansion. Franklin’s bumble bee was not included.

Some of the species found to be declining had very broad ranges. The species known as the American bumble bee is found in the eastern United States all the way to the Rocky Mountains. The study showed the bee absent from much of its historical northern and eastern territory.

The four species “were dominant where they were, they have wide ranges, some of them especially wide ranges,” said Cameron, an entomologist at the University of Illinois, Urbana-Champaign. “And they occurred in high abundance where they were found.”

Seventy percent of wild plants are pollinated by insects, mostly bees, Black said. He called the declines “potentially catastrophic.”

Bumble bees are especially important because they are robust animals and able to withstand cold temperatures, meaning they are the primary bees in tundra regions, Cameron said. Bumble bees also have long tongues, allowing them to pollinate long-tubed flowers.

They also pollinate plants important to humans — tomatoes, eggplants, peppers, blueberries and cranberries — through a behavior called “buzz pollination.” When a bumble bee buzzes at a specific frequency near the flowers of these plants, the plants’ pores open in response.

The study cites the spread of *Nosema bombi*, the disease bumble bees may have gotten from Europe, as one possible cause of the decline. Reduced genetic diversity may be responsible, but the study is clear that the causes for the decline are still uncertain.

A study published in *PLoS ONE* in December found that disease from honey bees can spread to bumble bees through pollen.

Inouye also points to climate change as a possible cause. He found evidence that bumble bees are moving up in altitude in the Rocky Mountains as lowlands become warmer. There, they come into contact and possibly into competition with species already found at those altitudes.

Cameron and Thorp recently received funding from USDA to test the hypothesis that the European disease pathogen could be causing the decline. They will study museum specimens to see if they can find *Nosema bombi*’s signature, Thorp said.

In general, researchers say much more study is needed. The bumble bee community, while galvanized, lacks the manpower and funding needed to observe all of North America’s species.

“We are heartened that our efforts and the efforts of other conservation organizations have highlighted the need for more funding for bumble bees and other native species, and we are seeing a move in that direction,” Black said. “I don’t think it’s enough yet, I think we can do more, and I think we do need additional funding. But at least we’ve started to take a serious look at these species.”