

Species Status Assessment

Common Name: Yellow bumble bee **Date Updated:** January 10, 2024

Scientific Name: *Bombus fervidus* **Updated By:** Katie Hietala-Henschell

Class: Insecta

Family: Apidae

Species Synopsis

Bombus fervidus (yellow bumble bee) belongs to the subgenus *Thoracobombus*, which has been shown to be significantly more infected by the pathogen *Nosema bombi* than bumble bees of other subgenera (Cameron *et al.* 2011). Researchers believe this pathogen is largely responsible for the rapid (99-100%) decline of this species in most of the Northeast (Schweitzer and Sears 2013).

This species appears to be persisting in NYC and Long Island and a couple disjunct populations in upstate New York, but was once widespread statewide (Richardson 2013, Yanega 2013). In New York there are approximately over one thousand historic records 1999 and earlier); while the recent number of *B. fervidus* records is 1,452 from years 2000-2021 (New York Natural Heritage Program 2023a, White *et al.* 2022). While the higher number of recent records may indicate stability, it also likely reflects the increased survey effort for this species. They are distributed spottily in states and provinces across the US and Canada, but many states and provinces have not yet assessed their conservation status (NatureServe 2023).

From White (2013): Bumble bees are generalist foragers and need nesting habitat in the spring, flowers for adult and larval nutrition throughout the spring and summer, and sites for queens to overwinter. Suitable habitat can occur in natural, agricultural, and urban areas and some species require forested habitat (Schweitzer *et al.* 2012). *Bombus fervidus* is known to nest on ground surfaces and underground and feeds on honeysuckles, thistles, clovers, vetches, bee balms, loosestrifes, and *Penstemon* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

i. **Federal:** Not listed _____ **Candidate:** Yes _____

ii. **New York:** Not listed _____

b. Natural Heritage Program

i. **Global:** G3 _____

ii. **New York:** S3 _____ **Tracked by NYNHP?:** Yes _____

Other Ranks:

-IUCN Red List: Vulnerable (Hatfield *et al.* 2015)

-Northeast Regional SGCN: Watchlist (Northeast Fish and Wildlife Diversity 2023)

-New York 2025 SGCN status: Species of Greatest Conservation Need

Status Discussion:

While there is evidence from museum records that *B. fervidus* had suffered a rapid, recent decline in New York (Richardson 2013, Yanega 2013), the species appears to have rebounded, as evidenced by a statewide survey (2017-2021) (White *et al.* 2022). Various threats continue to face this species including habitat loss, insecticides, and urbanization (Schweitzer *et al.* 2012).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	1805-2001 vs 2002-2012	Not Listed	
Northeastern US	Yes	Declining	Declining		Watchlist	
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S3	Yes
Connecticut	Yes	Declining	Declining		S2	Yes
Massachusetts	Yes	Declining	Declining		S2	Yes
New Jersey	Yes	Unknown	Unknown		SNR	
Pennsylvania	Yes	Unknown	Unknown		SNR	
Vermont	Yes	Declining	Declining		S2	Yes
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		Exotic?	

Column options

Present?: Yes; No; Unknown; No data; (blank) or Choose an Item

Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item

SGCN?: Yes; No; Unknown; (blank) or Choose an item

References used in table: North America (IUCN 2024, U.S. Fish and Wildlife Service 2024), Northeastern US (Northeast Fish and Wildlife Diversity 2023), State/Province Ranks (NatureServe 2023, NY SWAP 2015)

*Bumble bee species that have been ranked as Critically Imperiled (S1), Imperiled (S2), or Vulnerable (S3) by individual states have been interpreted as declining in abundance and distribution for this Species Status Assessment, unless additional data is available suggesting otherwise. Bumble bees are generalists and were typically widespread within their ranges and many species have experienced declines within their range. Most bumble bee species are not restricted to a specific rare habitat type or host, although some cuckoo bumble bees are reliant on an individual host species.

Monitoring in New York (*specify any monitoring activities or regular surveys that are conducted in New York*):

The Empire State Native Pollinator Survey was a multi-year pollinator survey effort conducted from 2017-2021. Bumble bees were included in the focal taxa targeted by this survey. The statewide effort resulted in up-to-date data on the occurrence of bumble bees across the state (White *et al.* 2022). However, no organized, regular monitoring or survey activities are directed toward this species.

Trends Discussion (*insert map of North American/regional distribution and status*):

Bombus fervidus is present in Quebec and New Brunswick to Georgia, west to the Pacific Coast (Discover Life 2024). From the NYNHP *B. fervidus* Conservation Guide (New York Natural

Heritage Program 2023b): Short-term trends for the species are unknown. Based on data from the Empire State Native Pollinator Survey, the current (2000 to 2021) and historical (1999 and earlier) distribution in New York has remained relatively stable. While there are some counties no longer occupied that were historically, there are also several new county records in recent years (White *et al.* 2022).

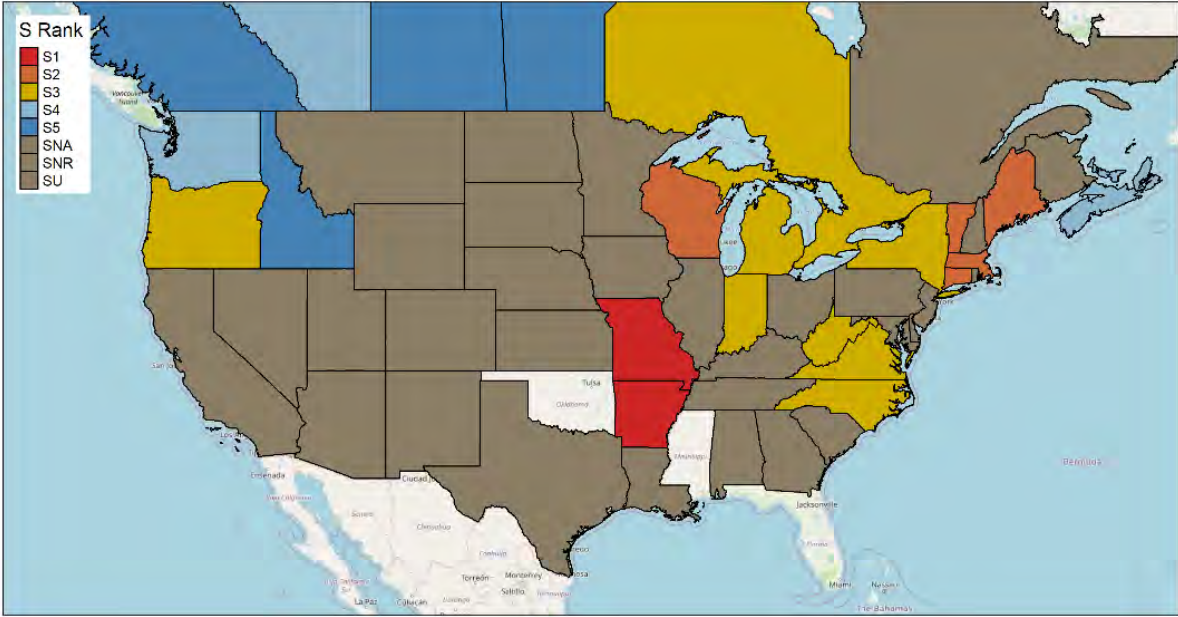


Figure 1. *Bombus fervidus* distribution and status (Source: NatureServe 2023)

III. New York Rarity (provide map, numbers, and percent of state occupied)

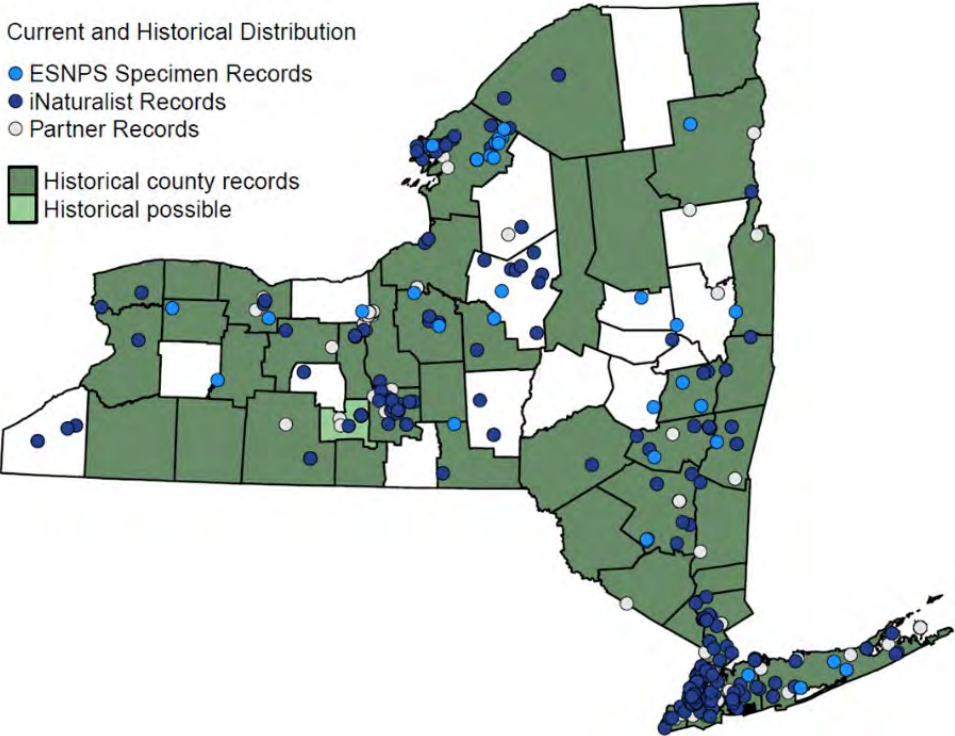


Figure 2. Records of *Bombus fervidus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

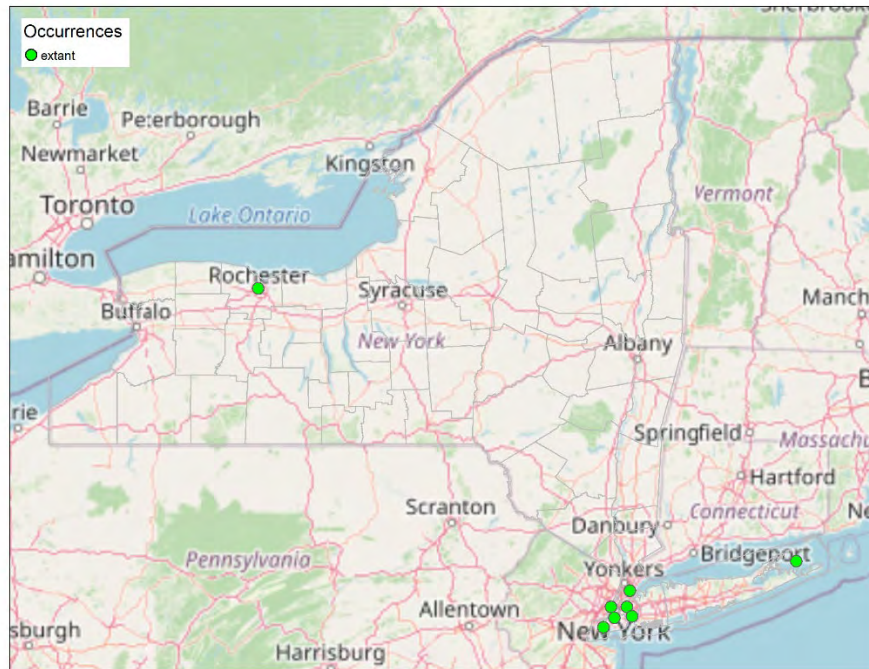


Figure 3. NYNHP element occurrence records for *Bombus fervidus* in New York (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	1,085	47	76
2000-2021	1,452	49	79

Table 1. Records of *Bombus fervidus* in New York.

Details of historic and current occurrence:

Based on data from the Empire State Native Pollinator Survey, the current (2000 to 2021) and historical (1999 and earlier) distribution in New York has remained relatively stable. This species appears to have a stronghold in New York City and the Hudson Valley, and Long Island, and there are also populations in several counties statewide (White *et al.* 2022).

New York’s Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	Unknown

Column options

Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item

Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type (from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):

Various terrestrial communities (both natural and otherwise) including but not limited to meadows, fields, grasslands, pasturelands, gardens, and orchards that can support a diversity of wildflowers with variable phenology throughout the warm seasons (White 2013). Typical habitats include open farmland and fields, urban parks, and gardens (Williams *et al.* 2014).

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Pollinator Species?	Habitat/Community Trend	Time frame of Decline/Increase
No	No	Yes	Unknown	

Column options

Habitat Specialist, Indicator Species and Pollinator Species: Yes; No; Unknown; (blank) or Choose an item

Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Bumble bees are generalist foragers and need nesting habitat in the spring, flowers for adult and larval nutrition throughout the spring and summer, and sites for queens to overwinter. Suitable habitat can occur in natural, agricultural, and urban areas and some species require forested habitat (Schweitzer *et al.* 2012). *Bombus fervidus* nests above ground and underground (Colla *et al.* 2011). Such species often use long grass or haystacks above ground or abandoned rodent nests underground in south facing exposures.

Bombus fervidus is a long-tongued, later emerging species (Williams *et al.* 2014). Foraging habitat should include flower abundance and species richness with overlapping blooms to ensure nectar availability throughout the growing season (Schweitzer *et al.* 2012). Select food plants for *B. fervidus* include *Vicia*, *Trifolium*, *Lonicera*, *Cirsium*, *Monarda*, *Penstemon*, *Lythrum*, *Astragalus*, *Helianthus*, *Lythrum*, and *Pedicularis* (Colla *et al.* 2011, Williams *et al.* 2014).

Suitable sites for bumble bees to overwinter may include rotting logs, mulch, or loose soil (Schweitzer *et al.* 2012).

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	-	-	Yes	Yes	-

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion (include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):

Bumble bees have annual colonies and are eusocial. In the spring, a queen will emerge from hibernation. She will forage on early floral resources and locate a suitable nest site. She will then

lay her first batch of eggs, from which worker bees will emerge a few weeks later. Workers typically live for about four weeks whereas queens live for about a year. Workers then take over the tasks of maintaining the colony and foraging for nectar and pollen to feed new generations. During mid to late summer, the queen will start laying eggs that will become new queens and males. In the late summer and early fall, the new queens and males will disperse from the colony, mate, and only the new queens will overwinter and begin their own nest the following spring (Schweitzer *et al.* 2012). *B. fervidus* is known to nest on ground surfaces and underground and feeds on honeysuckles, thistles, clovers, vetches, bee balms, loosestrifes, and *Penstemon* (Colla *et al.* 2011). It sometimes nests underground, but mostly nests on the surface or aboveground in tall grass, haystacks or in deserted mouse nests; males congregate outside nest entrances in search of mates (Williams *et al.* 2014).

The foraging range of a bumble bee varies by species, size of individual and colony, resource availability, and other factors. Studies have found that the flight range typically falls between 0.15 and 0.62 miles; however, some species have been documented to forage as far as 1.86 miles (Jarau and Hrnčir 2009).

VI. Threats (from NY 2015 SWAP or newly described):

The primary threat to species in the subgenus *Thoracobombus* leading to their rapid, recent decline in the 1990s has been attributed to exotic pathogens. Cameron *et al.* (2011) showed a higher proportion of *Thoracobombus* individuals infected by the pathogen *Nosema bombi* than other bumble bees with stable global populations. While there is evidence from museum records that this species had a precipitous decline in New York (Richardson 2013, Yanega 2013), the species appears to have rebounded, as evidenced by a statewide survey 2017-2021. Various other threats continue to face this species including habitat loss, insecticides, and urbanization (Schweitzer *et al.* 2012).

Recent studies have started to identify the impacts of climate change. Increased temperatures had negative impacts on the majority of bumble bee species studied (Jackson *et al.* 2022). Climate change is also leading to shrinking and shifting of bumble bee ranges (Kerr *et al.* 2015) and can cause phenological mismatch between bumble bees and their floral resources (Pyke *et al.* 2015).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
1. Residential and Commercial	1.1 Housing & Urban Areas	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
4. Transportation & Service Corridors	4.1 Roads & Railroads	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.4 Pathogens	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 2. Threats to *Bombus fervidus*.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: ü No: _____ Unknown: _____

If yes, describe mechanism and whether adequate to protect species/habitat:

Governor Kathy Hochul signed into law Legislation S.1856-A/A.7640, the Birds and Bees Protection Act. This law prohibits the use of certain neonicotinoid pesticide treated corn, soybean, or wheat seeds and neonicotinoid pesticides for outdoor ornamental plants and turfs. Reducing the amount of neonicotinoids used in the landscape in New York will likely benefit *B. fervidus*.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Management of agricultural, urban, or natural areas should include attention to general habitat needs during various life stages, including adequate nest and overwintering sites as well as food sources throughout March-October, in relatively close proximity, and without barriers to dispersal (Schweitzer *et al.* 2012). It is recommended to avoid application of insecticides on flowers used by bumble bees, and when chemicals must be used, to limit dosage and modify the application timing and method to minimize effects. Minimizing contact between wild bumble bee populations and commercial bees can help protect the wild bees (Schweitzer *et al.* 2012).

Any efforts to protect wild bumble bee populations from pathogen exposure would benefit *B. fervidus*. Suggested actions would include using mesh to prevent escape of bees from commercial breeding greenhouses, proper disposal of commercial bees, sanitation in greenhouses, and development of molecular screening (New York Natural Heritage Program 2023b). Tight restrictions on importing bumble bees and elimination of parasites from commercial populations has been suggested as ideal (Meeus *et al.* 2011, Schweitzer *et al.* 2012).

Further research is needed to document extant occurrences in New York, and to define the current distribution of *B. fervidus*. In addition, research is required to understand the habitat requirements and threats to this species, and to create appropriate management guidelines for its persistence in known locations. Further research is needed on climate change effects and the effects of pesticides on bumble bees. Further research is needed to determine more information on habitat requirements, threats, climate change effects, and insecticide effects for *B. fervidus*.

Action Category	Action	Description
B.3 Outreach	B.3.1.4.0 Public outreach and information	Awareness and communications
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation Planning	Resource and habitat protection

Action Category	Action	Description
C.6 Design and Plan Conservation	C.6.5.1.3 Develop a conservation, management, or restoration plan for protected private lands	Habitat/Natural process restoration
C.7 Legislative and Regulatory Framework or Tools	C.7.1.3.0 Create, amend, or influence regulation	
C.7 Legislative and Regulatory Framework or Tools	C.7.2.1.0 Create or amend policies	

Table 3. Recommended conservation actions for *Bombus fervidus*.

VII. References

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 2/7/2013

Last updated: Katie Hietala-Henschell

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