

**Endangered Species Coalition 2019 Top 10 Report Nominating Form**

**Deadline: June 21, 2019**

General Information		Nominating Organizations: Please use this Column to Provide the Requested Information	
1	Organization & Web address		The Xerces Society, <a href="http://www.Xerces.org">www.Xerces.org</a>
2	Contact name		Rich Hatfield
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4	Email & phone		<a href="mailto:Rich.Hatfield@xerces.org">Rich.Hatfield@xerces.org</a> ; 503.232.6639 x115
5	Communications staff contact name (if different from above)		Matthew Shepherd
6	Email & phone		<a href="mailto:Matthew.Shepherd@xerces.org">Matthew.Shepherd@xerces.org</a> ; 503.232.6639
General Species Information			
7	Common name, genus, and species		Crotch's bumble bee, <i>Bombus crotchii</i>
8	Geographic range		California
9	Conservation status		Endangered (IUCN Red List: <a href="https://www.iucnredlist.org/species/44937582/46440211">https://www.iucnredlist.org/species/44937582/46440211</a> )
10	Remaining population size		Unknown
Report Logistics Questions			
11	Can you provide <b>high-resolution</b> photos?		Yes
12	If your species is selected, will you use the report to advocate for the species?		Yes
13	5 free reports provided; additional copies = ~\$2.60/each. If you'd like additional copies, how many?		
Public Engagement Questions (Please explain why the species is interesting, why it matters, why decision-makers & the public should care.)			
14	Provide background information, including interesting facts, for the species profile.		<i>Bombus crotchii</i> inhabits open grassland and scrub habitats. Nesting occurs underground. Males perch and chase moving objects in search of mates. This species is classified as a short-tongued species, whose food plants include <i>Asclepias</i> , <i>Chaenactis</i> , <i>Lupinus</i> , <i>Medicago</i> , <i>Phacelia</i> , and <i>Salvia</i> (Williams et al. 2014). Bumble bees are social insects that live in colonies composed of a queen, workers, and reproductives (males and new queens). Colonies are annual and only the new, mated queens overwinter. These queens emerge from hibernation in the early spring and immediately start foraging for pollen and nectar and begin to search for a nest

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		<p>site. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. Initially, the queen does all of the foraging and care for the colony until the first workers emerge and assist with these duties. Bumble bees collect both nectar and pollen of the plants that they pollinate. In general, bumble bees forage from a diversity of plants, although individual species can vary greatly in their plant preferences, largely due to differences in tongue length. Bumble bees are well-known to engage in “buzz pollination,” a very effective foraging technique in which they sonicate the flowers to vibrate the pollen loose from the anthers. Tomatoes (Solanaceae), blueberries (Ericaceae), and many other important food plants are pollinated by bumble bees in this way.</p>
15	<p>What is your organization’s <u>most important lead message</u> for the public about the potential impacts to this species?</p>	<p>The Crotch bumble bee (<i>Bombus crotchii</i>) is endangered with extinction throughout its entire range. Recent research has shown a significant reduction in both the range and relative abundance of this species, and where they still persist, they are far less common than they were historically. This species was historically common in the southern two-thirds of California, but now appears to be absent from most of it, especially in the center of its historic range (Hatfield et al. 2015; Richardson et al. 2014); analyses suggests sharp declines in both relative abundance (98% decline) and persistence (80% decline) over the last ten years.</p> <p>Each of the following factors pose a substantial threat to the survival of Crotch’s bumble bee: the modification or destruction of its habitat including agricultural intensification and urbanization; diseases spread and amplified by commercial pollinators; and other natural events and human-related activities, including pesticide use, and global climate change.</p>
16	<p>Is your NGO saving the species? If yes, how?</p>	<p>The Xerces Society has been working in California to protect pollinators like <i>Bombus crotchii</i> for over 10 years. We work to protect Crotch’s bumble bee by 1) protecting and restoring habitat, 2) providing land owners and land managers with technical and scientific guidance about bumble bee conservation 3) conducting outreach about the importance of pollinators and actions people can take to help conserve pollinators, and 4) working to influence state and federal policy that will affect <i>B. crotchii</i>.</p> <p><b>Habitat.</b> We work with a variety of state and federal agencies to restore and protect pollinator habitat. We have several staff in CA, including one partner biologist with</p>

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the NRCS, who work closely with local farmers and ranchers to install pollinator friendly habitat on their property. We use native, drought-tolerant species that are likely to withstand hotter, drier conditions expected with climate change. We also work closely with landowners to mitigate pesticide risk to pollinators using the habitat, and support efforts to reduce pesticide use.

We have created the Bee Better Certified (BBC) program where farmers who take steps to protect pollinators like bumble bees on their land can get a BBC seal on their products. This third party certification program requires that a certain percent of the producer's land provides habitat for pollinators and that the habitat is protected from pesticides. The certification program also prohibits the use of certain high risk pesticides and pesticide practices, and requires growers to utilize non-chemical pest management techniques. The idea behind this program is that consumers will choose bee friendly products and will also pay more for these products, rewarding farmers who support pollinators like *B. crotchii* on their land. We are working with several California farmers to get Bee Better Certification.

**Outreach.** We routinely engage in outreach efforts to a variety of audiences including urban audiences, agricultural audiences, managers of natural areas, and managers of roadsides and rights-of-way. In the past two years, we have participated in 39 outreach events in California focused on pollinators, reaching almost 1800 people. These events include short courses, workshops, seminars and tabling at conferences where we educate people on pollinator biology and conservation.

**Technical guidance.** Xerces prides itself on providing scientifically based management recommendations. To that end, we have created several publications offering science-based information on bumble bee biology and conservation (<https://xerces.org/bumblebees/>) and pesticide mitigation (<https://xerces.org/pesticides/>), all of which are available for free on our website. Over the last two years alone, Xerces staff have provided 118 people with technical guidance on pollinator conservation in CA. This may include plant lists, site visits, and/or habitat restoration recommendations that benefit bumble bees.

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		<p><b>Policy.</b> Xerces works to protect <i>B. crotchii</i> through policy as well as through on-the-ground restoration. Xerces works with policy makers to provide recommendations on protecting pollinators for inclusion in the US Farm Bill and through NRCS initiatives. Xerces also co-wrote a petition to have <i>B. crotchii</i> and three other bumble bee species protected under California’s state Endangered Species Act (Hatfield et al. 2018) . Crotch’s bumble bee has been granted candidate status by the California Fish and Game Commission and starting June 28, 2019 will undergo a 1-year review to determine whether listing is warranted.</p>
17	How can individuals help the species? Please be specific.	<p>As the leading factors for the decline of this species are reversible, there is much that can be done to help protect it. Bumble bees need three things to thrive: 1) plants with abundant nectar and pollen from early spring through fall; 2) a safe place to build a nest and overwinter; and 3) a pesticide and disease free environment. To help, individuals can 1) <a href="#">plant bumble bee, and other pollinator friendly plants</a>; 2) <a href="#">provide nesting and overwintering habitat – and avoid management activities that would disturb them</a>; and 3) avoid the use of pesticides, <a href="#">especially cosmetic uses</a>, and <a href="#">support farmers in implementing practices that reduce the risks posed by pesticides</a> and <a href="#">potential diseases from managed bees</a>. In addition to this, individuals can help conservation biologists understand where populations of this bee are thriving by submitting bumble bee observations to <a href="http://www.BumbleBeeWatch.org">www.BumbleBeeWatch.org</a>.</p>

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Criteria-specific Questions: Importance of Species and Severity & Extent of Threat. Please answer N/A or “see above/below” if appropriate.		
18	Detail the species’ ecological importance and function. Does the ecosystem depend on this species (e.g., as a keystone pollinator, keystone predator, ecological engineer, refugia provider, etc.)?	Bumble bees are economically and ecologically significant pollinators on farms and in natural areas. In general, bumble bees forage from a diversity of plants, although individual species can vary greatly in their plant preferences, largely due to differences in tongue length. Bumble bees are well-known to engage in “buzz pollination,” a very effective foraging technique in which they sonicate the flowers to vibrate the pollen loose from the anthers. Tomatoes (Solanaceae), blueberries (Ericaceae), and many other important food plants are pollinated by bumble bees in this way. Significantly, Crotch’s bumble bee visits milkweed preferentially, and is thus an important pollinator of the host plants for the western monarch, which is also highly imperiled.
19	Detail information on any social or economic benefits the species provides—e.g., food, clean water, medicine, etc. (Optional)	Bumble bees are significant pollinators of tomatoes, apples, peppers, squash, other cucurbits, strawberries, blueberries and cranberries.
20	Can the species be an ambassador for its habitat or taxonomic group? If yes, detail.	Bumble bees are the charismatic macrofauna of the bee world. They are cute and fuzzy and recognizable. Also, because they are generalists, and ubiquitous, efforts to conserve bumble bees will contribute to broader pollinator conservation – and contribute to larger biodiversity through the ecosystem service of pollination. Over 85% of flowering plants require an animal pollinator, and usually that animal is a bee. Countless birds, mammals, lizards, invertebrates and amphibians depend on the plants that are pollinated by bumble bees and other pollinators.
<b>Importance of Species. Judge’s score:</b>		
21	Provide background on the pesticide(s) & herbicide(s) impacting this species. (Pesticides include insecticides, miticides, fungicides, herbicides and rodenticides.) Is it widely used? Does it impact other species?	Millions of pounds of pesticides are applied each year in California across diverse landscapes from backyards and parks to farmlands (CDPR 2018). This pesticide use includes hundreds of insecticide, fungicide and herbicide active ingredients, the vast majority of which have not been adequately evaluated for impacts on non-target species like bumble bees. Insecticides pose the most direct risk to bumble bees including <i>B. crotchii</i> (Hopwood et al. 2016). A number of highly toxic insecticides are used in both the urban and agricultural areas where Crotch’s bumble bee have been recorded. Neonicotinoids, a class of insecticides commonly used in these areas, are particularly concerning because of their toxicity and persistence. In some cases, bees can be exposed to

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		<p>harmful (even lethal) levels of neonicotinoids months to years after an application. In addition to the effects on Crotch's bumble bee, these insecticides are affecting all beneficial insects that are herbivores or flower visitors. This includes butterflies, bees, wasps, beetles, moths, and flies – among many other species groups.</p> <p>Fungicides, often classified as practically non-toxic to bees, are now being found to pose risk to bees. Fungicides are commonly used on the diverse crops that overlap with <i>B. crotchii</i>'s range. While the effects on <i>B. crotchii</i> in particular have not been studied, fungicide use has been linked with the decline of other at-risk bumble bee species.</p> <p>Herbicides also affect Crotch's bumble bee as they are used to remove weedy plants from farm fields. Glyphosate and dicamba are both widely used throughout California to remove flowering plants in herbicide resistant crops. Herbicide use that removes flowering resources reduces habitat quality and affects pollinator populations.</p>
22	Describe the impact that the pesticide(s) & herbicide(s) is/are having on the species, including current and projected decline.	<p>Crotch's bumble bee is at risk from exposure to the numerous pesticides that are used throughout its range. Pesticide exposures are most likely to happen when bees forage on flowering plants where applications are occurring or recently occurred. This can happen in both urban and agricultural settings.</p> <p>Queen Crotch's bumble bees, and their resulting colonies, are especially vulnerable in the early spring when the queen is out foraging and building her colony. The planting of seeds treated with insecticides overlaps with the timeframe when queen bees are out foraging to build their nests. This planting process can cause harmful levels of insecticides to be released into the air exposing foraging bees, including the newly emerged queens that are establishing colonies. California's diverse cropping systems also means that pesticides are being applied throughout the growing season across <i>B. crotchii</i>'s range, potentially impacting the species at various life stages.</p> <p>The question above provides a broad overview of potential impacts caused by pesticide exposure, including harms to Crotch's bumble bee.</p>
23	If not described above, detail the status of the species' habitat(s). Is it impacted by the pesticide(s) & herbicide(s) or other threats? Is there adequate connectivity?	<p>Much of the historic range of <i>B. crotchii</i> has been dramatically altered to support large-scale agricultural production. Therefore, a large portion of Crotch's bumble range is treated with pesticides.</p>
24	If not described above, describe the timing of the threat(s)—current, eminent, or future.	<p>The threat from pesticides is an ongoing concern for Crotch's bumble bee. A veritable cocktail of pesticides are frequently used in their range throughout the year potentially posing a risk to all life stages of <i>B. crotchii</i>. Additionally, queen Crotch's</p>

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		bumble bees are put at risk from the extensive and growing practice of planting treated seed. Furthermore, research has predicted an increase in pest pressure in California caused by climate change. This increase in pest pressure is expected to increase the use of pesticides, thus increasing risk to the species from pesticide exposure.
25	Does the species face political threats from industry, members of Congress, &/or states?	A coalition of industrial agricultural companies drafted a letter in opposition to the California Endangered Species Act petition and also testified in front of the California Fish and Game Commission expressing this opposition. The California Fish and Game Commission openly expressed the expectation of a lawsuit from this coalition challenging the current status of Crotch's bumble bee in California as a candidate species.
<b>Severity &amp; Extent of Threat. Judge's score:</b>		
<b>Judge's Final Score</b>		

Please submit to [top10@endangered.org](mailto:top10@endangered.org) by **June 21, 2019**, and thank you for participating in the 2019 Top 10 Report.

#### Literature Cited:

CDPR. 2018. California Pesticide Information Portal (CALPIP). Available from <https://calpip.cdpr.ca.gov/main.cfm> (accessed 2019).

Hatfield R, Jepsen S, Thorp R, Richardson LL, Colla S. 2015a. *Bombus crotchii*. The IUCN Red List of Threatened Species **2015**. Available from <http://www.iucnredlist.org/details/44937582/0>.

Hatfield RG, Colla SR, Jepsen S, Richardson LL, Thorp RW, Foltz-Jordan S. 2015b. IUCN Assessments for North American *Bombus* spp. for the North American IUCN Bumble Bee Specialist Group. The Xerces Society for Invertebrate Conservation, Portland, OR. Available from <https://paperpile.com/shared/0wXyBt>.

Hatfield RG, Jepsen S, Foltz Jordan S, Blackburn M, Code A. 2018. A petition to the California Fish and Game Commission to list the Crotch bumble bee (*Bombus crotchii*), Franklin's bumble bee (*Bombus franklini*), Suckley cuckoo bumble bee (*Bombus suckleyi*), and western bumble bee (*Bombus occidentalis occidentalis*) as Endangered under the California Endangered Species Act. The Xerces Society for Invertebrate Conservation. Available from <https://paperpile.com/shared/0wXyBt>.

Hopwood J, Code A, Vaughan M, Biddinger D, Shepherd M, Black SH, Mader E, Mazzacano C. 2016. How Neonicotinoids Can Kill Bees. 2016-022. The Xerces Society. Available from [http://www.xerces.org/wp-content/uploads/2016/10/HowNeonicsCanKillBees\\_XercesSociety\\_Nov2016.pdf](http://www.xerces.org/wp-content/uploads/2016/10/HowNeonicsCanKillBees_XercesSociety_Nov2016.pdf).

Richardson L. 2017. Data Contributors. Available from <http://www.leifrichardson.org/bbna.html> (accessed September 23, 2015).

Williams PH, Thorp RW, Richardson LL, Colla SR. 2014. Bumble Bees of North America: An Identification Guide: An Identification Guide. Princeton University Press.

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