

Species Status Assessment

Common Name: Rusty-patched bumble bee **Date Updated:** 1/3/2024

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

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus affinis (rusty-patched bumble bee) belongs to the subgenus (*Bombus*), 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). The last known New York record is from 1999, and the species appears to have not persisted in this or neighboring states (New York Natural Heritage Program 2023a, Richardson 2013, Yanega 2013). It is ranked as SH, state historical, in New York and highly imperiled globally. The historical native range spanned from Maine along the east coast south to Georgia and west to Nebraska and Ontario. It is listed as SH throughout much of the northeast (NatureServe 2023). Its current range has been reduced to the Midwest and can be found in Wisconsin, Ohio, Iowa, Indiana, Illinois, and Minnesota and isolated populations in Virginia, Tennessee, Connecticut, Maryland, and Massachusetts (Hatfield *et al.* 2015).

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 affinis* is known to nest underground and feeds on sunflowers, honeysuckles, goldenrods, asters, *Vaccinium*, *Prunus*, and *Aesculus* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

- i. **Federal:** Endangered (USFWS 2024) **Candidate:** No
- ii. **New York:** Not listed, HPSGCN (NY SWAP 2015)

b. Natural Heritage Program

- i. **Global:** G2
- ii. **New York:** SH **Tracked by NYNHP?:** Yes

Other Ranks:

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

-Northeast Regional RSGCN: Yes (Northeast Fish and Wildlife Diversity 2023)

Status Discussion:

From the NYNHP Conservation Guide (New York Natural Heritage Program 2023b): *Bombus affinis* has been ranked state historical (SH) as the last known record for New York is from 1999 and the species has not persisted in most neighboring states, suffering catastrophic decline throughout its range in recent years. While the definitive cause for its decline is unknown, bumble

bee experts and scientists strongly suspect exotic pathogens such as *Nosema bombi* that have been introduced into wild populations (Cameron *et al.* 2011) and neonicotinoid pesticides (Colla and Taylor-Pindar 2011).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	<1931-2000 vs 1991-2009	Federally Endangered	Choose an item.
Northeastern US	Yes	Declining	Declining		RSCGN	Yes
New York	Possibly extirpated	Declining	Declining	Pre-2000 vs 2000-2022	SH	Yes
Connecticut	Presumed extirpated	Declining	Declining		SX	Yes
Massachusetts	Presumed extirpated	Declining	Declining		SX	Yes
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Yes	Declining	Declining		S1	Yes
Vermont	Presumed extirpated	Declining	Declining		SX	Yes
Ontario	Yes	Declining	Declining		S1	Yes
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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):

Species in the subgenus *Bombus* have declined 99-100% in most of the Northeast (Schweitzer and Sears 2013). In New York, there are no known records of *B. affinis* post 2000 (White *et al.* 2022). There is a 100% decline of this species long-term and it is currently ranked state historical (White *et al.* 2022).

Historically, *B. affinis* had a large distribution from as far west as North and South Dakota, to the upper Midwest, to the eastern United States (from northern Georgia to Maine) and continuing north into southern Quebec and Ontario in Canada (USFWS 2021). This wide distribution encompassed 31 states; however, *B. affinis* has experienced drastic declines in its distribution and abundance since the late 1990s (Colla and Packer 2008, USFWS 2016). Approximately only 9% of their historical locations are currently occupied by *B. affinis* (USFWS 2016). Its current range covers just 13 states and 1 Canadian Province (USFWS 2021). Most of the remaining population occurs in the Midwest.

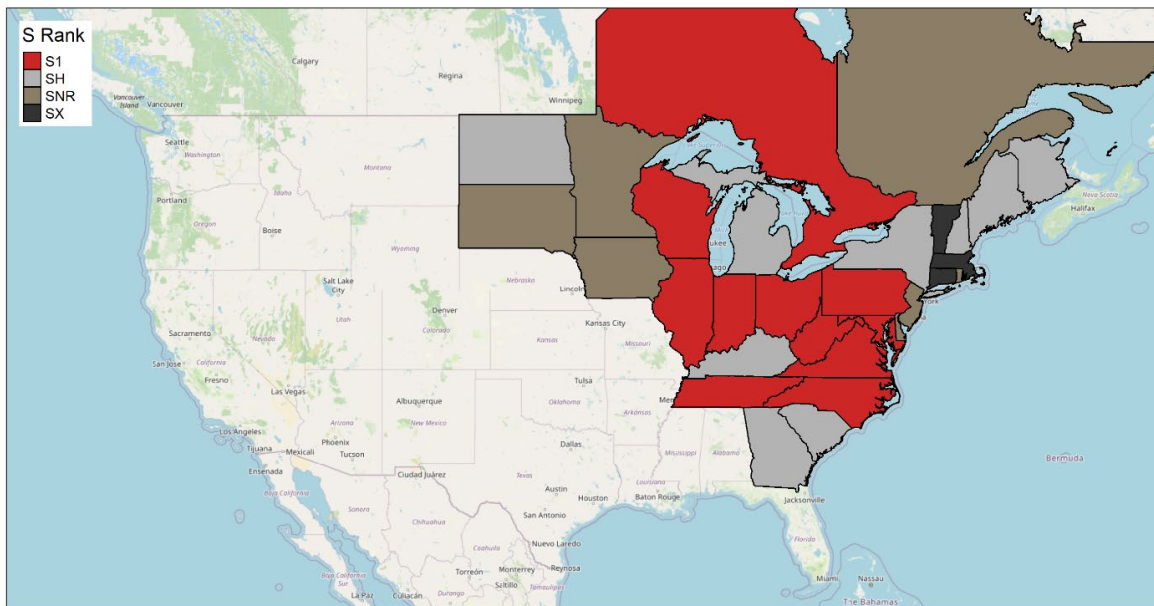


Figure 1. *Bombus affinis* distribution and status (Source: NatureServe 2023)

Bombus affinis

- Present
- Presence Expected
- Historical



Ecosystem-based Automated Range (EBAR)

Date Generated: July 3, 2020; Version: 1.0; Stage: Expert Reviewed; Scope: Global

Synonyms Used: None

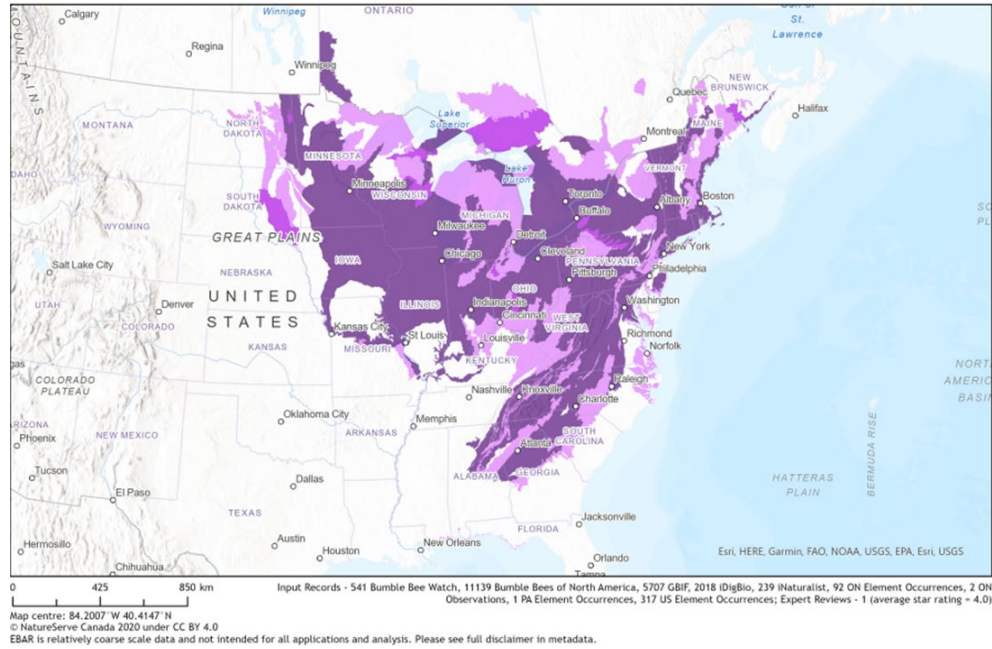


Figure 2. *Bombus affinis* distribution and range map (Source: NatureServe Canada 2020).

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

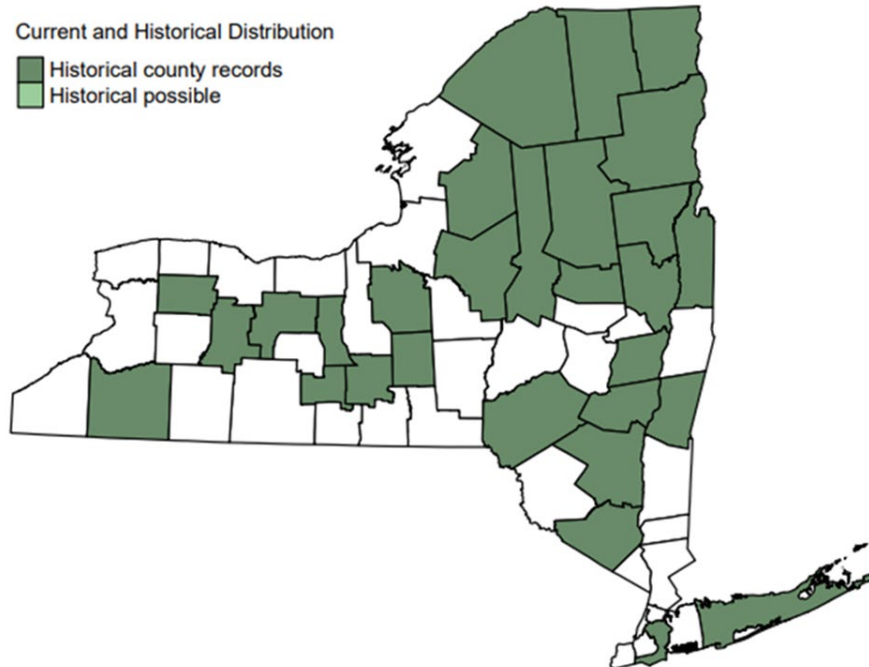


Figure 3. Records of *Bombus affinis* in New York. No observations from 2000 to present; those from 1999 and earlier shown as shaded counties (Source: White et al. 2022).

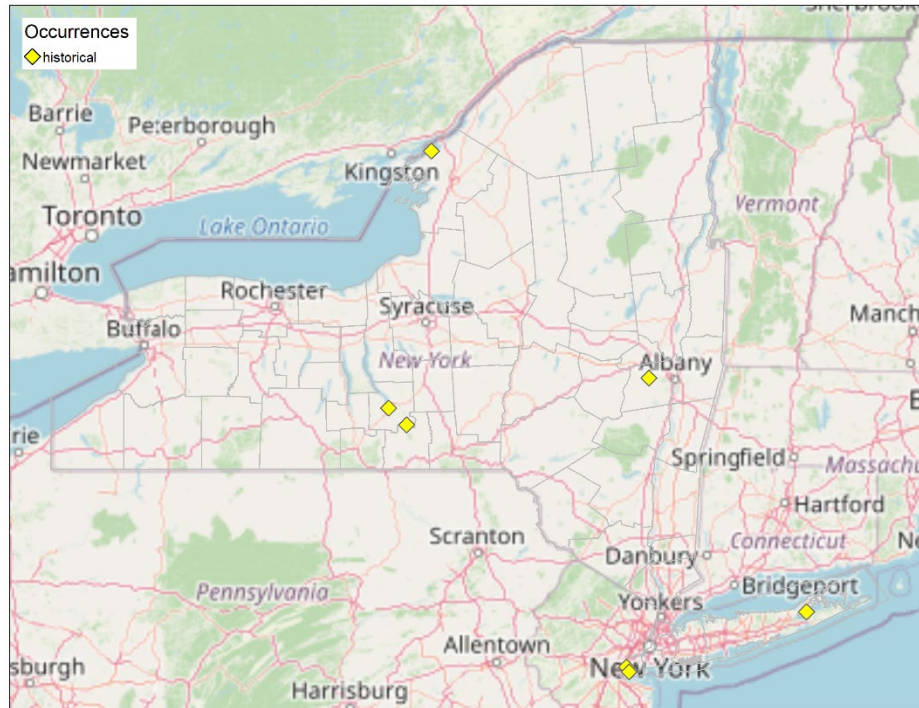


Figure 3. NYNHP element occurrence records for *Bombus affinis* in New York (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	845	38	61%
2000-2021	0	0	0%

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

Details of historic and current occurrence:

Bombus affinis has not been confirmed in New York since 1999. Due to this and its rapid, recent decline throughout much of its range, its current status in New York is state historical (SH). There are no records known from New York post-2000 (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).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓
Time frame of decline/increase:
Habitat Specialist **Yes:** **No:** ✓
Indicator Species **Yes:** **No:** ✓
Pollinator **Yes:** ✓ **No:**

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. *Bombus affinis* are underground nesters and will use abandoned rodent burrows, hollow tree stumps, and fallen dead wood (Colla and Taylor-Pindar 2011). Suitable sites for bumble bees to overwinter may include rotting logs, mulch, or loose soil (Schweitzer *et al.* 2012). Usually close to or within woodlands, urban parks and gardens (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. affinis* include asters, *Helianthus*, *Solidago*, *Vaccinium*, *Prunus*, *Aesculus*, *Agastache*, *Dalea*, *Eupatorium*, *Impatiens*, *Lonicera*, and *Monarda* (Colla *et al.* 2011, Williams *et al.* 2014).

V. Species Demographic and Life History:

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

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 and mate. Only the new queens will overwinter and begin their own nest the following spring (Schweitzer *et al.* 2012). *B. affinis* typically nests underground in deserted mammal burrows; males patrol circuits 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 fall between 0.15 to 0.62 miles; however, some species have been documented to forage as far as 1.86 miles (Jarau and Hrnecir 2009).

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

The primary threat to species in the subgenus *Bombus* leading to their rapid, recent decline has been attributed to exotic pathogens. Cameron *et al.* (2011) showed a higher proportion of *B. affinis* individuals infected by the pathogen *Nosema bombi* than other bumble bees with stable global populations. In addition, insecticides, habitat loss and fragmentation, are known long-term threats for many bumble bees and research is needed to determine the impact of climate change and the introduction of non-native Hymenoptera (Colla and Taylor-Pindar 2011, Environment and Climate Change Canada 2020, 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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes: 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. affinis*.

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

In various life stages, including adequate nest and overwintering sites as well as food sources from March-October in relatively close proximity 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 affect them as little as possible. Minimizing contact between wild bumble bee populations and commercial bees can help protect the wild bees (Schweitzer *et al.* 2012). The recovery strategy for *B. affinis* in Canada includes surveys and monitoring, management of individuals and habitat, research, and partnership, communication, outreach, and education (Environment and Climate Change Canada 2020).

Further inventory is needed within its native range to document any extant occurrences, if present, and define the current distribution of *B. affinis*. 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 to determine more information on threats, climate change effects, insecticide, and non-native bee introduction effects for *B. affinis*.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection
5. Species management	Species recovery

Table 2. Recommended conservation actions for *Bombus affinis*.

VII. References

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 10/30/2013

First revision: Samantha Hoff

Revision date: 2/19/2014

Last updated: Katie Hietala-Henschell

Updated Date: 1/3/2024

Species Status Assessment

Common Name: Black-and-gold bumble bee **Date Updated:** 1/12/2024

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

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus auricomus (black-and-gold bumble bee) belongs to the subgenus (Bombias), which are not experiencing higher susceptibility to the *Nosema bombi* pathogen like *Bombus* and *Thoracobomus* are, but may be experiencing other threats of habitat loss, pesticides, and urbanization (Schweitzer *et al.* 2012) as well as pollution and invasive species.

This species is only known from 18 counties in New York and appears to never have been common. New York is on the northern and eastern range margins for this species (Richardson 2013, Yanega 2013). They are distributed in many states and provinces across the United States and Canada, but many of these 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 auricomus* is known to nest underground and feeds on clovers, bee balms, *Solanum*, *Hypericum*, and *Eupatorium* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** No

ii. **New York:** Not listed – SPCN (NY SWAP 2015)

b. Natural Heritage Program

i. **Global:** G5

ii. **New York:** S2 **Tracked by NYNHP?:** Yes

Other Ranks:

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

-Northeast Regional SGCN: Not listed (Northeast Fish and Wildlife Diversity 2023)

Status Discussion:

Bombus auricomus appears to never have been common in New York. This species has been documented in 18 counties in New York State. There are an additional seven counties with historical records (1999 and earlier) (White *et al.* 2022). Threats include habitat loss, pesticides, and urbanization, pollution, and invasive species. This subgenus (Bombias) does not appear to be experiencing high susceptibility to the protozoan *N. bombi*, a pathogen attributed to playing a large role in the decline of *Bombus* and *Thoracobombus* subgenera.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	1805-2001 vs 2002-2012	Not listed	Choose an item.
Northeastern US	Yes	Unknown	Unknown		Not listed	Choose an item.
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S2	Yes
Connecticut	Yes	Declining	Declining		S1	Yes
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	Yes	Stable	Stable		S4	No
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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 auricomus appears to be a widespread species, occurring throughout eastern North America and as far west as the eastern Great Plains (NatureServe 2023). New York is on the northern and eastern range margins for this species (Richardson 2013, Yanega 2013).

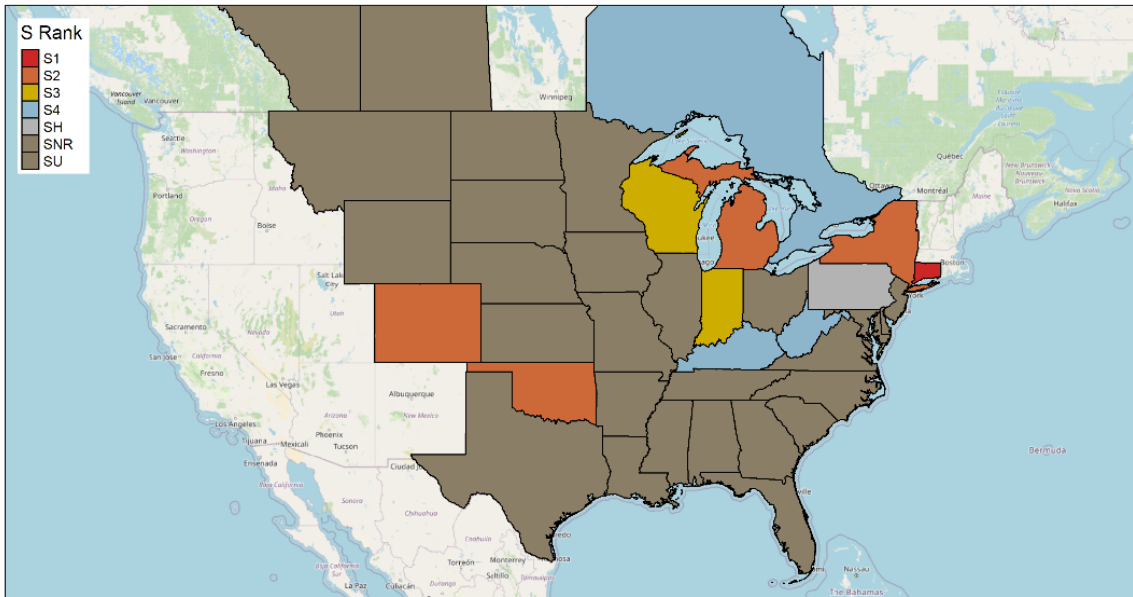


Figure 1. *Bombus auricomus* distribution and status (Source: NatureServe 2023)

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

From the NYNHP *B. auricomus* Conservation Guide (New York Natural Heritage Program 2023b): The short-term trends for this species are unknown. Based on data from the Empire State Native Pollinator Survey, the current (2000 to present) and historical (1999 and earlier) distribution in New York has remained relatively stable. While there appear to be seven counties no longer occupied that were historically, there are also several new county records in recent years (White *et al.* 2022). *Bombus auricomus* has been documented in 18 counties in New York State.

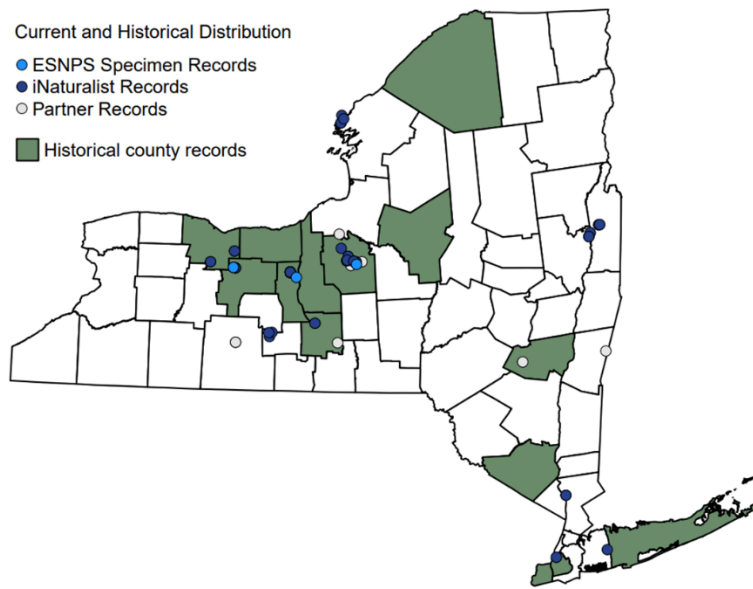


Figure 2. Records of *Bombus auricomus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

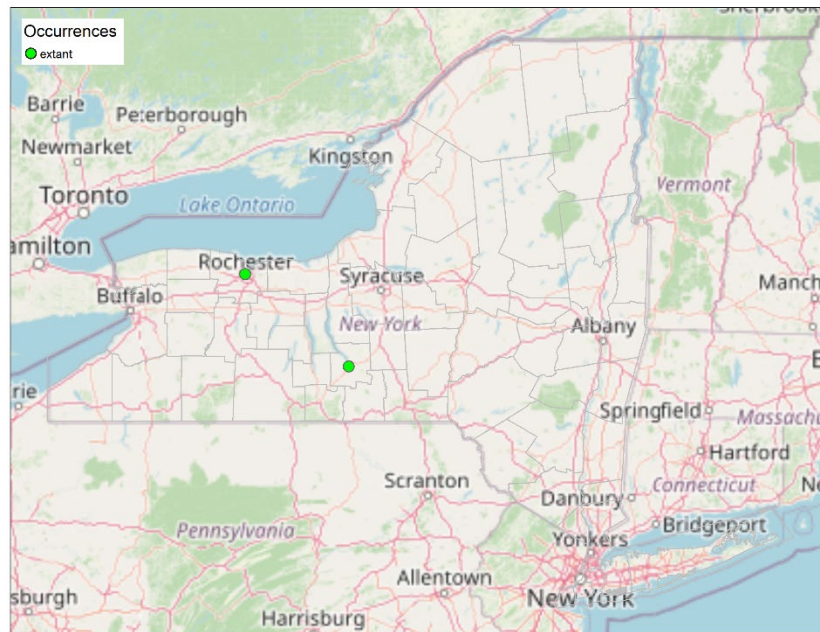


Figure 3. NYNHP element occurrence records for *Bombus auricomus* in New York (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	61	14	23
2000-2021	97	18	29

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

Details of historic and current occurrence:

Bombus auricomus was only known from 14 counties prior to 2000. With increased survey efforts it has been documented in 18 counties in New York State. There are an additional seven counties with historical records (1999 and earlier) (White *et al.* 2022). The increase in the number of counties is likely a result of increased survey effort and does not likely reflect a range expansion.

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).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓

Time frame of decline/increase:

Habitat Specialist **Yes:** **No:** ✓

Indicator Species **Yes:** **No:** ✓

Pollinator **Yes:** ✓ **No:**

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. This bumble bee nests underground (Colla *et al.* 2011). Such species often use abandoned rodent nests underground in south facing exposures. 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. auricomus* include clovers, bee balms, *Solanum*, *Hypericum*, and *Eupatorium* (Colla *et al.* 2011). Suitable sites for bumble bees to overwinter may include rotting logs, mulch, or loose soil (Schweitzer *et al.* 2012). *Bombus auricomus* nests are small and above-ground, in open grassland and old field habitats (Williams *et al.* 2014).

V. Species Demographic and Life History:

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

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). The nests of *B. auricomus* are small and on the ground surface (Williams *et al.* 2011).

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):

A score of high to medium threat impact was calculated in NatureServe ranking calculator for this subgenus, which are not experiencing higher susceptibility to the *N. bombi* pathogen like *Bombus* and *Thoracobomus* are, but may be experiencing other threats of habitat loss and fragmentation, pesticides, and urbanization (Schweitzer *et al.* 2012) as well as pollution and invasive species. The score was estimated based on Schweitzer and Sears bumble bee ranking guidelines of May 1, 2013.

Additional research is needed to determine the impact of climate change and the introduction of non-native hymenoptera (Colla and Taylor-Pindar 2011, 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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes:

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. auricomus*.

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

Any efforts to protect wild bumble bee populations from pathogen exposure would benefit *B. auricomus*. 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. 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).

Minimal to no exposure of *B. auricomus* to insecticides would also benefit them. Suggested actions include avoidance of application to flowers that bumble bees are attracted to and application of solutions or soluble powders (rather than dusts or wettable powders) to the ground in calm wind and warmer temperatures during periods of dewless nights to minimize the impact to resident bumble bee populations (Schweitzer *et al.* 2012). Organic farming has also been suggested to benefit bumble bees.

Further research is needed to document extant occurrences in New York, and to define the current distribution of *B. auricomus*. 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.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus auricomus*.

VII. References

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VIII. Version history

Originally prepared by: Erin White
Date prepared: 2/7/2013

Last updated: Katie Hietala-Henschell
Updated Date: 1/12/2024

Species Status Assessment

Common Name: Ashton's cuckoo bumble bee **Date Updated:** 1/12/2024

Scientific Name: *Bombus bohemicus* (=ashtoni) **Updated By:** Katie Hietala-Henschell

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus bohemicus (Ashton's cuckoo bumble bee, formerly *B. ashtoni*) belongs to the subgenus Psithyrus, which are obligate nest parasites of other bumble bee species. In addition to habitat loss, pesticides, and urbanization as long-term threats (Schweitzer *et al.* 2012), Cameron *et al.* (2011) showed a higher proportion of *Bombus* and *Thoracobombus* individuals infected by the pathogen *Nosema bombi* than other *Bombus* with stable global populations. Since this species is a social parasite of *B. affinis* and *B. terricola* in the subgenus *Bombus* (Colla *et al.* 2011), it may have a higher threat impact from this pathogen. Researchers believe this pathogen is largely responsible for the rapid (99-100%) decline of *Bombus* and *Thoracobombus* species in most of the Northeast (Schweitzer and Sears 2013). Historically known from half of the counties in New York, with the last known state record from 1997 (New York Natural Heritage Program 2023a); *B. bohemicus* is currently ranked as SH, state historical, in New York (New York Natural Heritage Program 2023b).

From White (2014): 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 bohemicus* is known to feed on goldenrods, clovers, and *Vaccinium* and parasitize *B. affinis* and *B. terricola* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

- i. **Federal:** Not listed **Candidate:** No
- ii. **New York:** Not listed, HPSGCN (NY SWAP 2015)

b. Natural Heritage Program

- i. **Global:** G3G5
- ii. **New York:** SH **Tracked by NYNHP?:** Yes

Other Ranks:

-IUCN Red List: Data Deficient (Hatfield *et al.* 2016)

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

Status Discussion:

The last known New York record is from 1997 (New York Natural Heritage Program 2023a) and the species appears to have not persisted in this or neighboring states, suffering catastrophic decline in recent years. It is globally threatened and state historical.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	1805-2001 vs 2002-2	Not listed	Choose an item.
Northeastern US	Yes	Declining	Declining		RSGCN	Yes
New York	Possibly extirpated	Declining	Declining	Pre-2000 vs 2000-2022	SH	Yes
Connecticut	Presumed extirpated	Declining	Declining		SX	No
Massachusetts	Possibly extirpated	Declining	Declining		SH	Yes
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	Yes	Unknown	Unknown		SNR	Choose an item.
Ontario	Yes	Declining	Declining		S1	Yes
Quebec	Possibly extirpated	Declining	Declining		SH	Yes

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):

Decline has been rapid in the short term. No *B. bohemicus* records were found post 2000, and just 6 out of 127 *Bombus* records from in 1991-1999 were *B. bohemicus* (New York Natural Heritage Program 2023b). The long-term trend is of high decline when comparing post-2000 records (zero) to all other records (White *et al.* 2022). The last known New York record is from 1997 and the species appears to have not persisted in this or neighboring states, suffering catastrophic decline in recent years. It is globally and state historical (White 2014).

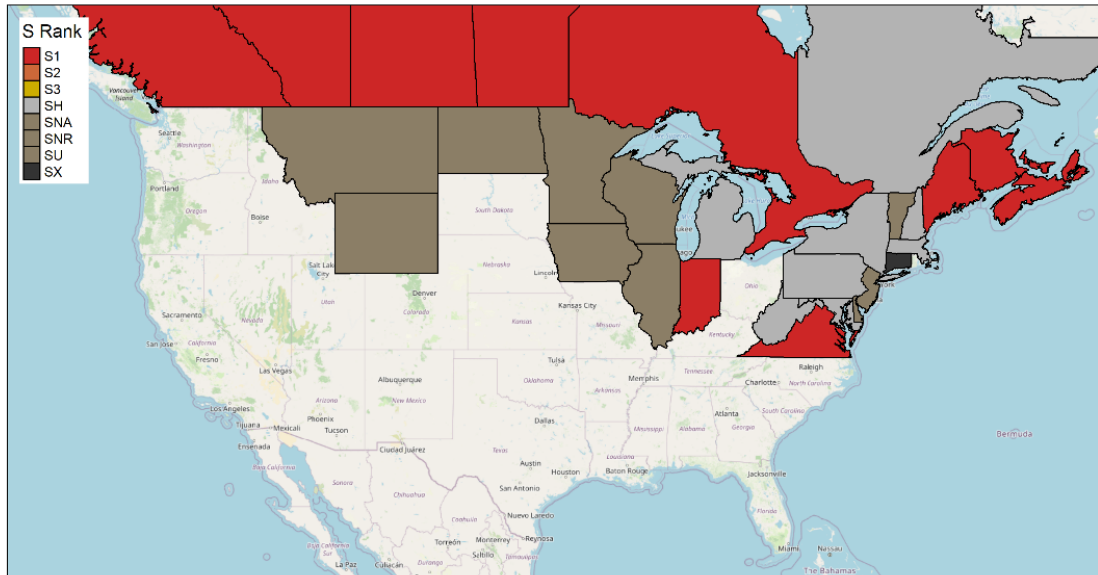


Figure 1. *Bombus bohemicus* distribution and status (Source: NatureServe 2023)

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

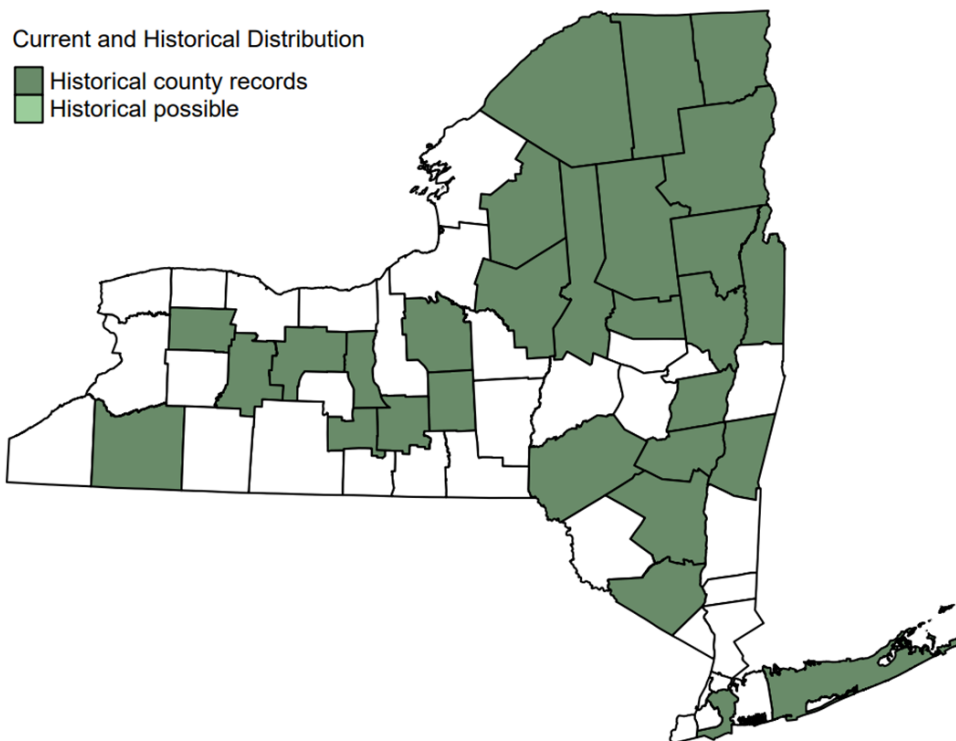


Figure 3. Records of *Bombus bohemicus* in New York. No observations from 2000 to present; those from 1999 and earlier shown as shaded counties (Source: White *et al.* 2022).

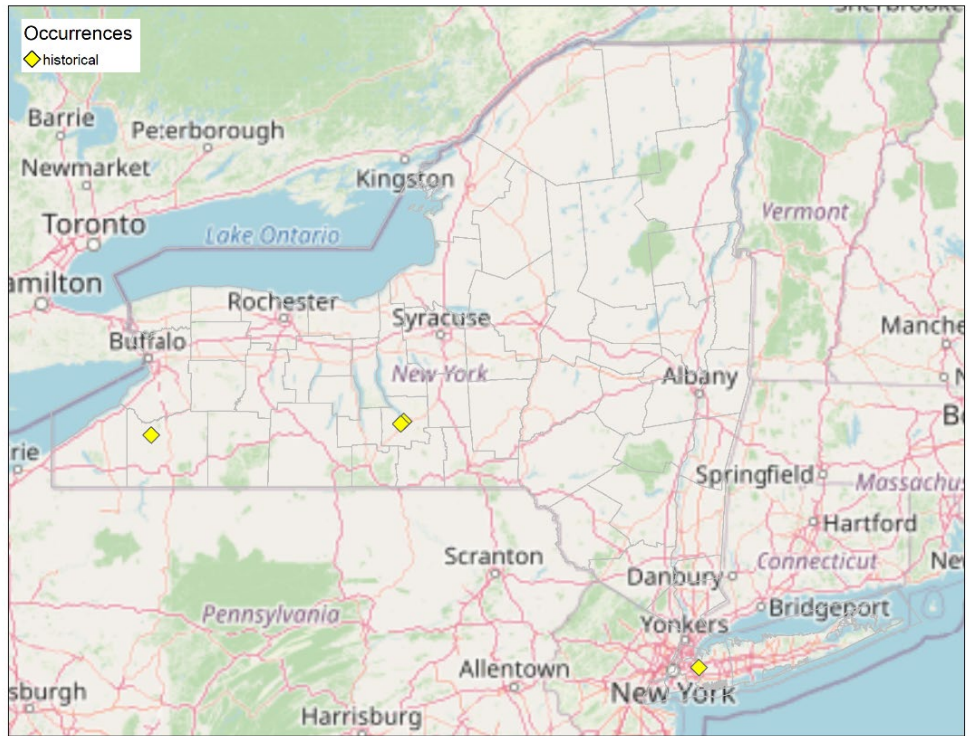


Figure 3. NYNHP element occurrence records for *Bombus bohemicus* in New York (Source: New York Natural Heritage Program 2023b).

Years	# of Records	# of Counties	% of State
Pre-2000	475	31	50%
2000-2021	0	0	0

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

Details of historic and current occurrence:

Currently considered SH, state historical (White 2014).

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 2014).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓
Time frame of decline/increase:
Habitat Specialist **Yes:** **No:** ✓
Indicator Species **Yes:** **No:** ✓
Pollinator **Yes:** ✓ **No:**

Habitat Discussion:

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 2014).

V. Species Demographic and Life History:

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

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 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 bohemicus* is one of the cuckoo bumble bees, a specialized lineage of bumble bees (subgenus *Psithyrus*) that has lost the ability to collect pollen and to rear their brood. This social parasite occurs exclusively in the nests of other bees. It is known to feed on goldenrods, clovers, and *Vaccinium* and parasitize *B. affinis* and *B. terricola* (Colla *et al.* 2011). The habitats of its known host species, *B. affinis* and *B. terricola*, are typically found in woodlands, urban parks and gardens, and wetlands (Williams *et al.* 2014). These bees enter the nests of other bumble bee species, kills or subdues the queen of that colony, and forces (through aggression and pheromones) the workers to rear the offspring of the usurper. All of the resulting cuckoo bee offspring are reproductive and leave the colony to mate (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):

In addition to habitat loss, pesticides, and urbanization as long-term threats (Schweitzer *et al.* 2012), Cameron *et al.* (2011) showed a higher proportion of *Bombus* and *Thoracobombus* individuals infected by the pathogen *Nosema bombi* than other *Bombus* with stable global populations. Since this species is a social parasite of *B. affinis* and *B. terricola* in the subgenus *Bombus* (Colla *et al.* 2011), it may have a higher threat impact from this pathogen.

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).

Threats to NY Populations	
Threat Category	Threat
1.Pollution	Agricultural & Forestry Effluents (pesticides)
2.Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3.Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes: 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. bohemicus*.

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

In states or provinces where the species still occurs, 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 from March-October in relatively close proximity 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 affect them as little as possible.

Minimizing contact between wild bumble bee populations and commercial bees can help protect the wild bees (Schweitzer *et al.* 2012).

Further inventory is needed within its native range to document any extant occurrences, if present, and define the current distribution of *B. bohemicus*. 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.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection
5. Species management	Species recovery

Table 2. Recommended conservation actions for *Bombus bohemicus*.

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 2/7/2014

Last updated: Katie Hietala-Henschell

Updated Date: 1/12/2024

(New York Natural Heritage Program 2023b). It appears to never have been a common species in New York.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	1805-2001 vs 2002-2012	Not listed	Choose an item.
Northeastern US	Yes	Unknown	Unknown		Not listed	Choose an item.
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S3	Yes
Connecticut	Yes	Declining	Declining		S1	Yes
Massachusetts	Yes	Unknown	Unknown		SU	Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Presumed extirpated	Declining	Declining		SX	Yes
Vermont	Yes	Increasing	Increasing		S4	Choose an item.
Ontario	Yes	Stable	Stable		S5	Choose an item.
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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 information on the occurrence of bumble bees across the state (White *et al.* 2022). However, no continued organized, regular monitoring or survey activities are directed toward this species.

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

Bombus borealis occurs across southern Canada and down through the eastern United States and as far west as Idaho (Discover Life 2024, NatureServe 2023). From the NYNHP *B. borealis* Conservation Guide (New York Natural Heritage Program 2023b): The short-term trends for this species are unknown. Based on data from the Empire State Native Pollinator Survey, the current (2000 to present) and historical (1999 and earlier) distribution in New York has remained relatively stable. While there appear to be three counties no longer occupied that were historically, there are also several new county records in recent years (White *et al.* 2022).

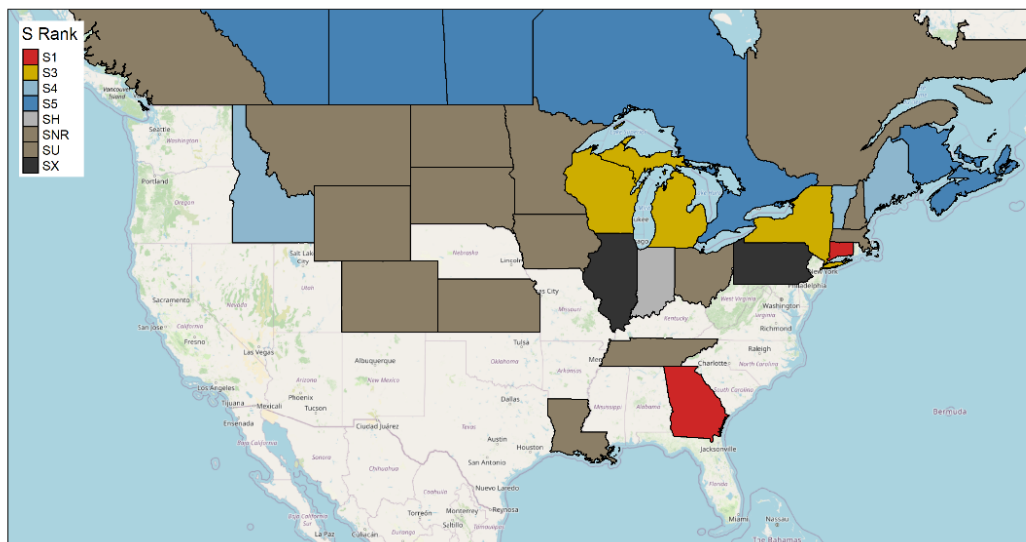


Figure 1. *Bombus borealis* distribution and status (Source: NatureServe 2023)

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

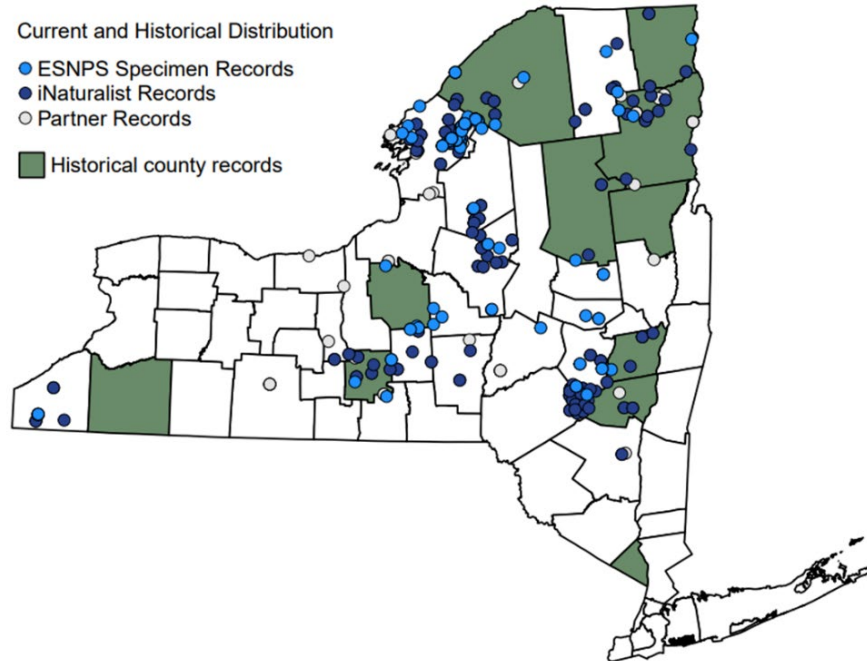


Figure 2. Records of *Bombus borealis* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

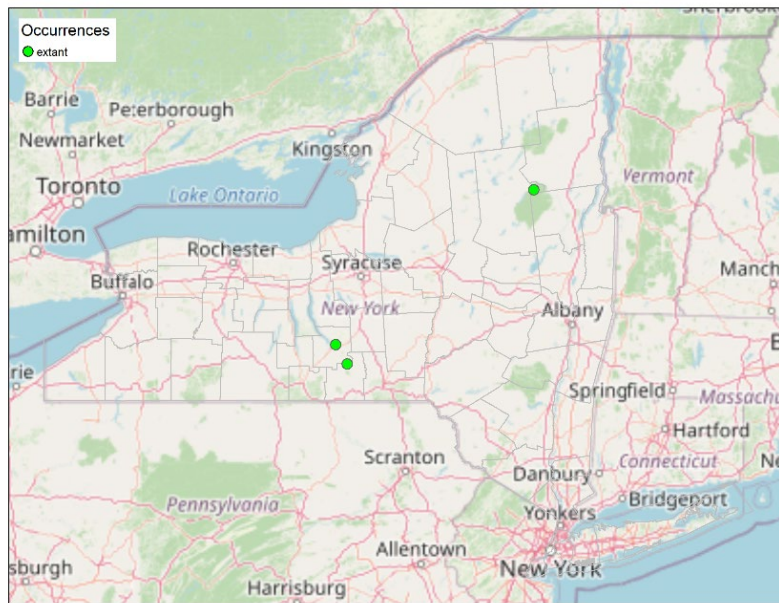


Figure 3. NYNHP element occurrence records for *Bombus borealis* in New York (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	141	11	18%
2000-2021	367	29	47%

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

Details of historic and current occurrence:

In New York, *B. borealis* was known from 11 counties based on historic records (1999 and earlier). Recent survey efforts (2000-2021) have detected *B. fervidus* in 29 counties (New York Natural Heritage Program 2023a, White *et al.* 2022). While the higher number of county 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).

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). This species is typically found close to or in wooded areas (Williams *et al.* 2014); also in wetland areas, and in forest near open water or beaches (Gibson *et al.* 2019).

Habitat or Community Type Trend in New York

Declining:	Stable:	Increasing:	Unknown: ✓
Time frame of decline/increase:			
Habitat Specialist	Yes:	No: ✓	
Indicator Species	Yes:	No: ✓	
Pollinator	Yes: ✓	No:	

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. *B. borealis* is known to nest underground, often using abandoned rodent nests underground in south facing exposures (Colla *et al.* 2011, 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. borealis* include vetches, thistles, asters, *Prunella*, *Eupatorium*, and *Symphytum officinale* (Colla *et al.* 2011). 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:

VI. Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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).

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 Hrnecir 2009).

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

Threats to *Bombus borealis* include habitat loss, pesticides, and urbanization (Schweitzer *et al.* 2012) as well as pollution and invasive species. This subgenus (*Subterraneobombus*) does not appear to have experienced high susceptibility to the protozoan *N. bombi*, a pathogen attributed to playing a large role in the decline of *Bombus* and *Thoracobombus* subgenera (New York Natural Heritage Program 2023b).

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).

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

Yes: _____

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. borealis*.

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

Any efforts to protect wild bumble bee populations from pathogen exposure would *B. borealis*. 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. 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).

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).

Further research is needed to determine more information on habitat requirements, threats, climate change effects, and insecticide effects for *B. borealis*.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus borealis*.

VII. References

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White, E.L., M. D. Schlesinger, and T.G. Howard. 2022. The Empire State Native Pollinator Survey (2017-2021). New York Natural Heritage Program, Albany, New York.

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 2/7/2013

Last updated: Katie Hietala-Henschell

Updated Date: 1/12/2024

Species Status Assessment

Common Name: Yellow bumble bee

Date Updated: 1/10/2024

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

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

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, HPSGCN (NY SWAP 2015)

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)

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	Choose an item.
Northeastern US	Yes	Declining	Declining		Watchlist	Choose an item.
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	Choose an item.
Pennsylvania	Yes	Unknown	Unknown		SNR	Choose an item.
Vermont	Yes	Declining	Declining		S2	Yes
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		Exotic?	Choose an item.

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).

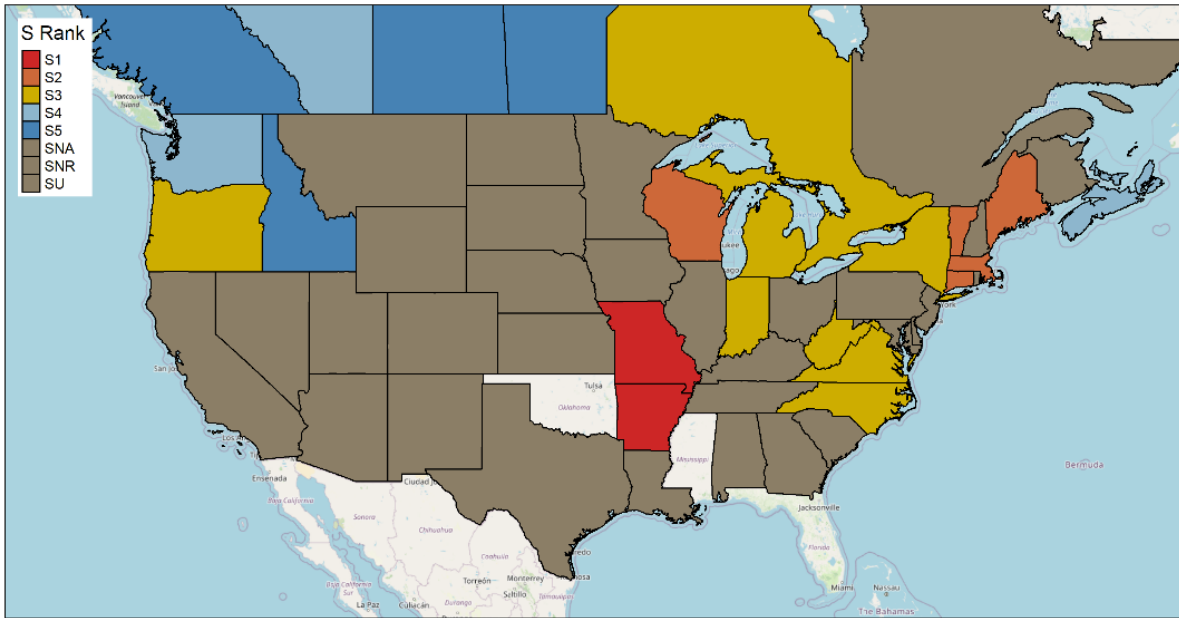


Figure 1. *Bombus fervidus* distribution and status (Source: NatureServe 2023)

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

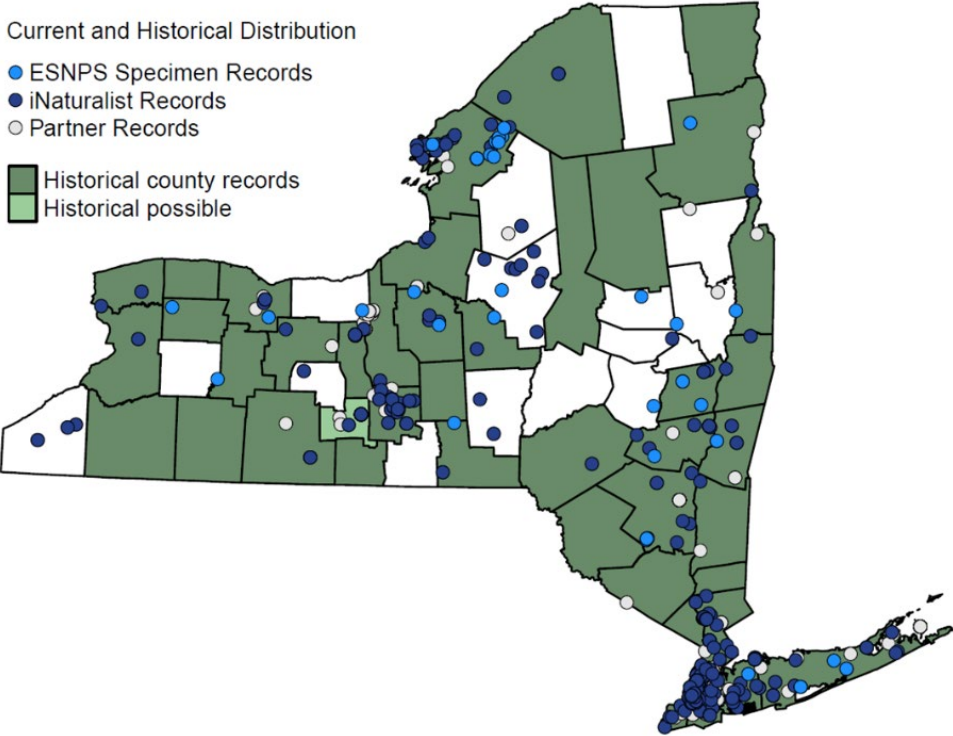


Figure 2. Records of *Bombus fervidus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White et al. 2022).

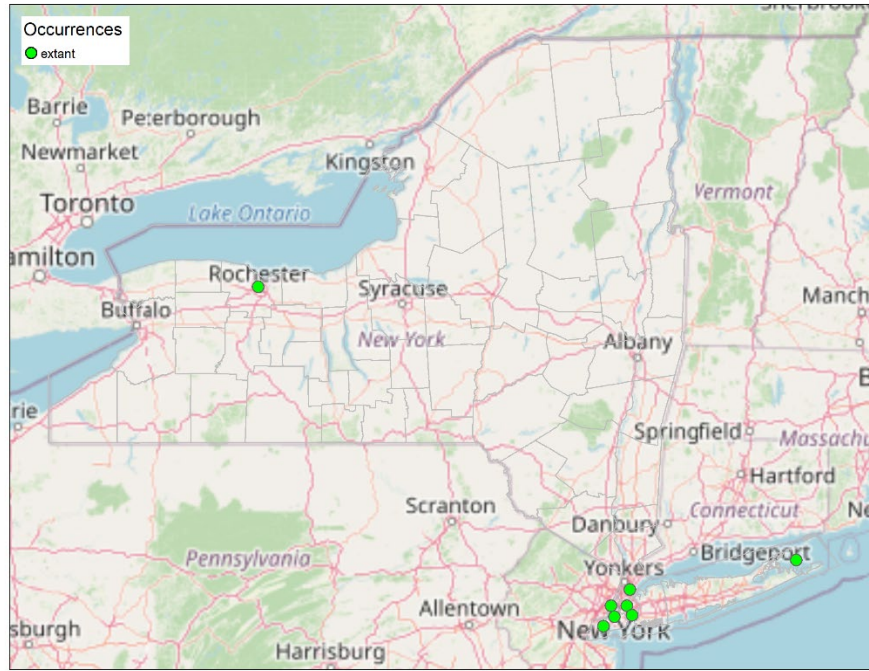


Figure 3. NYNHP element occurrence records for *Bombus fervidus* in New York (Source: New York Natural Heritage Program 2023c).

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

Declining: _____ Stable: _____ Increasing: _____ Unknown:

Time frame of decline/increase: _____

Habitat Specialist Yes: _____ No:

Indicator Species Yes: _____ No:

Pollinator Yes: No: _____

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	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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 Hrnir 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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes: 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*.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) - <https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus fervidus*.

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 2/7/2013

Last updated: Katie Hietala-Henschell

Updated Date: 1/10/2024

Species Status Assessment

Common Name: Fernald cuckoo bumble bee **Date Updated:** 1/12/2024

Scientific Name: *Bombus flavidus* (= *fernaldae*) **Updated By:** Katie Hietala-Henschell

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus flavidus (Fernald cuckoo bumble bee, formerly *B. fernaldae*) belongs to the subgenus *Psithyrus*, which are obligate nest parasites of other bumble bee species. This species is a social parasite on *B. perplexus* and *B. rufocinctus* (Colla *et al.* 2011). Threats to *B. flavidus*, and their hosts, include habitat loss, pesticides, and urbanization (Schweitzer *et al.* 2012) as well as pollution, invasive species, and roads (barriers to dispersal and habitat fragmentation). The threat impact for these factors was estimated to be high to medium (White 2014).

Bombus flavidus was considered state historical until recently re-discovered during ESNPS in small numbers (White *et al.* 2022). While it was not detected in some historically known counties, it was detected in not previously known counties. There were 34 historic records (1999 and earlier) and 43 extant records (post-2000) in the state of New York, suggesting this species is rare across New York but that populations may be stable (New York Natural Heritage Program 2023a).

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 flavidus* is known to feed on goldenrods, clovers, and cinquefoils, and *Rubus* and parasitize *B. perplexus* and *B. rufocinctus* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

- i. **Federal:** Not listed **Candidate:** No
- ii. **New York:** Not listed – non-SGCN, extirpated from New York (NY SWAP 2015)

b. Natural Heritage Program

- i. **Global:** G5
- ii. **New York:** S2 **Tracked by NYNHP?:** Yes

Other Ranks:

-IUCN Red List: Data Deficient (Hatfield *et al.* 2016)

-Northeast Regional SGCN: Not listed (Northeast Fish and Wildlife Diversity 2023)

Status Discussion:

The species was state historical until recently re-discovered during ESNPS (White *et al.* 2022). The number of records appear relatively stable, with 34 historic records and 43 current records; however, not all historic records were confirmed (New York Natural Heritage Program 2023a). This species is rare in New York and has been ranked as S2, Imperiled.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	1805-2001 vs 2002-2012	Not listed	Choose an item.
Northeastern US	Yes	Unknown	Unknown		Not listed	Choose an item.
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S2	Yes
Connecticut	Yes	Unknown	Unknown		SNR	Choose an item.
Massachusetts	Yes	Unknown	Unknown		SU	Choose an item.
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	Yes	Declining	Declining		S3	Yes
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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 information on the occurrence of bumble bees across the state (White *et al.* 2022). However, no continued organized, regular monitoring or survey activities are directed toward this species.

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

Bombus flavidus is considered widespread in Canada and the northern United States, from Alaska to California in the West, New Brunswick to North Carolina in the East (Discover Life 2024).

Previously ranked as historic due to a lack of extant records, this species was confirmed to be present, in low numbers, in New York during a recent pollinator survey effort (White *et al.* 2022).

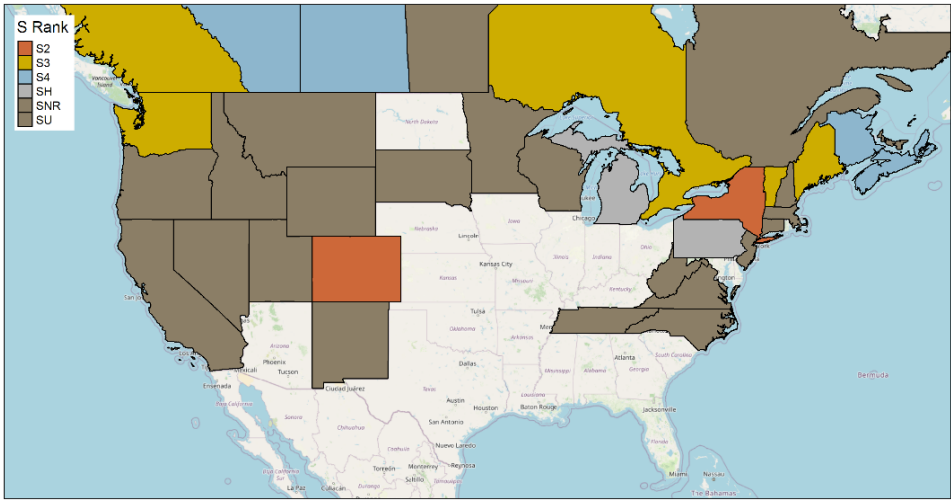


Figure 1. *Bombus flavidus* distribution and status (Source: NatureServe 2023)

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

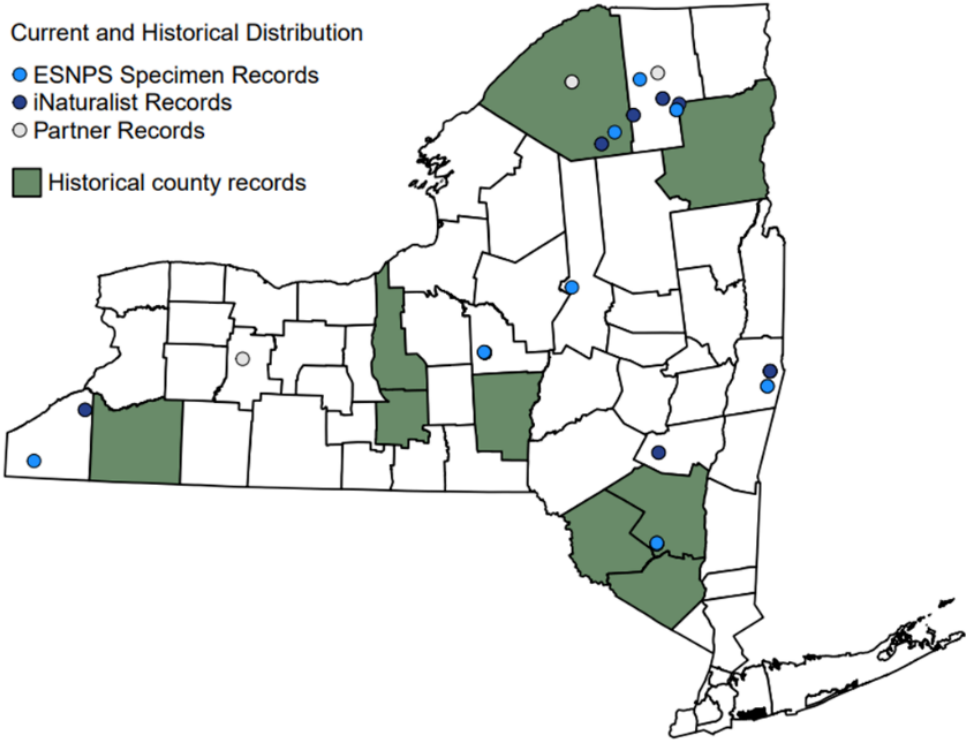


Figure 2. Records of *Bombus flavidus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

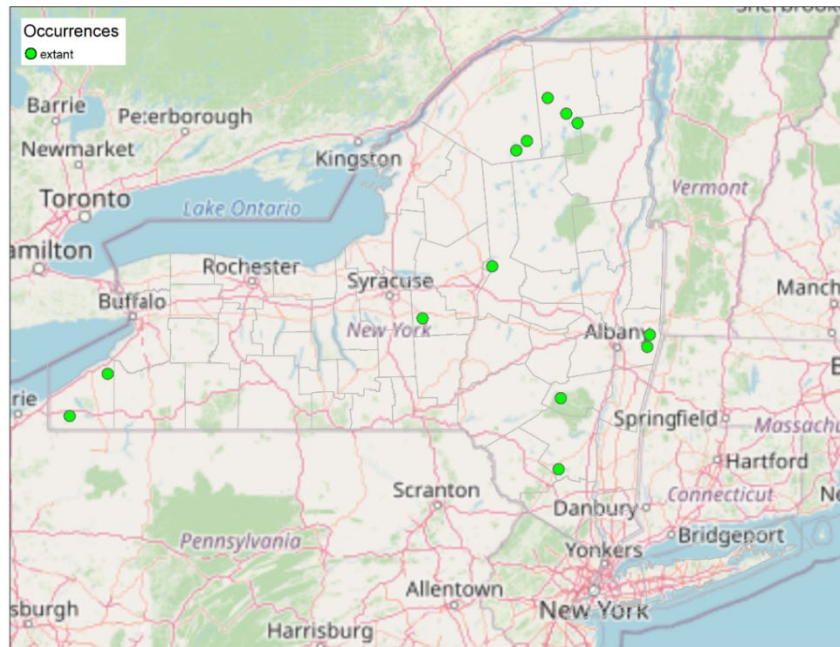


Figure 3. NYNHP element occurrence records for *Bombus flavidus* in New York (Source: New York Natural Heritage Program 2023b).

Years	# of Records	# of Counties	% of State
Pre-2000	34	9	15%
2000-2021	43	10	16%

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

Details of historic and current occurrence:

Bombus flavidus was historically known from only 34 records across nine counties. Recent survey efforts detected this species in 10 counties including Chautauqua, Essex, Franklin, Greene, Herkimer, Livingston, Madison, Rensselaer, St. Lawrence, and Ulster Counties (White *et al.* 2022, New York Natural Heritage 2023a).

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 2014).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓
Time frame of decline/increase:
Habitat Specialist **Yes:** **No:** ✓
Indicator Species **Yes:** **No:** ✓
Pollinator **Yes:** ✓ **No:**

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 flavidus* is known to feed on goldenrods, clovers, and cinquefoils, and *Rubus* and parasitize *B. perplexus* and *B. rufocinctus* (Colla *et al.* 2011). This northern species can be found in subalpine and low alpine habitats and, in the north, boreal forest.

V. Species Demographic and Life History:

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

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):

Bombus flavidus is a cuckoo bumble bee, a specialized lineage of bumble bees (subgenus *Psithyrus*), that has lost the ability to collect pollen and to rear their brood. These bees enter the nests of other bumble bee species, kills or subdues the queen of that colony, and forces (through aggression and pheromones) the workers to rear the offspring of the usurper. All of the resulting cuckoo bee offspring are reproductive and leave the colony to mate (Williams *et al.* 2014). Thorp *et al.* (1983), Williams (2008), and Wilson *et al.* (2010) conclude hosts of *B. flavidus* are likely species in the subgenus *Pyrobombus*. In the eastern United States, known hosts of this social parasite include species of the subgenus *Pyrobombus*, as well as *B. rufocinctus* which mostly nest underground (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 fall between 0.15 to 0.62 miles; however, some species have been documented to forage as far as 1.86 miles (Jarau and Hrnir 2009).

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

This species is a social parasite on *B. perplexus* and *B. rufocinctus* (Colla *et al.* 2011), belonging to subgenera *Cullumanobombus* and *Pyrobombus*. While these subgenera may not have experienced drastic declines from the *N. bombi* pathogen (like species in the *Bombus* and *Thoracobomus* subgenera) (Cameron *et al.* 2011, Schweitzer and Sears 2013), they may be experiencing other threats of habitat loss, pesticides, and urbanization (Schweitzer *et al.* 2012) as

well as pollution, invasive species, and roads (barriers to dispersal and habitat fragmentation) and the threat impact for these factors was estimated to be high to medium (New York Natural Heritage Program 2023b).

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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes:

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. flavidus*.

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

In states or provinces where the species still occurs, 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 from March-October in relatively close proximity 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 affect them as little as possible. Minimizing contact between wild bumble bee populations and commercial bees can help protect the wild bees (Schweitzer *et al.* 2012).

Further inventory is needed within its native range to document any extant occurrences, if present, and define the current distribution of *B. flavidus*. 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.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated

subcategories for Action (e.g., Site/Area Protection) -
<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus flavidus*.

VII. References

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VIII. Version history

Originally prepared by: Erin White
Date prepared: 2/7/2014

Last updated: Katie Hietala-Henschell
Updated Date: 1/12/2024

Species Status Assessment

Common Name: Indiscriminate cuckoo bumble bee **Date Updated:** 1/8/2024

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

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus insularis (indiscriminate cuckoo bumble bee) belongs to the subgenus Psithyrus, which are obligate nest parasites of other bumble bee species. In addition to habitat loss, pesticides, and urbanization as long-term threats (Schweitzer *et al.* 2012), Cameron *et al.* (2011) showed a higher proportion of *Bombus* and *Thoracobombus* individuals infected by the pathogen *Nosema bombi* than other *Bombus* with stable global populations. Since this species is a social parasite of *B. pensylvanicus* and *B. terricola*, also *B. rufocinctus* and *B. ternarius* belonging to other subgenera, (Colla *et al.* 2011), it may have a higher threat impact from this pathogen. Researchers believe this pathogen is largely responsible for the rapid (99-100%) decline of *Bombus* and *Thoracobombus* species in most of the Northeast (Schweitzer and Sears 2013). The last known New York record is from circa 1916 and it was not detected after an extensive four-year survey effort (New York Natural Heritage Program 2023a, White *et al.* 2022). It is currently ranked as SH, state historical, in NY.

From White (2014): 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 insularis* is known to feed on goldenrods, clovers, and *Vaccinium* (Colla *et al.* 2011).

I. Status

a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** No

ii. **New York:** No, Non-SGCN – Extirpated from New York (NY SWAP 2015)

b. Natural Heritage Program

i. **Global:** G3

ii. **New York:** SH **Tracked by NYNHP?:** Yes

Other Ranks:

-IUCN Red List: Least Concern (Hatfield *et al.* 2014)

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

Status Discussion:

There were only two records located for New York state, collected by T.H. Frison of unknown date in Richardson 2013 and Yanega 2013. As other collections by this individual occurred circa 1916, these records are determined to be historical. There have been no known records since then and the species is state historical.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	1805-2001 vs 2002-2012	Not listed	Choose an item.
Northeastern US	Yes	Declining	Declining		Watchlist	Choose an item.
New York	Possibly extirpated	Declining	Declining	Pre-2000 vs 2000-2022	SH	Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	Yes	Unknown	Unknown			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	No data	Unknown	Unknown			Choose an item.
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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 insularis is considered widespread in Canada and the northern United States, although it is rare in collections with specimens known from New Brunswick and New York (Discover Life 2024). From the New York Natural Heritage Program database (New York Natural Heritage

Program 2023b): The species has not been documented recently and is only known historically in the state.

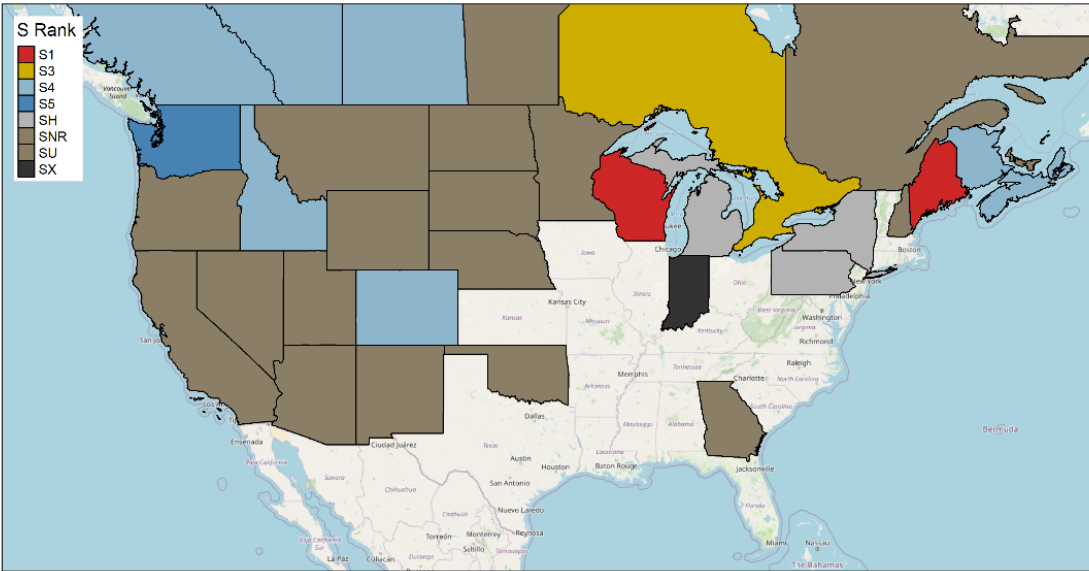


Figure 1. *Bombus insularis* distribution and status (Source: NatureServe 2023)

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

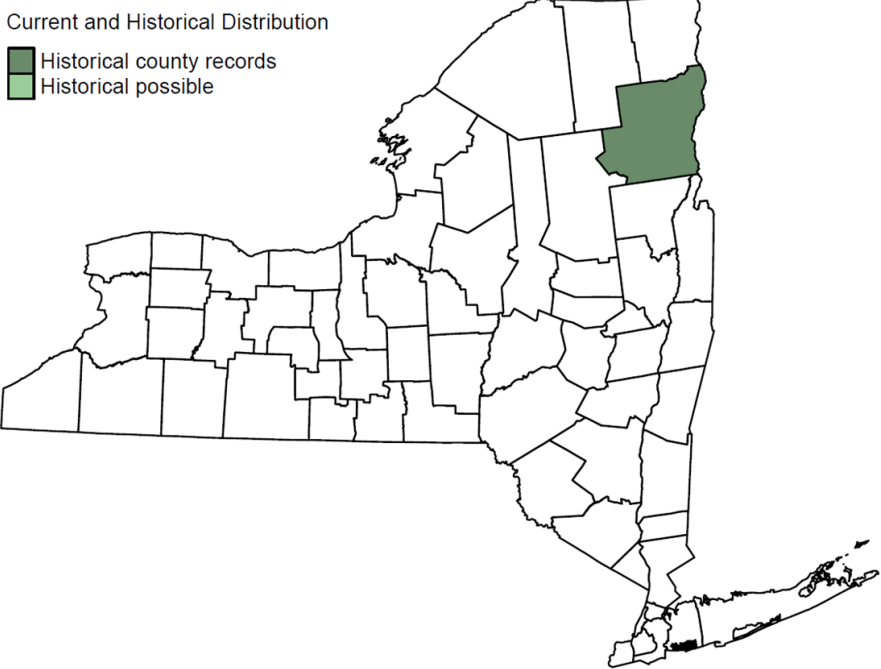


Figure 3. Records of *Bombus insularis* in New York. No records from 2000 to present; those from 1999 and earlier as shaded counties (Source: White et al. 2022).

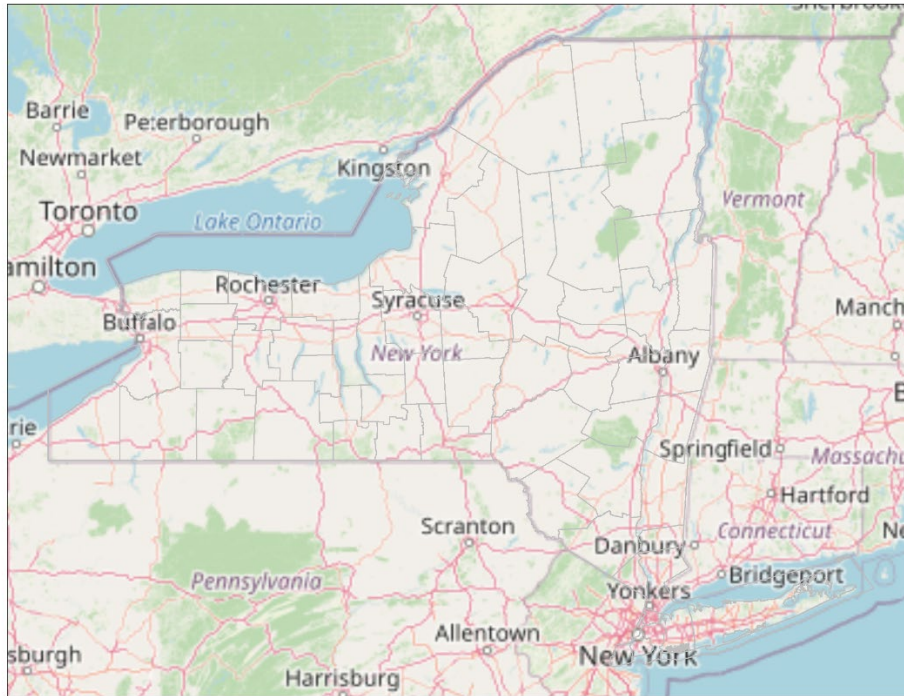


Figure 3. NYNHP element occurrence records for *Bombus insularis* in New York (Source: New York Natural Heritage Program 2023b).

Years	# of Records	# of Counties	% of State
Pre-2000	6	1	2%
2000-2021	0	0	0%

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

Details of historic and current occurrence:

There are no records known from New York post-2000 (White 2014, 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 2014). Found in open farmland and fields (Williams *et al.* 2014).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓
Time frame of decline/increase:
Habitat Specialist **Yes:** **No:** ✓
Indicator Species **Yes:** **No:** ✓
Pollinator **Yes:** ✓ **No:**

Habitat Discussion:

The adult food plants of this species include asters, *Eupatorium*, *Heliomeris*, *Melilotus*, *Rubus*, *Senecio*, *Solidago*, *Trifolium*, and *Vaccinium* (Williams *et al.* 2014). The habitats of its known host species (*B. appositus*, *B. fervidus*, *B. flavifrons*, *B. nevadensis*, and *B. ternarius*) include open farmland and fields, open woodlands, meadows, grassy prairies, mountain meadows as well as transition and northern forest areas, and urban parks, and gardens (Williams *et al.* 2014).

V. Species Demographic and Life History:

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

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):

This is one of the cuckoo bumble bees, a specialized lineage of bumble bees (subgenus *Psithyrus*) that has lost the ability to collect pollen and to rear their brood. This social parasite occurs exclusively in the nests of other bees. Known breeding hosts include *B. appositus*, *B. fervidus*, *B. flavifrons*, *B. nevadensis*, and *B. ternarius*. It has also been recorded as present in the nests of *B. rufocinctus*, *B. occidentalis*, and *B. terricola*. Males of *B. insularis* patrol in circuits in search of females (Williams *et al.* 2014). These bees enter the nests of other bumble bee species, kills or subdues the queen of that colony, and forces (through aggression and pheromones) the workers to rear the offspring of the usurper. All of the resulting cuckoo bee offspring are reproductive and leave the colony to mate (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 Hrncir 2009).

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

In addition to habitat loss, pesticides, and urbanization as long-term threats (Schweitzer *et al.* 2012), Cameron *et al.* (2011) showed a higher proportion of *Bombus* and *Thoracobombus* individuals infected by the pathogen *Nosema bombi* than other *Bombus* with stable global populations. Since this species is a social parasite of *B. pensylvanicus* and *B. terricola* (also *B. rufocinctus* and *B. ternarius* belonging to other subgenera, Colla *et al.* 2011), it may have a higher threat impact from this pathogen (New York Natural Heritage Program 2023b).

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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes:

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. insularis*.

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

In states or provinces where the species still occurs, 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 from March-October in relatively close proximity 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 affect them as little as possible. Minimizing contact between wild bumble bee populations and commercial bees can help protect the wild bees (Schweitzer *et al.* 2012).

Further inventory is needed within its native range to document any extant occurrences, if present, and define the current distribution of *B. insularis*. 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.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) - <https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection
5. Species management	Species recovery

Table 2. Recommended conservation actions for *Bombus insularis*.

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VIII. Version history

Originally prepared by: Erin White

Date prepared: 2/7/2014

Last updated: Katie Hietala-Henschell

Updated Date: 1/8/2024

Species Status Assessment

Common Name: American bumble bee

Date Updated: 1/5/2024

Scientific Name: *Bombus pensylvanicus*
Henschell

Updated By: Katie Hietala-

Class: Insecta

Family: Apidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

Bombus pensylvanicus (American 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 much of the Northeast (Schweitzer and Sears 2013). In New York, this species has historically occurred in 29 counties; however, recent survey efforts only detected it in 11 counties (New York Natural Heritage Program 2023a, White *et al.* 2022). This species has suffered catastrophic decline in the 1990s to present in New York, but was once common statewide (Colla *et al.* 2012). They are distributed from Quebec to Florida in eastern North America (Discover Life 2024), but many states and provinces have not yet assessed its 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). *B. pensylvanicus* is known to nest on ground surfaces and feeds on vetches, clovers, goldenrods, *Hypericum* and *Eupatorium*, among others (Colla *et al.* 2011). Nest sites are within grassy tussocks or dense vegetation or within abandoned nests of small mammals (Goulson 2010).

I. Status

a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** No

ii. **New York:** Not listed, HPSGCN (NY SWAP 2015)

b. Natural Heritage Program

i. **Global:** G3G4

ii. **New York:** S2 **Tracked by NYNHP?:** Yes

Other Ranks:

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

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

Status Discussion:

The *B. pensylvanicus* has suffered rapid, recent declines in New York and has been confirmed in only eleven counties in New York (year 2000 to present) but was once common statewide (Colla *et al.* 2012, White *et al.* 2022). Its decline has been attributed mainly to exotic pathogens and insecticide use, but it also faces other threats (Schweitzer *et al.* 2012, Cameron *et al.* 2011).

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	Choose an item.
Northeastern US	Yes	Declining	Declining		Watchlist	Choose an item.
New York	Yes	Declining	Declining	Pre-2000 vs 2000-2022	S1	Yes
Connecticut	Yes	Declining	Declining		S1	Yes
Massachusetts	Yes	Declining	Declining		S1	Yes
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Yes	Unknown	Unknown		SNR	Choose an item.
Vermont	Yes	Declining	Declining		S1	Yes
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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 information on the occurrence of bumble bees across the state (White *et al.* 2022). However, no continued organized, regular monitoring or survey activities are directed toward this species.

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

In the East *B. pensylvanicus* is present from Quebec to Florida and west to the Pacific Coast (Discover Life 2024). From the NYNHP *B. pensylvanicus* 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 present) and historical (1999 and earlier) distribution in NY has declined by more than half of their distribution. While the species was once known from several counties statewide, recent observations have been made in only eleven counties (White *et al.* 2022).

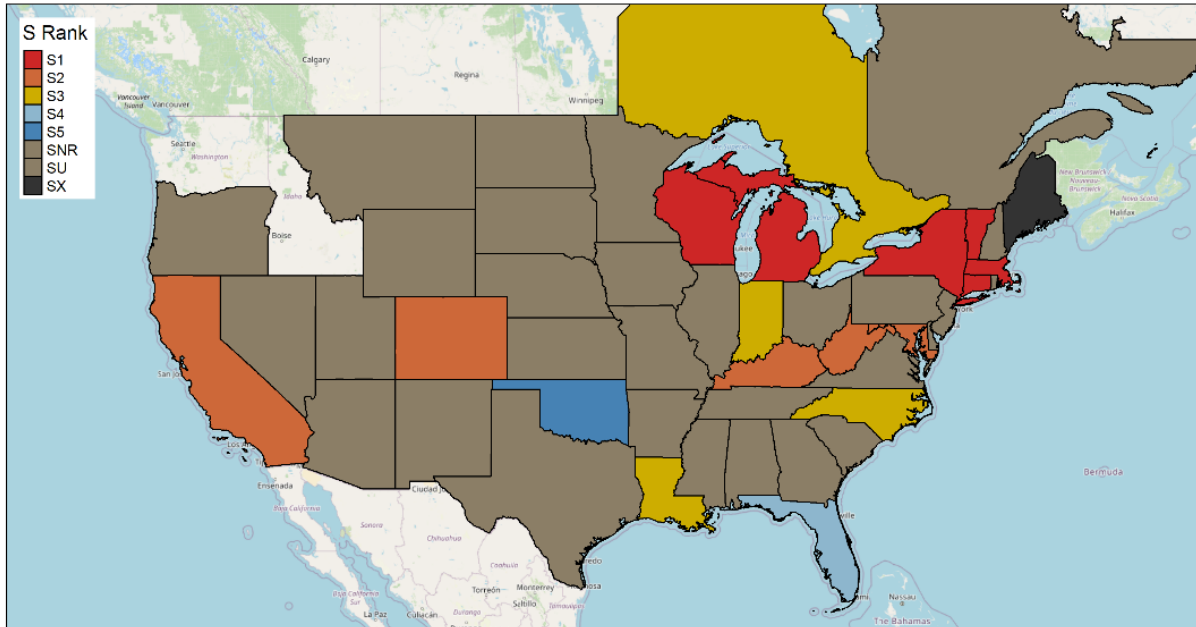


Figure 1. *Bombus pensylvanicus* distribution and status. (Source: NatureServe 2023)

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

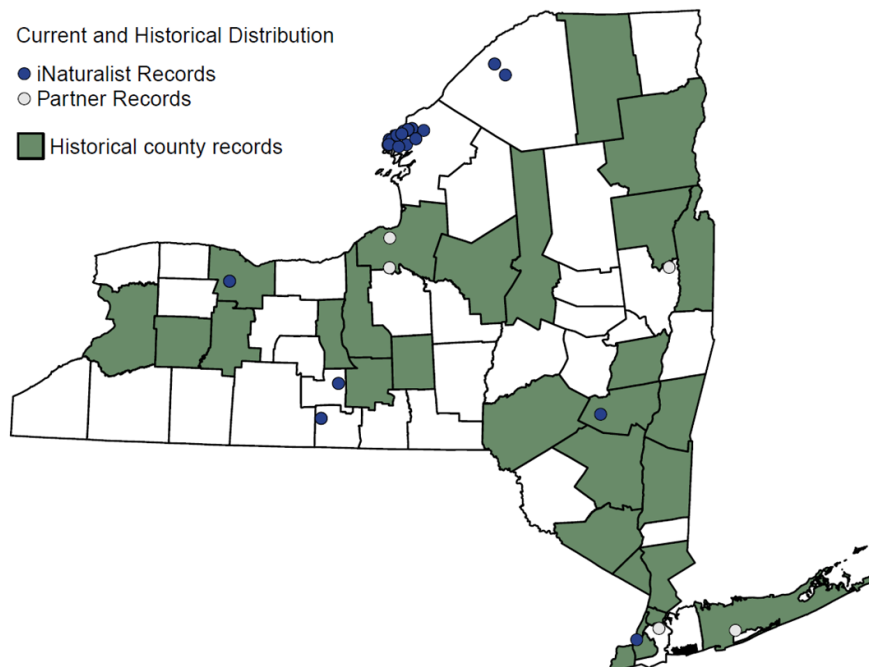


Figure 2. Records of *Bombus pensylvanicus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

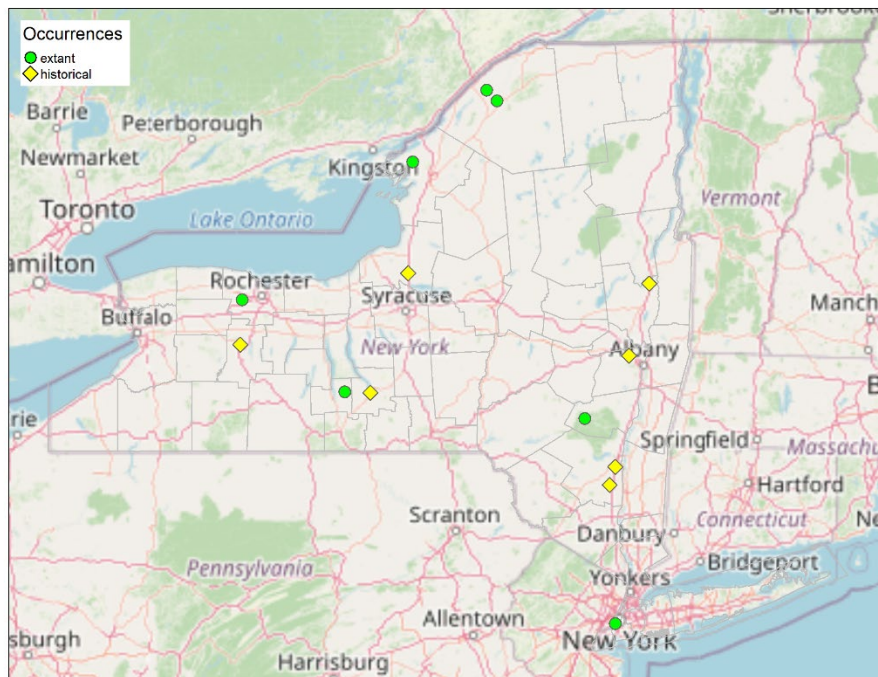


Figure 3. NYNHP element occurrence records for *Bombus pensylvanicus* in New York (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	396	29	47%
2000-2021	47	11	18%

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

Details of historic and current occurrence:

Bombus pensylvanicus has suffered rapid, recent declines in New York and has been confirmed in 11 counties in New York (year 2000 to present) but was once common statewide (Colla *et al.* 2012, White *et al.* 2022). Its decline has been attributed mainly to exotic pathogens and insecticide use, but it also faces other threats (Schweitzer *et al.* 2012, Cameron *et al.* 2011).

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. Found in open farmland and fields (Williams et al. 2014).

Habitat or Community Type Trend in New York

Declining:	Stable:	Increasing:	Unknown: ✓
Time frame of decline/increase:			
Habitat Specialist	Yes:	No: ✓	
Indicator Species	Yes:	No: ✓	
Pollinator	Yes: ✓	No:	

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. Bumble bees that nest above ground such as this species often use long grass or haystacks. 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. pensylvanicus* include vetches, clovers, goldenrods, *Hypericum*, and *Eupatorium* (Colla *et al.* 2011). 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	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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 clutch 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. pensylvanicus* nests mostly on the surface of the ground in tall grass, but occasionally underground; males congregate outside nest entrances in search of mates. It is host to the endangered nest parasite *B. variabilis* (variable cuckoo bumble bee) (Williams *et al.*

2014). However, *B. variabilis* is only known historically from Ulster and Essex counties and is possibly extirpated (SH) in New York.

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 Hrnir 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 exotic pathogens. Cameron *et al.* (2011) showed a higher proportion of *B. pennsylvanicus* individuals infected by the pathogen *Nosema bombi* than other bumble bees with stable global populations. In addition, habitat loss, insecticides, and urbanization are known long-term threats for many bumble bees (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).

Threats to NY Populations	
Threat Category	Threat
1.Pollution	Agricultural & Forestry Effluents (pesticides)
2.Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3.Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes: 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. pennsylvanicus*.

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).

Further research is needed to understand the habitat requirements and threats to this species, and to create appropriate management guidelines for its persistence in known locations. Additional research on climate change effects and the effects of pesticides on *B. pensylvanicus* would be useful to help conserve and protect populations.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) - <https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus pensylvanicus*.

VII. References

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VIII. Version history

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First revision: Samantha Hoff
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Last updated: Katie Hietala-Henschell
Updated Date: 1/5/2024

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	Choose an item.
Northeastern US	Yes	Declining	Declining		RSGCN	Yes
New York	Yes	Declining	Stable	Pre-2000 vs 2000-2021	S3	Yes
Connecticut	Yes	Declining	Declining		S1	Yes
Massachusetts	Yes	Declining	Declining		S2	Yes
New Jersey	Yes	Unknown	Unknown		SNR	Choose an item.
Pennsylvania	Yes	Unknown	Unknown		SNR	Choose an item.
Vermont	Yes	Declining	Declining		S3	Yes
Ontario	Yes	Stable	Stable		S4	Choose an item.
Quebec	Yes	Unknown	Unknown		SNR	Choose an item.

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*):

In the East, *B. terricola* is present from Nova Scotia to Florida (Discover Life 2024). From the NYNHP *B. terricola* 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 present) and historical (1999 and earlier) distribution in New York has

remained relatively stable. While there has been a contraction from the lower latitudes of southern New York and Long Island, there has been expansion into other counties of New York not previously occupied (White *et al.* 2022).

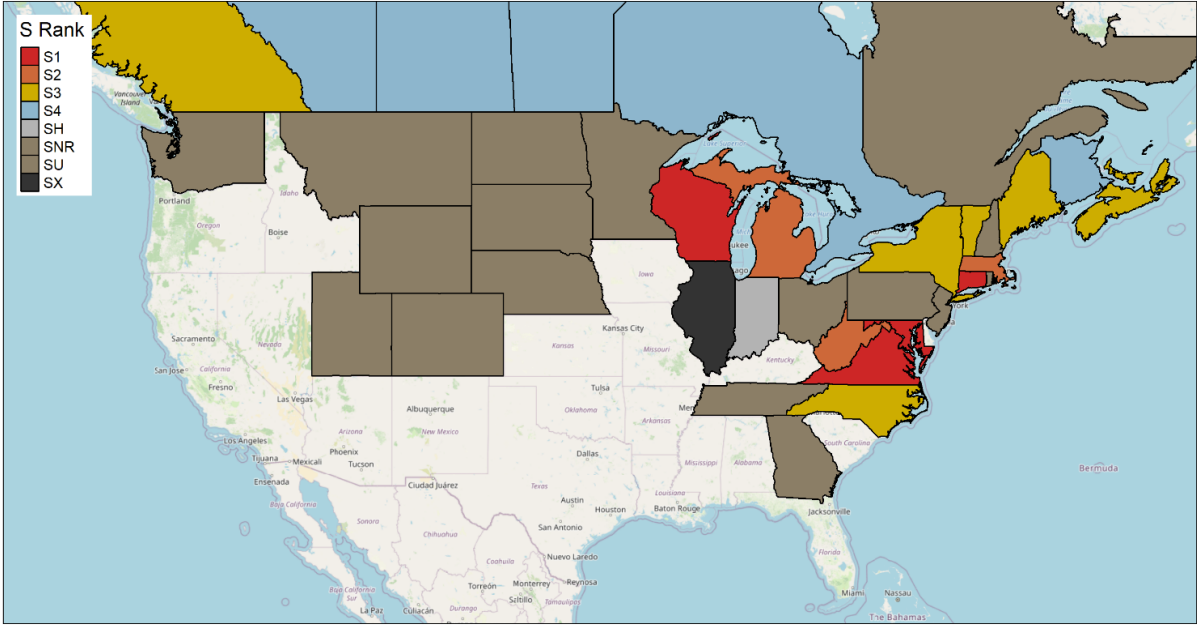


Figure 1. *Bombus terricola* distribution and status (Source: NatureServe 2023)

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

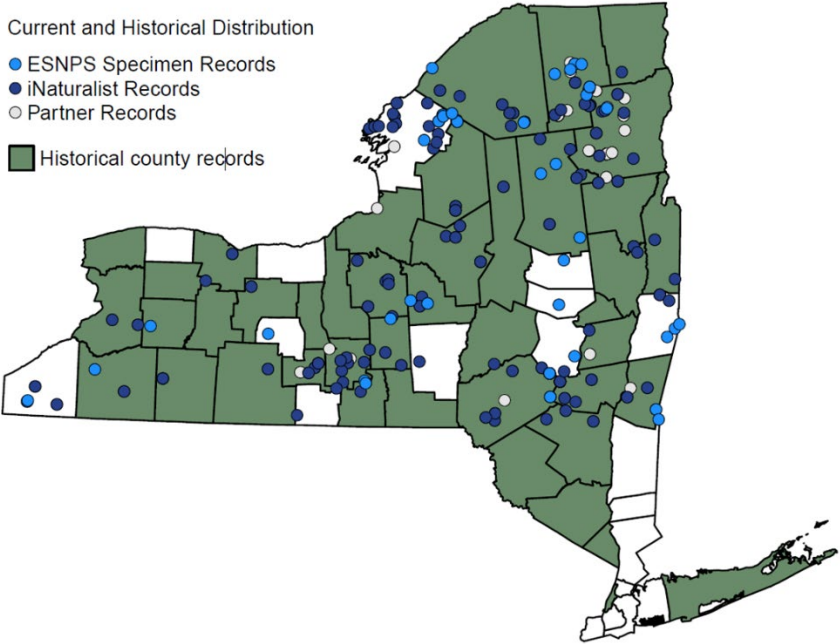


Figure 2. Records of *Bombus terricola* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

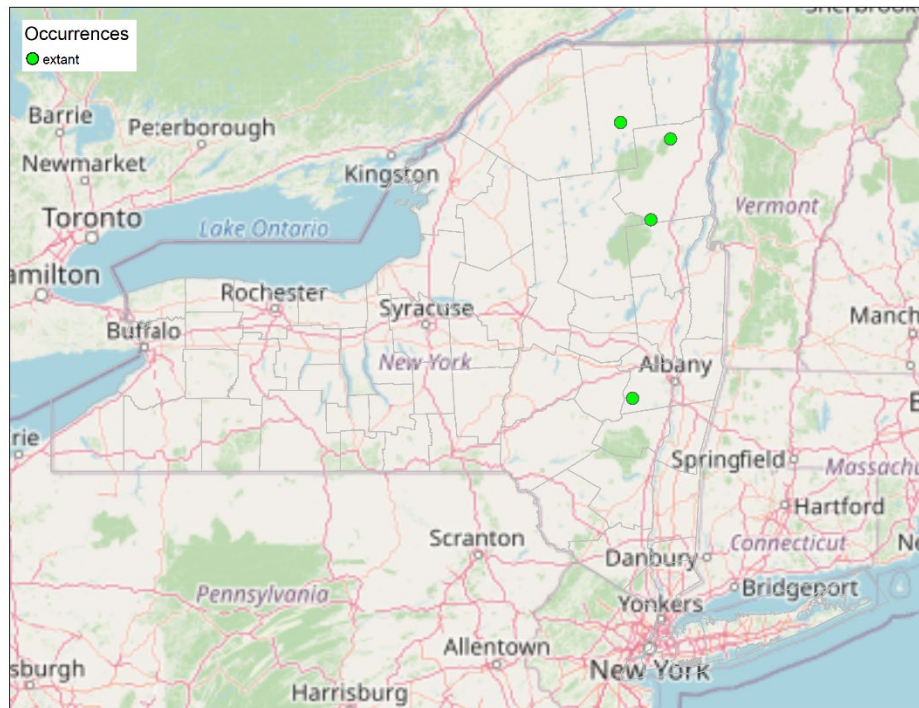


Figure 3. NYNHP element occurrence records for *Bombus terricola* in NY (Source: New York Natural Heritage Program 2023c).

Years	# of Records	# of Counties	% of State
Pre-2000	2718	47	76%
2000-2021	361	45	73%

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

Details of historic and current occurrence:

Bombus terricola has been confirmed in locations throughout most of the state of NY (year 2000 to present). It does appear to be absent from southern NY and Long Island in recent years, though historically (1999 and earlier) present there (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).

Habitat or Community Type Trend in New York

Declining: **Stable:** **Increasing:** **Unknown:** ✓

Time frame of decline/increase:

Habitat Specialist **Yes:** **No:** ✓

Indicator Species **Yes:** **No:** ✓

Pollinator **Yes:** ✓ **No:**

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. Bumble bees that are underground nesters such as this species often use abandoned rodent nests in south facing exposures. Foraging habitat should include flower abundance and species richness with overlapping blooms to ensure nectar availability throughout the growing season (Schweitzer *et al.* 2012). Suitable sites for bumble bees to overwinter may include rotting logs, mulch, or loose soil (Schweitzer *et al.* 2012). *Bombus terricola* is a short-tongued species and food plants include *Crocus*, *Eupatorium*, *Linaria*, *Melilotus*, *Monarda*, *Ribes*, *Rosa*, *Rubus*, *Spiraea*, *Taraxacum*, *Vaccinium*, and *Vicia*. It is a frequent nectar robber of long-corolla flowers (Williams *et al.* 2014).

V. Species Demographic and Life History:

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

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 clutch 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). It nests underground; males patrol circuits in search of mates. It is a

known host to the cuckoo bumble bee *B. bohemicus*, and a probable host to *B. suckleyi* and *B. insularis* (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 *Bombus* leading to their global rapid, recent decline in the 1990s has been attributed to exotic pathogens. Cameron *et al.* (2011) showed a higher proportion of *B. terricola* 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), 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).

Threats to NY Populations	
Threat Category	Threat
1. Pollution	Agricultural & Forestry Effluents (pesticides)
2. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (introduced pathogens from managed bee populations in greenhouses)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration
4. Residential & Commercial Development	Housing & Urban Areas (habitat loss from development)
5. Transportation & service corridors	Roads & railroads

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

Yes:

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. terricola*.

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

Any efforts to protect wild bumble bee populations from pathogen exposure would benefit *B. terricola*. 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. 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).

Limiting exposure of *B.terricola* to insecticides would also benefit them. Suggested actions include avoidance of application to flowers that bumble bees are attracted to and application of solutions or soluble powders (rather than dusts or wettable powders) to the ground in calm wind and warmer temperatures during periods of dewless nights to minimize the impact to resident bumble bee populations (Schweitzer *et al.* 2012). Organic farming has also been suggested to benefit bumble bees.

Ensuring habitat resources for foraging, nesting, and overwintering will also benefit this species. These habitats should be within close proximity to each other and without road or railroads between them, which have been suggested as potential barriers to dispersal. Suggested actions for habitat management should include ensuring nectar availability throughout the spring and summer by improving flower abundance and species richness and species with overlapping blooms. Select food plants for *B. terricola* include willows, roses, honeysuckles, goldenrods, asters, *Vaccinium*, and *Rubus* (Colla *et al.* 2011). If mowing of fields occurs, summer is the best time and mower blades should be raised to avoid ground nests. Staggering cutting times in different field areas will ensure nectaring sources are always available. Increasing available nesting habitat may be accomplished by reducing tillage in fields, leaving unplowed strips vegetated, or even providing artificial nesting boxes. Managing for rodents and ground-nesting birds should also benefit bumble bees (Schweitzer *et al.* 2012).

Further research is needed to determine more information on habitat requirements, threats, climate change effects, and insecticide effects for *B. terricola*.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Conservation Actions	
Action Category	Action
1. Law and policy	Polices and regulations
2. Education and awareness	Awareness and communications
3. Land/water management	Habitat and natural process restoration
4. Land/water protection	Resource and habitat protection

Table 2. Recommended conservation actions for *Bombus terricola*.

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