

## Project Bumble Bee

In the late 1990's, bee biologists started to notice a decline in the abundance and distribution of several wild bumble bee species. Five of these species ([western bumble bee](#), [rusty patched bumble bee](#), [yellowbanded bumble bee](#) and the American bumble bee) were once very common and important crop pollinators over their ranges. [Franklin's bumble bee](#) was historically found only in a small area in southern Oregon and northern California, and it may now be extinct.

Recent research indicates that additional species of bumble bees may be in decline. Wild bumble bees face many threats including habitat alteration, pesticide use, management practices, and pathogens. Recent reports are troubling, but there is much you can do to help!

To read more about recent declines [see the Threats section below](#).

## Recent efforts to track the western bumble bee

This project was funded by the [Oregon Zoo](#).



## What you can do!

### Create habitat!

Download our new publication: [Conserving Bumble Bees: Guidelines for Creating and Managing Habitat for America's Declining Pollinators](#).

The Xerces Society has collaborated with the [Lady Bird Johnson Wildflower Center](#) to create a list of plants that are attractive to bumble bees. [please consider using this valuable resource](#).

### Participate in our citizen science project:

We are very interested in tracking the status of these five bumble bee species and finding out where current populations are situated. If you have seen any of these bees please [send us a photo](#). See the sidebar to the right for more information (distribution, ID help, etc) on the species in which we are interested.

Below is a map of the citizen records of our species of interest and our nest survey sites. Citizen science has greatly helped us to understand the distribution and nesting habits of these important yet imperiled pollinators and will help us to target our conservation efforts.



[View Larger Map](#) (Click on the legend in the upper left to see the symbol categories)

In the **western U.S.**, please [contact us](#) and [send a photo](#) if you have observed the [western bumble bee](#) (*Bombus occidentalis*) or [Franklin's bumble bee](#) (*Bombus franklini*). In the **eastern U.S.**, please [contact us](#) and [send a photo](#) if you have observed the [rusty-patched bumble bee](#) (*Bombus affinis*), the [yellowbanded bumble bee](#) (*Bombus terricola*), or the [American bumble bee](#) (*Bombus pennsylvanicus*) so that we can piece together the current distribution of these bees. If you do research on bumble bees, have incidental bumble bees in your collection, or have student/insect collections from the past few years, it would help us to know if you have or have not seen these bees. It is as important for us to document where these bees were formerly common, but not recently collected, as it is to document where they were collected. Click on the name of each bee above to see the former ranges of each of these bees. See our [identification page](#) for more information about identifying bumble bees.

### Have you seen an active bumble bee nest?

We are collecting data on bumble bee nesting habits. Please visit [this site](#) for more information and to fill out our bumble bee nest survey.

#### Threats

There are a number of threats facing bumble bees, any of which may be leading to the decline of these species. The major threats to bumble bees include: spread of pests and diseases through commercial bumble bee rearing or other methods, habitat destruction or alteration, pesticides, invasive species, low genetic diversity and climate change.

Commercial bumble bee rearing may be the greatest threat to *B. affinis*, *B. occidentalis*, *B. terricola*, and *B. franklini* in North America, two bumble bee species have been commercially reared for pollination of greenhouse tomatoes and other crops. *B. occidentalis* and *B. impatiens* Between 1992 and 1994, queens of *B. occidentalis* and *B. impatiens* were shipped to European rearing facilities, where colonies were produced then shipped back to the U.S. for commercial pollination. Bumble bee expert Robbin Thorp has hypothesized that these bumble bee colonies acquired a disease (probably a virulent strain of the microsporidian *Nosema bombi*) from a European bee that was in the same rearing facility, the buff-tailed bumble bee (*Bombus terrestris*). The North American bumble bees would have had no prior resistance to this pathogen. Dr. Thorp hypothesizes that the disease then spread to wild populations of *B. occidentalis* and *B. franklini* in the West from exposure to infected populations of commercially reared *B. occidentalis*, and *B. affinis* and *B. terricola* in the East (from exposure to commercially reared *B. impatiens*). In the late 1990's, biologists began to notice that *B. affinis*, *B. occidentalis*, *B. terricola*, and *B. franklini* were severely declining.

Where these bees were once very common, they were nearly impossible to find. *B. impatiens* has not shown a dramatic decline. Robbin Thorp hypothesizes that *B. impatiens* may serve as a carrier of an exotic strain of *Nosema bombi*, although it may not be as severely affected by the disease as *B. affinis*, *B. occidentalis*, *B. terricola*, and *B. franklini*. *B. affinis*, *B. occidentalis*, *B. terricola*, and *B. franklini* are closely related to each other (they all belong to the subgenus *Bombus sensu stricto*).

This hypothesis was supported by a recent study led by Sydney Cameron, Ph.D., published in the Proceedings of the National Academy of Sciences. They found that the western bumble bee and the American bumble bee had significantly higher infection rates from a fungal parasite than more stable species. They also found that these two species had lower genetic diversity than species that were not in decline. Research is currently underway in Dr. Cameron's lab to determine whether or not this fungal parasite was introduced from Europe via the commercial bumble bee trade. You can read more about their study and its implications [here](#). The Xerces Society is currently working to urge the USDA Animal and Plant Health Inspection Service to regulate the commercial bumble bee trade. You can read a [status review](#) that includes more details on this issue and the decline of three bumble bees that was written by Dr. Robbin Thorp and The Xerces Society.

#### Biology

All bumble bees belong to the genus *Bombus* within the family Apidae. The family Apidae includes the well-known honey bees and bumble bees, as well as carpenter bees, cuckoo bees, digger bees, stingless bees, and orchid bees. *B. affinis*, *B. terricola*, *B. occidentalis*, and *B. franklini* all belong to the same sub-genus of *Bombus*, *Bombus sensu stricto*.

Bumble bees are important pollinators of wild flowering plants and crops. As generalist foragers, they do not depend on any one flower type. However, some plants do rely on bumble bees to achieve pollination. Loss of bumble bees can have far ranging ecological impacts due to their role as pollinators. In Britain and the Netherlands, where multiple bumble bee and other bee species have gone extinct, there is evidence of decline in the abundances of insect pollinated plants. Bumble bees are also excellent pollinators of many crops. Bumble bees are able to fly in cooler temperatures and lower light levels than many other bees, and they perform a behavior called "buzz pollination," in which the bee grabs the pollen producing structure of the flower in her jaws and vibrates her wing musculature causing vibrations that dislodge pollen that would have otherwise remained trapped in the flower's anthers. Some plants, including tomatoes, peppers, and cranberries, require buzz pollination. [Read more](#).

#### Xerces Society bumble bee conservation efforts

On February 10, 2010, a broad coalition of [scientists submitted a letter](#) to the USDA's Animal and Plant Health Inspection Service (APHIS) requesting that they create new regulations to protect wild bumble bees from threats posed by commercial bumble bees. The letter was signed by over 60 scientists with research on bumble bees and other bees, including: Charles D. Michener, Ph.D., author of *The Bees of the World*; Bernd Heinrich, Ph.D., author of *Bumblebee Economics*; David Goulson, Ph.D., author of *Bumblebees: Their Behaviour, Ecology and Conservation*; James Thomson, Ph.D., co-author of *The Natural History of Bumble Bees*; and May Berenbaum, Ph.D., Chair of the National Research Council Committee on the Status of Pollinators in North America. Letters of support were also submitted by [native plant societies](#), [sustainable agriculture organizations](#) and [conservation organizations](#).

On January 12, 2010, The Xerces Society, Defenders of Wildlife, Natural Resources Defense Council and Dr. Robbin Thorp submitted a petition to the USDA's Animal and Plant Health Inspection Service (APHIS) requesting that they create new regulations to protect wild bumble bees from disease. In order to prevent the spread of disease to wild populations of agriculturally significant bee pollinators, petitioners asked APHIS to use its authority to regulate the movement and health of commercial bumble bees. Specifically, petitioners requested that APHIS create rules prohibiting the movement of bumble bees outside of their native ranges and regulate interstate movement of bumble bee pollinators within their native ranges by requiring permits that show that bumble bees are certified as disease-free prior to movement. [Read more](#) about this action. [Read the petition](#).

For a brief summary of this issue, read our [fact sheet](#).

#### Contributors to the bumble bee project

A number of scientists and citizen monitors have contributed their unpublished records or other information regarding bumble bees for our efforts: we greatly appreciate their collaboration:

Bernd Heinrich, Professor Emeritus, University of Vermont  
Chiho Kimoto and Sandy DeBano, Oregon State University, Hermiston Field Station  
Chris Maier, Connecticut Agricultural Experiment Station  
Christina North, University of Illinois  
David W. Inouye, University of Maryland  
Dale Reimer, retired  
Doug Golick, University of Nebraska  
Elaine Evans  
Elizabeth Elle, Simon Fraser University  
Howard Ginsburg, USGS Patuxent Wildlife Research Center  
[James Strange](#), USDA-ARS Logan-Bee Lab  
Jennifer Gixti and Colin Favret, University of Illinois  
Jodi DeLong, freelance writer  
John Neff, Central Texas Melittological Institute  
Kevin Alexander, Western State College of Colorado  
Larry Stevens, Museum of Northern Arizona  
Lee Solter, Illinois Natural History Survey  
Liz Day  
Matthew Bowser, Kenai National Wildlife Refuge  
Michael Otterstatter, University of Toronto  
Mike Quinn  
Pete Schroeder, Southern Oregon University  
Ralph Cartar, University of Calgary  
Rebecca Irwin, Dartmouth College  
Robbin Thorp, Professor Emeritus, U.C. Davis  
Robert Jacobson  
Robert Jean and Peter Scott, Indiana State University  
[Sholia-Collia](#), graduate student of [Laurence Packer](#), York University  
Sam Droege, USGS Patuxent Wildlife Research Center  
Steve Hendrix and Chris Gienapp, University of Iowa  
[Sydney Cameron](#), University of Illinois  
Sue Sheehan, Fermilab, Batavia, IL  
T'ai Roulston, Research Associate Professor, University of Virginia  
Leif Richardson, Dartmouth College

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#### bumble bee species western species of concern

[Franklin's bumble bee](#)

[western bumble bee](#)

#### eastern species of concern

[rusty-patched bumble bee](#)

[yellowbanded bumble bee](#)

#### pocket identification guides

##### pocket ID guides for eastern species

[rusty-patched bumble bee](#)

[yellowbanded bumble bee](#)

##### pocket ID guides for western species

[western bumble bee](#)

[folding instructions](#)

#### wanted posters

[rusty-patched bumble bee \(eastern U.S.\)](#)

[yellowbanded bumble bee \(eastern U.S.\)](#)

[western bumble bee \(western U.S.\)](#)

#### additional resources

[identifying bumblebees](#)

[status review](#)

[bumble bees in decline fact sheet](#)

[Oregon Field Guide film](#)

[guide: how to raise local bumble bees](#)

#### comprehensive identification guides

[eastern bumble bees](#)

[western bumble bees](#)

these guides were produced by the USDA Forest Service along with The Pollinator Partnership

photo: the yellowbanded bumble bee, *Bombus terricola*, by Leif Richardson