

**Species Listing PROPOSAL Form:**  
**Listing Endangered, Threatened, and Special Concern Species in Massachusetts**

Scientific name: *Bombus terricola*Current Listed Status (if any): NoneCommon name: Yellow-banded Bumble Bee**Proposed Action:**☒ Add the species, with the status of:Threatened☐ Remove the species☐ Change the species' status to: \_\_\_\_\_

Change the scientific name to: \_\_\_\_\_

Change the common name to: \_\_\_\_\_

(Please justify proposed name change.)

**Proponent's Name and Address:**

Michael W. Nelson, Ph.D., Invertebrate Zoologist  
 Natural Heritage & Endangered Species Program  
 Massachusetts Division of Fisheries & Wildlife  
 1 Rabbit Hill Road, Westborough, MA 01581

Phone Number: (508) 389-6374

E-mail: [mike.nelson@state.ma.us](mailto:mike.nelson@state.ma.us)

Fax:

Association, Institution or Business represented by proponent: Massachusetts Division of Fisheries &amp; Wildlife

Proponent's Signature:



Date Submitted: March 1, 2018

**Please submit to:** Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, 1 Rabbit Hill Road, Westborough, MA 01581

**Justification**

Justify the proposed change in legal status of the species by addressing each of the criteria below, as listed in the Massachusetts Endangered Species Act (MGL c. 131A) and its implementing regulations (321 CMR 10.00), and provide literature citations or other documentation wherever possible. Expand onto additional pages as needed but make sure you address all of the questions below. The burden of proof is on the proponent for a listing, delisting, or status change.

**(1) Taxonomic status.** Is the species a valid taxonomic entity? Please cite scientific literature.

- Yes, *Bombus terricola* Kirby, 1837 is a valid species (Williams et al. 2014, Ascher & Pickering 2016).

**(2) Recentness of records.** How recently has the species been conclusively documented within Massachusetts?

- There are Massachusetts records of *B. terricola* through the year 2017 (R. Gegear, pers. comm.).

**(3) Native species status.** Is the species indigenous to Massachusetts?

- Yes (Williams et al. 2014, Ascher & Pickering 2016).

**(4) Habitat in Massachusetts.** Is a population of the species supported by habitat within the state of Massachusetts?

- Yes, recent records of *B. terricola* indicate its persistence in northern Berkshire County, as well as a few scattered locations in the Connecticut River Valley and southeastern Massachusetts (see Map 3 below).

**(5) Federal Endangered Species Act status.** Is the species listed under the federal Endangered Species Act? If so, what is its federal status (Endangered or Threatened)?

- No, *B. terricola* is not listed under the federal Endangered Species Act. However, the U.S. Fish & Wildlife Service is currently reviewing a petition to list this species.

**(6) Rarity and geographic distribution.**

(a) Does the species have a small number of occurrences (populations) and/or small size of populations in the state? Are there potentially undocumented occurrences in the state, and if so, is it possible to estimate the potential number of undocumented occurrences?

- See Map 3 below. Records of *B. terricola* over the past 25 years indicate its persistence in northern Berkshire County, as well as a few scattered locations in the Connecticut River Valley and southeastern Massachusetts.

(b) What is the extent of the species' entire geographic range, and where within this range are Massachusetts populations (center or edge of range, or peripherally isolated)? Is the species a state or regional endemic?

- *B. terricola* is a northern species, in the East ranging from Newfoundland south to Pennsylvania, and further south at elevation in the Appalachian Mountains; it ranges "west through North Dakota and the Canadian Great Plains, to the tundra/taiga of Canada and the Mountain West, especially in British Columbia" (Williams et al. 2014). Massachusetts is at the southeastern edge of this species' geographic range.

**(7) Trends.**

(c) Is the species decreasing (or increasing) in state distribution, number of occurrences, and/or population size? What is the reproductive status of populations? Is reproductive capacity naturally low? Has any long-term trend in these factors been documented?

- *B. terricola* has declined in parts of its range, including the northeastern U.S. (Colla & Packer 2008, Gixti et al. 2009, Williams & Osborne 2009, Williams et al. 2009, Cameron et al. 2011, Williams et al. 2014, Colla 2016).
- In Massachusetts prior to 50 years ago, *B. terricola* occurred throughout the state including the offshore islands: see Map 1 below. During the 25 years from 1968 to 1992, it was rarely recorded except in northern Berkshire County, the Connecticut River Valley, and southeastern Massachusetts (but not on Martha's Vineyard or Nantucket): see Map 2 below. During the past 25 years, it has become largely restricted to northern Berkshire County, with a few scattered records in the Connecticut River Valley and southeastern Massachusetts: see Map 3 below.

**(8) Threats and vulnerability.**

(d) What factors are driving a decreasing trend, or threatening reproductive status in the state? Please identify and describe any of the following threats, if present: habitat loss or degradation; predators, parasites, or competitors; species-targeted taking of individual organisms or disruption of breeding activity.

- Species of *Bombus* respond differently to various threats (Williams et al. 2014). Three categories of threats likely affecting *B. terricola* in Massachusetts are listed below. *B. terricola* is thought to be particularly susceptible to introduced pathogens (Szabo et al. 2012).

(1) Habitat loss or degradation

- Habitat loss
  - Urbanization, conversion to intensive row crop agriculture or other non-habitat
  - Succession and afforestation
- Habitat degradation
  - Loss of native floral diversity to adverse landscaping practice, agricultural intensification, succession, or excessive deer browse

(2) Pathogens introduced via commercially propagated bumble bees (Colla et al. 2006, Colla & Packer 2008, Otterstatter & Thomson 2008, Cameron et al. 2011, Graystock et al. 2013, Colla 2016)

- The microsporidians *Nosema bombi* and *N. ceranae*
- The protozoans *Apicystis bombi* and *Crithidia bombi*

- (3) Pesticide use (especially neonicotinoids) where habitat overlaps or interfaces with agricultural or landscaped areas (Whitehorn et al. 2012)
- (4) Climate change (Colla 2016, NatureServe 2017)

(e) Does the species have highly specialized habitat, resource needs, or other ecological requirements? Is dispersal ability poor?

- As a group, species of *Bombus* are relatively generalized in habitat requirements and floral resource needs as compared to many other bees. *B. terricola* is a short-tongued, nectar-robbing species that seeks out tubular flowers for nectar, although it will visit composite flowers if available (R. Gegear, pers. comm.).
- *B. terricola* is typically found “close to or within wooded areas and wetlands” (Williams et al. 2014). However, *habitat must provide a diversity of native flora blooming throughout the growing season, and threats such as introduced pathogens or pesticide use must be sufficiently diffuse or absent*. Within such habitat, this species nests underground in preexisting holes and crevices (e.g., deserted rodent burrows), often under rocks or fallen trees or branches.

### **Conservation goals.**

What specific conservation goals should be met in order to change the conservation status or to remove the species from the state list? Please address goals for any or all of the following:

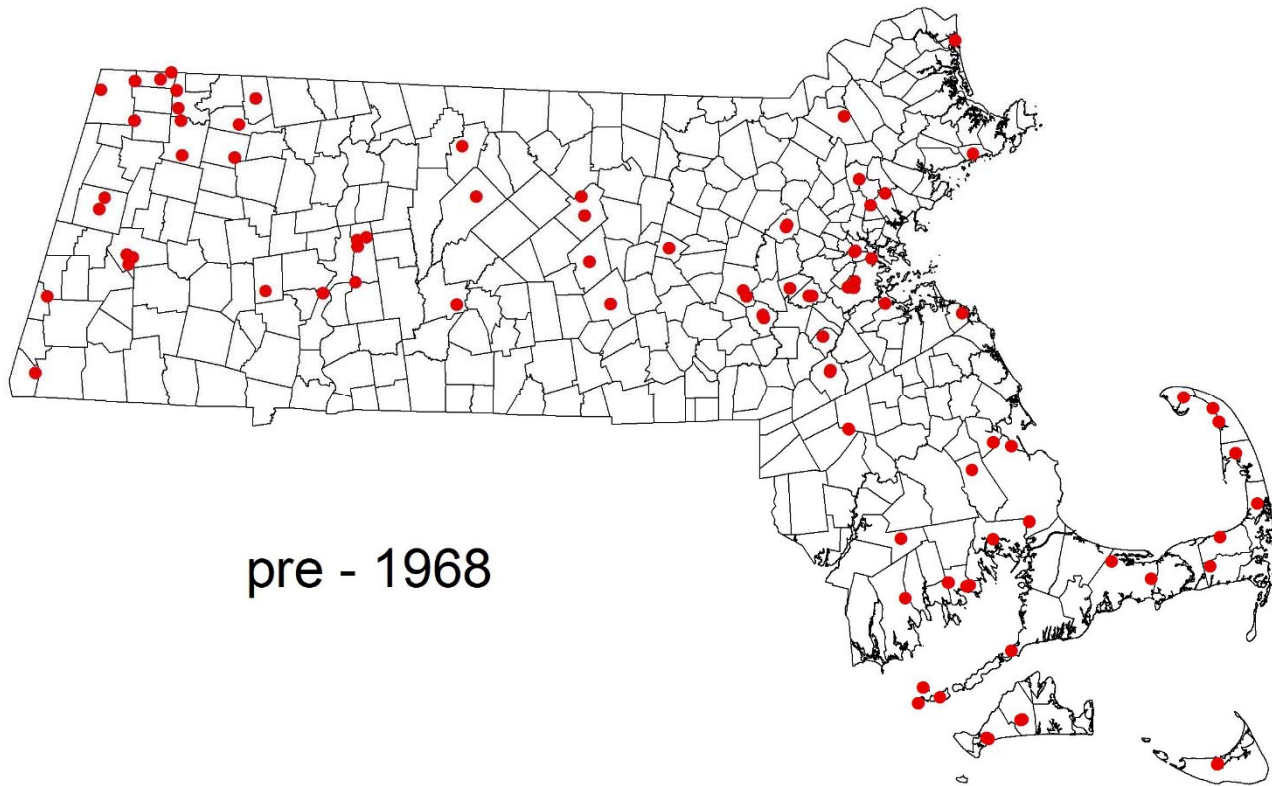
- (a) State distribution, number of occurrences (populations), population levels, and/or reproductive rates
- (b) Amount of protected habitat and/or number of protected occurrences
- (c) Management of protected habitat and/or occurrences
- When all three of the following goals are met, *B. terricola* should be evaluated for potential down-listing to Special Concern (or delisting):
  - (1) State distribution that includes the four currently occupied counties (Barnstable, Berkshire, Hampshire, and Plymouth), plus reestablishment (or rediscovery) in Bristol, Dukes, and Franklin Counties, as well as at least three of the following counties: Essex, Hampden, Middlesex, Nantucket, Norfolk, and Worcester.
  - (2) Number of current (within past 25 years) occurrences  $\geq 100$ , where one occurrence is defined as one or more mapped record(s) in the NHESP database within 500 m of each other, and separated from other occurrence(s) by at least 500 m.
  - (3) A minimum of half of current (within past 25 years) occurrences within habitat that is both protected conservation land *and* managed in a manner expected to maintain persistence of this species.

### **Literature cited, additional documentation, and comments.**

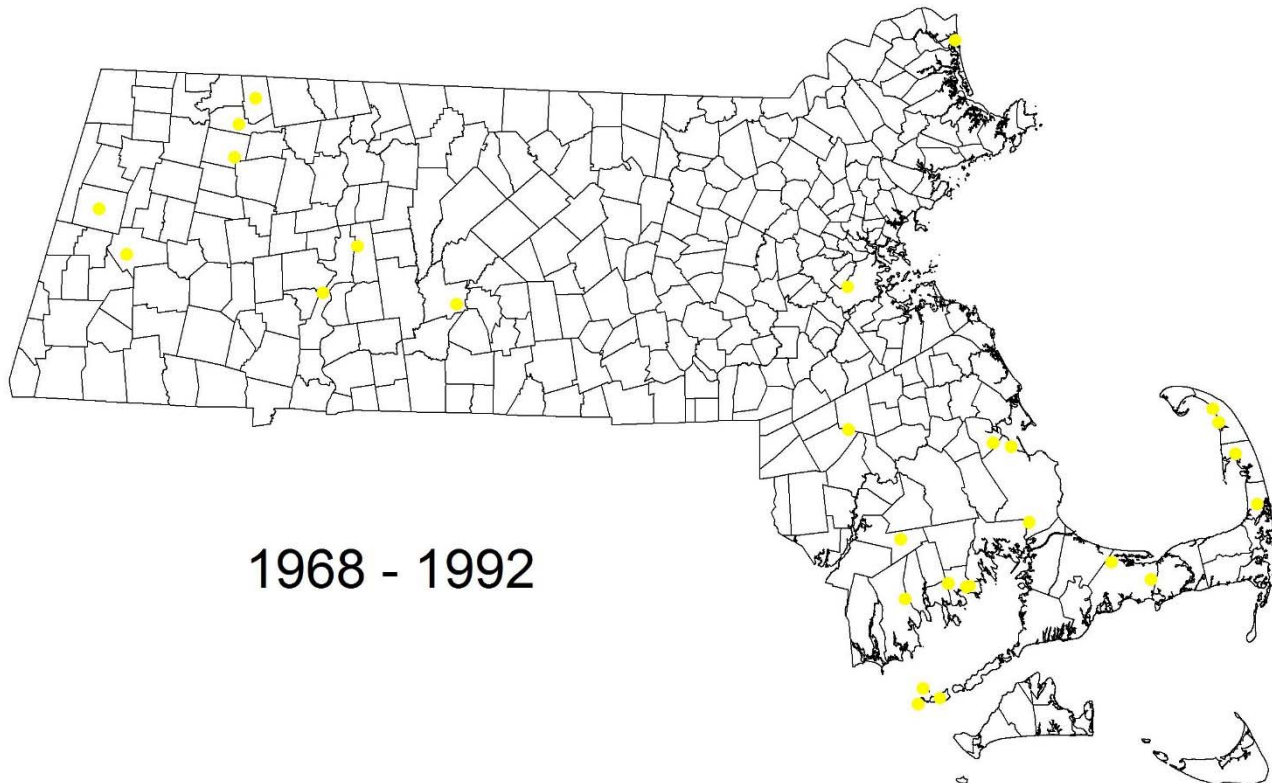
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**Map 1.** Records of *Bombus terricola* in Massachusetts prior to 1968 (more than 50 years ago). Data from Richardson (2017), Ascher & Pickering (2016), Michael Veit, and Fred Morrison.



**Map 2.** Records of *Bombus terricola* in Massachusetts from 1968 to 1992 (25 years). Data from Richardson (2017), Ascher & Pickering (2016), Michael Veit, and Fred Morrison.



**Map 3.** Records of *Bombus terricola* in Massachusetts from 1993 to 2017 (past 25 years). Data from Richardson (2017), Ascher & Pickering (2016), Michael Veit, and Fred Morrison.

