

Species Status Assessment

Common Name: Ashton's cuckoo bumble bee **Date Updated:** Jan. 12, 2024

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

Class: Insecta

Family: Apidae

Species Synopsis

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

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: RSGCN (Northeast Fish and Wildlife Diversity 2023)

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

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	
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	
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	Yes	Unknown	Unknown		SNR	
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

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

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).

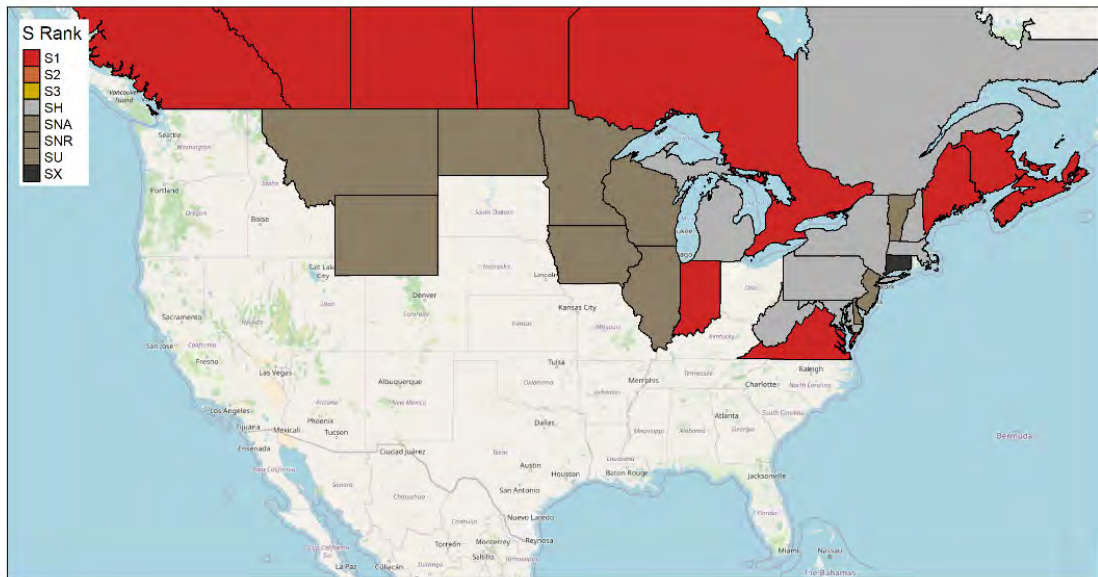


Figure 1. *Bombus bohemicus* distribution and status (Source: NatureServe 2023)

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

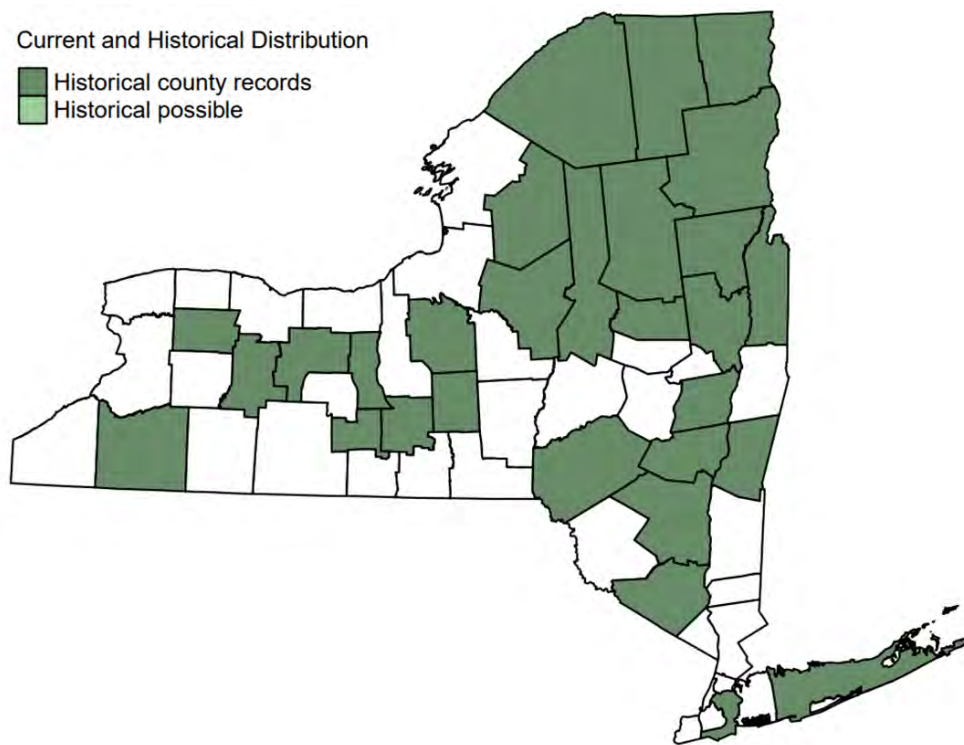


Figure 2. Records of *Bombus bohemicus* in New York. No observations from 2000 to present; those from 1999 and earlier shown as shaded counties (Source: White *et al.* 2022).

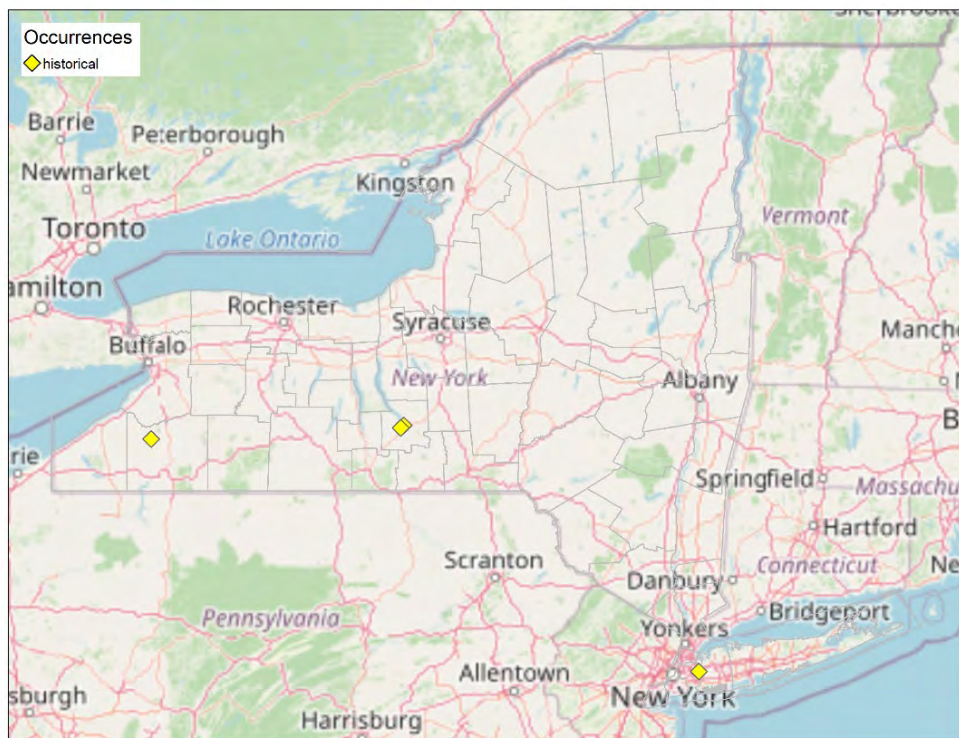


Figure 3. NYNHP element occurrence records for *Bombus bohemicus* in New York (Source: New York Natural Heritage Program 2023b).

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

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

Column options

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

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

Habitat Discussion:

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	-	-	Yes	Yes	-

Column options

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

Species Demographics and Life History 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 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

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).

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

Table 2. Threats to *Bombus bohemicus*.

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.

Action Category	Action	Description
A.2 Direct Species Management	A.2.0.0.0 Direct Species Management	Species recovery
B.3 Outreach	B.3.1.4.0 Public outreach and information	Awareness and communications
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation Planning	Resource and habitat protection
C.6 Design and Plan Conservation	C.6.5.1.3 Develop a conservation, management, or restoration plan for protected private lands	Habitat/Natural process restoration

Action Category	Action	Description
C.7 Legislative and Regulatory Framework or Tools	C.7.1.3.0 Create, amend, or influence regulation	
C.7 Legislative and Regulatory Framework or Tools	C.7.2.1.0 Create or amend policies	

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

VII. References

- Cameron, S. A., J. D. Lozier, J. P. Strange, J. B. Koch, N. Cordes, L. F. Solter, and T. L. Griswold. 2011. Patterns of widespread decline in North American bumble bees. *Proceedings of the National Academy of Sciences* 108:662–667.
- Colla, S., L. Richardson, and P. Williams. 2011. Bumble bees of the eastern United States. USDA Forest Service and the Pollinator Partnership. 104 pages.
- Hatfield, R., Jepsen, S., Thorp, R., Richardson, L. and Colla, S. 2016. *Bombus bohemicus*. *The IUCN Red List of Threatened Species* 2016: e.T13152926A46440141. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T13152926A46440141.en>. Accessed on 03 January 2024.
- IUCN. 2024. The IUCN Red List of Threatened Species. Version 2023-1. <https://www.iucnredlist.org>
- Jackson, H.M., S.A. Johnson, L.A. Morandin, L.L. Richardson, L.M. Guzman, and L.K. M’Gonigle. 2022. Climate change winners and losers among North American bumblebees. *Biol. Lett.* 18: 20210551. <https://doi.org/10.1098/rsbl.2021.0551>
- Jarau, S. and M. Hrncir. 2009. Food Exploitation by Social Insects: Ecological, Behavioral, and Theoretical Approaches. CRC Press, Boca Raton, Florida.
- Kerr, J.T., A. Pindar, P. Galpern, L. Packer, S.G. Potts, S.M. Roberts, P. Rasmont, O. Schweiger, S.R. Colla, L.L. Richardson, D.L. Wagner, L.F. Gall, D.S. Sikes, and A. Pantoja. 2015. Climate change impacts on bumblebees converge across continents. *Climate Change*. Vol 349: 6244. <https://www.science.org>
- NatureServe. 2023. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed December 12, 2023.
- New York Natural Heritage Program. 2023a. Pollinator Record Compilation. Unpublished data. New York Natural Heritage Program, State University of New York College of Environmental Science and Forestry, Albany, New York.
- New York Natural Heritage Program. 2023b. Element occurrence database. New York Natural Heritage Program, State University of New York College of Environmental Science and Forestry, Albany, New York.

- Northeast Fish and Wildlife Diversity. 2023. Regional Species of Greatest Conservation Need (2023). <https://northeastwildlifediversity.org/rsgcn>. Accessed December 12, 2023.
- NY SWAP. 2015. New York State Wildlife Action Plan. Department of Environmental Conservation. September 2015. https://extapps.dec.ny.gov/docs/wildlife_pdf/swapfinaldraft2015.pdf
- Pyke, G.H., J.D. Thomson, D.W. Inouye, and T.J. Miller. 2016. Effects of climate change on phenologies and distributions of bumble bees and plants they visit. *Ecosphere*. Volume 7(3). www.esajournals.org
- Schweitzer, D. F., N. A. Capuano, B. E. Young, and S. R. Colla. 2012. Conservation and Management of North American Bumble Bees.
- Schweitzer, D., and N. Sears. 2013, May 1. Bumble bee ranking guidelines. NatureServe, Arlington, VA.
- White E. 2014. NYS DEC SWAP 2015 Species Status Assessment for *Bombus ashtoni*. Prepared on February 7, 2014.
- 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.
- Williams, P.H., R.W. Thorp, L.L. Richardson, and S.R. Colla. 2014. Bumble bees of North America: an Identification Guide. Princeton University Press. 208 pp.

VIII. Version history

Originally prepared by: Erin White
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Last updated: Katie Hietala-Henschell
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