



## Questions and Answers

### Proposed Listing of Rusty Patched Bumble Bee as Endangered

#### 1. What action is the U.S. Fish and Wildlife Service taking?

The U.S. Fish and Wildlife Service announced a proposal to list the rusty patched bumble bee (*Bombus affinis*) as an endangered species under the Endangered Species Act. This proposal opens a 60-day public comment period to allow agencies, groups and interested people to comment and provide us with new information. The public comment period is open through November 21, 2016.

#### 2. What is the rusty patched bumble bee and where is it found?

The rusty patched bumble bee is one of 46 bumble bee species found in North America. Before the mid- to late-1990s, it was considered abundant across a broad geographic range that included the following 28 states, District of Columbia and two Canadian provinces: Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Ontario, Pennsylvania, Quebec, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin. Since 2000, this bumble bee has been reported in only 12 states and 1 province: Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin – and Ontario, Canada.

The rusty patched bumble bee is a colonial insect with an annual cycle that starts in early spring when solitary queens become active after winter dormancy. These solitary queens begin new colonies by producing female workers that collect pollen and nectar throughout the summer as the queen continues laying eggs. The annual cycle ends with the production of males and new queens in late summer and early fall. The males mate with the new queens and then die, while the new queens go into diapause (a form of hibernation) over winter. The old queen and workers also die and the cycle begins again in early spring with the solitary new foundress queen.

Survival of a colony requires a continuous supply of flowering plants from early spring through fall, undisturbed nest sites near those flowering plants, and overwintering sites for the next year's queens. Healthy populations of the rusty patched bumble bee may include tens to hundreds of colonies. The health of bumble bee populations depends on the quantity and quality of available nectar and pollen and the proximity of flowering plants to nest sites.

The rusty patched bumble bee has been observed and collected in a variety of habitats that include prairies, woodlands, marshes, agricultural landscapes and residential parks and gardens.

### **3. Why is the Service proposing to list the rusty patched bumble bee as endangered?**

Historically, this bumble bee was abundant and wide-spread, with hundreds of populations across an expansive range. Since the late 1990s, rusty patched bumble bee abundance and distribution has declined by about 91 percent. The percent decline may actually be higher because many of the populations that we considered current for our assessment have not been reconfirmed since the early 2000s and may no longer persist.

As numbers decline, the bumble bee's reproductive strategy makes it particularly vulnerable to the effects of small population size. If related queens and males mate, fewer females and more sterile males are produced. If the population is declining, the percent of successfully mated new queens goes down, fewer new colonies are started in the spring, the opportunity for related animals to mate increases, and a downward spiral ensues. Given this, some of the populations that we considered current most likely no longer persist and some are likely quasi-extinct. Quasi-extinct means that, although individuals are still present, a population's numbers are so low that they cannot recover; it is only a matter of time before extinction occurs.

Along with the loss of populations, the geographic distribution markedly decreased in the last 20 years. Before the 1990s, the rusty patched bumble bee was broadly distributed across the eastern U.S., upper Midwest, and southern Quebec and Ontario, across 28 states and the District of Columbia, inclusive of 378 counties and two provinces. That distribution has been reduced to 8 percent of its historical extent. Since 2000, the rusty patched bumble bee has been found in only 12 states, one province and 41 counties.

### **4. What is causing the loss of rusty patched bumble bees?**

Multiple threats have likely contributed to the rusty patched bumble bee's dramatic decline, including: disease, pesticides, the effects of climate change, habitat loss, and the effects of small population dynamics. It appears that no one single factor is likely responsible, but these threats working together have likely caused the decline.

#### *Disease*

The precipitous decline of several bumble bee species (including the rusty patched) from the mid-1990s to present occurred at the same time that commercially-bred western bumble bees (*B. occidentalis*) experienced severe declines. Beekeepers started commercially raising bumble bees to pollinate greenhouse tomato and sweet pepper crops in the late 1980s. Around the same time, several North American wild bumble bee species also declined rapidly. Some researchers attributed the declines to the spread or "spillover" of the parasitic fungus *Nosema bombi* from the commercial colonies to wild populations. However, spillover does not completely explain the patterns of losses. Evidence for chronic spillover of disease-causing organisms (*i.e.*, bacteria, fungi or viruses) from commercial bumble bees as a main cause of wild bumble bee declines

remains debatable.

### *Pesticides*

Pesticides are widely used in agricultural, urban and even natural settings, which exposes native bumble bees and other pollinators to multiple insecticides, fungicides, herbicides and the chemicals added to pesticides to improve application or other properties. Insecticides and herbicides have the most potential to harm bumble bees: insecticides are specifically designed to directly kill insects and can kill non-target species such as bumble bees. Herbicides, by killing plants, can reduce or eliminate available flowers that bumble bees need for pollen and nectar.

Certain pesticides have been documented to both kill and harm bumble bees. For example, neonicotinoids are a class of insecticides used to target pests of agricultural crops, forests, turf, gardens and pets. Neonicotinoids have been strongly implicated as the cause of the decline of bees, in general, and for rusty patched bumble bees, specifically. The introduction of neonicotinoid use and the precipitous decline of the species occurred during the same time. The use of neonicotinoids rapidly increased when suppliers began selling pre-treated seeds. Neonicotinoids are effective because the chemicals persist from the pre-treated seeds through the plant and its nectar and pollen. Thus, pollinators foraging on treated plants are exposed to the chemicals directly. This type of insecticide use marked a shift toward large-scale, preemptive insecticide use in contrast to using insecticides only when and where needed.

Most studies examining the effect of pesticides on bees have been conducted using the European honey bee (*Apis mellifera*). Bumble bees, however, may be more vulnerable to pesticides than honey bees. First, bumble bees are more susceptible to pesticides applied early in the year because, for one month, the entire bumble bee population depends on the success of the solitary queens that emerge from winter diapause. The loss of one queen means the loss of an entire colony. In contrast, honey bees have many workers supplying a single colony, even in early spring. Second, most bumble bee colonies are smaller than honey bee colonies, so a single bumble bee is more important to the survival of the colony than a single honey bee. Lastly, bumble bees nest underground, so they are not only exposed to pesticides in pollen and nectar, but also exposed to pesticide residues in the soil. In addition, best practices to spray pesticides and herbicides in the early morning or late in the day when honey bees are less active may inadvertently expose bumble bees because they are better adapted to foraging in cooler temperatures and lower light conditions.

### *Effects of Climate Change*

Global climate change is one of the most significant risks to biodiversity worldwide. However, specific impacts of climate change on pollinators are not well understood. The changes in climate likely to have the greatest effects on bumble bees include: increased drought, increased flooding, increased storm events, early snow melt, late frost, and increased variability in

temperatures and precipitation. These changes may lead to decreased resource availability (due to mismatches in timing, such as lack of available flowers early in the flight period), decreased availability of nesting habitat (due to changes in rodent populations or increased flooding or storms), increased stress from over-heating (due to higher temperatures), and increased pressures from pathogens and non-native plants and animals.

#### *Habitat Loss and Degradation*

Habitat loss is unlikely to have been a main driver of the recent (since the mid- to late 1990s), widespread North American bee declines. But, intensive farming has reduced and degraded habitat for the rusty patched bumble bee and is likely a factor working in concert with other threats to exacerbate declines. Large areas dominated by a single crop cover do not provide the diversity of flowering plants that bumble bees need from April through October. Traditionally, field borders and “weeds” growing within crop fields provided that diversity. But widespread use of herbicide-resistant genetically modified crops and resulting broad-spectrum herbicide application has almost eliminated weeds from crop fields and reduced flowering plants from field borders. At the same time, intensive farming practices have led to converting fencerows, field borders and roadsides to crops. The result is little habitat for bumble bees across most agricultural lands.

#### *Small Population Dynamics*

Various types of surveys were used to document rusty patched bumble bee populations. Most populations we consider current were documented by only a single or few individuals found during those surveys; only two populations were documented by more than 10 individuals. This indicates that most remaining populations exist at very low numbers. The bumble bee’s reproductive strategy makes it particularly vulnerable to the effects of small population size. As population numbers decrease, there is an increased chance of related individuals mating, which results in an increase in the proportion of the population made up of sterile males. In this way, successful reproduction is further reduced and an extinction spiral occurs as proportionally fewer and fewer females and fertile males are produced.

### **5. We have heard a lot about the decline of honey bees, monarch butterflies and other pollinators. Are the reasons for honey bee and monarch declines the same for the rusty patched bumble bee?**

There are a number of factors affecting all three of these insects; some affect all three, although they may affect each species differently.

According to the U.S. Department of Agriculture

([www.ars.usda.gov/News/docs.htm?docid=15572](http://www.ars.usda.gov/News/docs.htm?docid=15572)): “Major factors threatening honey bee health can be divided into four general areas: parasites and pests, pathogens, poor nutrition, and sublethal exposure to pesticides. In reality though, these factors tend to overlap and interact

with one another, which complicates issues. In addition, there are other issues that have impacts on honey bee health, such as the narrow genetic base of honey bees in the United States.”

The Monarch Joint Venture website has the following statement . . . “Monarchs face many risks that are resulting in declining populations in both the eastern and western parts of their North American range. The largest impacts come from the loss of habitat for breeding, migrating, and overwintering. In addition, pesticides that are used to control insects and weeds have harmful unintended consequences for monarchs, a changing climate may be making some habitat less suitable and forcing changes in migratory patterns, and monarchs face many risks from natural enemies, such as predators, parasitoids, and diseases.”

It is clear that there is overlap in the factors causing declines of honey bees, monarchs and rusty-patched bumble bees. Primary threats affecting both honey bees and rusty patched are pathogens and pesticides. Threats affecting monarchs and rusty-patched are pesticides, habitat loss and climate change. While the impacts to each are different, the primary threats are very similar.

## **6. Will actions taken to help honey bees and monarch butterflies help rusty patched bumble bees?**

In general, actions to protect and conserve pollinators are actions most likely to benefit the rusty patched bumble bee and other bumble bees.

Some of the research examining causes of honey bee declines also help explain impacts to rusty patched bumble bees, particularly the research on the effects of pesticides. However, honey bees are not native bees and much of the research is targeted at ensuring their continued survival for commercial purposes. Therefore, not all of this research is applicable to or beneficial for native bees. Additional research is needed to examine the effects of stressors on bumble bees. Additionally, loss of native habitats and climate change are not factors causing honey bee declines.

Habitat restoration and conservation for monarchs in the U.S. and Canada also provide habitat for bumble bees, including rusty patched. However, the life history, biological and ecological needs of both species are quite different. Habitat maintained specifically for monarchs could fall short of providing for the needs of bumble bees. For example, rusty patched bumble bees need flowers as food resources consistently from April through October, whereas, the monarch is migratory and needs flowering plants during only a portion of the growing season. But, with a few adjustments, good monarch habitat can provide habitat needs for the rusty patched bumble bee and many other pollinators. Many guides for pollinator gardens are available online; check out the Xerces Society “Pollinator-Friendly Plant Lists” at [www.xerces.org/pollinator-conservation/plant-lists/](http://www.xerces.org/pollinator-conservation/plant-lists/).

## **7. How would listing as endangered under the Endangered Species Act help conserve the rusty patched bumble bee?**

Listing under the Endangered Species Act helps conserve species in several ways. Listing focuses conservation planning and funding, raises awareness that can lead to additional conservation opportunities and partners, and by regulation protects listed species from intentional and unintentional harm.

The Endangered Species Act requires the Service to prepare a recovery plan for each listed species. A recovery plan identifies and prioritizes actions needed to conserve and recover a species. Non-governmental agencies, universities, Tribes and other federal and state agencies often carry out conservation actions identified in recovery plans.

Federally listed threatened and endangered species are usually considered as priorities during land-use planning.

Listing protects species by prohibiting “take” under section 9, unless otherwise permitted. The take prohibition includes significant habitat modification or degradation that results in the direct killing or injury to listed animal species. States may also have their own laws restricting activity that affect federally listed species.

In addition, section 7 of the Endangered Species Act protects listed species by requiring that other federal agencies consult with the Service to ensure that their actions are not likely to jeopardize the continued existence of a listed species. Through this consultation, the Service works with the federal agency and advises on whether the actions would affect the species or critical habitat as well as ways to avoid those impacts. Listed species often become priorities for grants and other funding because of the section 7(a)(1) requirement that all federal agencies use their authorities to carry out programs for the conservation of threatened and endangered species.

## **8. Why expend time and money to try to protect and restore the rusty patched bumble bee?**

The decline of the rusty patched bumble bee happened relatively recently and very dramatically. This insect was once common, widespread and abundant, but within only 20 years is now almost extinct. The causes of that decline are continuing to act across a broad geographic area, impacting other native pollinators. From the Rocky Mountains to the Atlantic Ocean and from the Midwest north into much of eastern Canada, pollinators and other invertebrates are harmed by the same activities pushing the rusty patched towards extinction. Preventing extinction of this bumble bee will help address those factors and identify how they work together to harm native bee and other pollinator populations, such as monarch butterflies.

There are many insects and invertebrates that are less well-known and studied than the rusty patched bumble bee. Other species may be declining for the same or similar reasons but we have not been tracking them, so their loss is unknown. Conserving the bumble bee is likely to help conserve other animals.

Our native pollinators, including native bees, are important to the productivity of our farms and our natural areas. Pollinators are essential for the continued reproduction of many plants and the animals that feed on those plants.

### **9. When will the final decision on listing be made?**

Making a final decision generally takes about one year from the publication of the proposed rule. That timeline may be extended by six months if we find there is substantial scientific disagreement regarding the sufficiency and accuracy of the available data relevant to our determination regarding the proposed listing.

### **10. Why is it important to conserve the rusty patched bumble bee?**

Bumble bees are important pollinators of wildflowers and are the chief pollinator of many economically important crops. They are not picky about where they get their nectar and pollen - almost any source of flower will do. Bumble bees are able to fly in cooler temperatures and lower light levels than many other bees, which makes them excellent crop pollinators. They also 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 muscles. These vibrations dislodge pollen from the flower. Some plants, including tomatoes, peppers, and cranberries, benefit from buzz pollination. Even for crops that can be self-pollinated (for example, some tomatoes), the plant produces more and bigger fruits with bumble bee-aided pollination. In natural areas, bumble bees pollinate plants that provide food for other wildlife. By conserving this species, other species of pollinators simultaneously benefit.

### **11. What can I do to help the rusty patched bumble bee?**

*Garden:* Grow a garden or add a flowering tree or shrub to your yard. Even small areas or containers on patios can provide nectar and pollen for native bees. Plant a variety of flowers that bloom throughout the growing season from April through October. Fruit trees typically bloom early in the spring, which is a critical time for foraging bumble bee queens. Try to ensure that your new plants have not been treated with neonicotinoids or other systemic pesticides.

*Plant natives:* Use native plants such as lupines, clovers, asters, bee balm, other mints and borage in your landscaping. Choose a variety of native plants, so that something is blooming from early spring, throughout the summer and into the fall. Avoid invasive non-native plants

and remove them if they invade your yard. For more information on attracting native pollinators, visit [www.fws.gov/pollinators/pdfs/PollinatorBookletFinalrevWeb.pdf](http://www.fws.gov/pollinators/pdfs/PollinatorBookletFinalrevWeb.pdf).

*Foster native landscapes.* Many native bumble bees build their nests in undisturbed soil, abandoned rodent burrows or clumps of grass. Preserve unmown, brushy areas and tolerate bumble bee nests when you find them. Reduce soil tillage and mowing where bumble bees might nest. Support natural areas in your community, county and state.

*Do not use pesticides.* The intent of applying an insecticide is to kill insects, so non-target species, including pollinators, may be killed. It can be difficult to keep insecticides in the specific area applied; insecticides may be carried by wind or water to non-target areas. Additionally, widespread application of insecticides for preventative purposes, such as planting neonicotinoid treated seeds or bedding plants, results in repeated applications of insecticides broadly across the landscape. Not only are insects in treated fields affected, but research has shown that those insecticides can be carried offsite in the dust of seeds during planting, by rain water, and by uptake of plants along field edges. Many plants sold at nurseries are treated with systemic pesticides, so the pollen and nectar from those plants may kill or harm pollinators and other insects. Check with your garden supplier to ensure that plants have not been treated with neonicotinoids or other systemic pesticides.

Herbicides kill plants so the result of herbicide use is to reduce the numbers of flowers available for bumble bees to feed. Some herbicides have insecticidal properties and can be carried offsite by wind and rain.

*Minimize your use of pesticides.* If you feel you cannot avoid all pesticide use, apply pesticides only where and when needed. Apply only at the labeled rate and carefully follow label directions to avoid drift into non-target areas.

## **12. How do I comment on the proposed rule?**

You may submit comments by one of the following methods:

(1) Electronically:

Go to the federal eRulemaking Portal at <http://www.regulations.gov>. In the Search box, enter FWS–R3–ES–2015–0112, which is the docket number for this rulemaking. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on the “Comment Now!” button;

or

(2) Submit hard copies by U.S. mail or hand-delivery to:

Public Comments Processing  
Attn: FWS–R3–ES–2015–0112  
U.S. Fish & Wildlife Headquarters, MS: BPHC  
5275 Leesburg Pike  
Falls Church, VA 22041-3803

We will accept and consider comments and information we receive or are postmarked on or before November 21, 2016. We must receive comments submitted electronically using the federal eRulemaking Portal by 11:59 p.m. Eastern Time on the closing date.

We request that you send your comments **only** by the methods described above. We will not accept verbal comments left on phone voicemail or comments sent to other postal or email addresses. The Service will post all information received on <http://www.regulations.gov>. This generally means that the Service will post any personal information you provide.

**13. Is there specific information that the Service would like to receive?**

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from the public, other concerned governmental agencies, Native American tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

- (1) The rusty patched bumble bee’s biology, range, and population trends, including:
  - (a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;
  - (b) Genetics and taxonomy;
  - (c) Historical and current range, including distribution patterns (in particular, we are interested in the locations and dates of surveys targeting bumble bees within the historical range of the rusty patched bumble bee, including negative survey results);
  - (d) Historical and current population levels, and current and projected trends; and
  - (e) Past and ongoing conservation measures for the species, its habitat, or both.
  
- (2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing conservation measures or regulations that may be addressing those threats.

(4) The reasons why any habitat should or should not be determined to be critical habitat for the rusty patched bumble bee as provided by section 4 of the Act, including physical or biological features within areas that are occupied or specific areas outside of the geographic area that are occupied that are essential for the conservation of the species.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

**14. Where can I learn more about the rusty patched bumble bee and the proposal to list it as endangered?**

Information is online at [www.fws.gov/midwest/endangered](http://www.fws.gov/midwest/endangered) or you may contact the U.S. Fish and Wildlife Service's Twin Cities Field Office at:

Peter Fasbender, Field Supervisor  
U.S. Fish and Wildlife Service  
Twin Cities Ecological Services Field Office  
4101 American Blvd. E., Bloomington, MN 55425

Telephone 952-252-0092, extension 210.

If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800-877-8339.