Species Status Assessment

Common Name: American bumble bee **Date Updated:** January 5, 2024

Scientific Name: *Bombus pensylvanicus* **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 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

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)

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

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	
Northeastern US	Yes	Declining	Declining		Watchlist	
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	
Pennsylvania	Yes	Unknown	Unknown		SNR	
Vermont	Yes	Declining	Declining		S1	Yes
Ontario	Yes	Declining	Declining		S3	Yes
Quebec	Yes	Unknown	Unknown		SNR	

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).

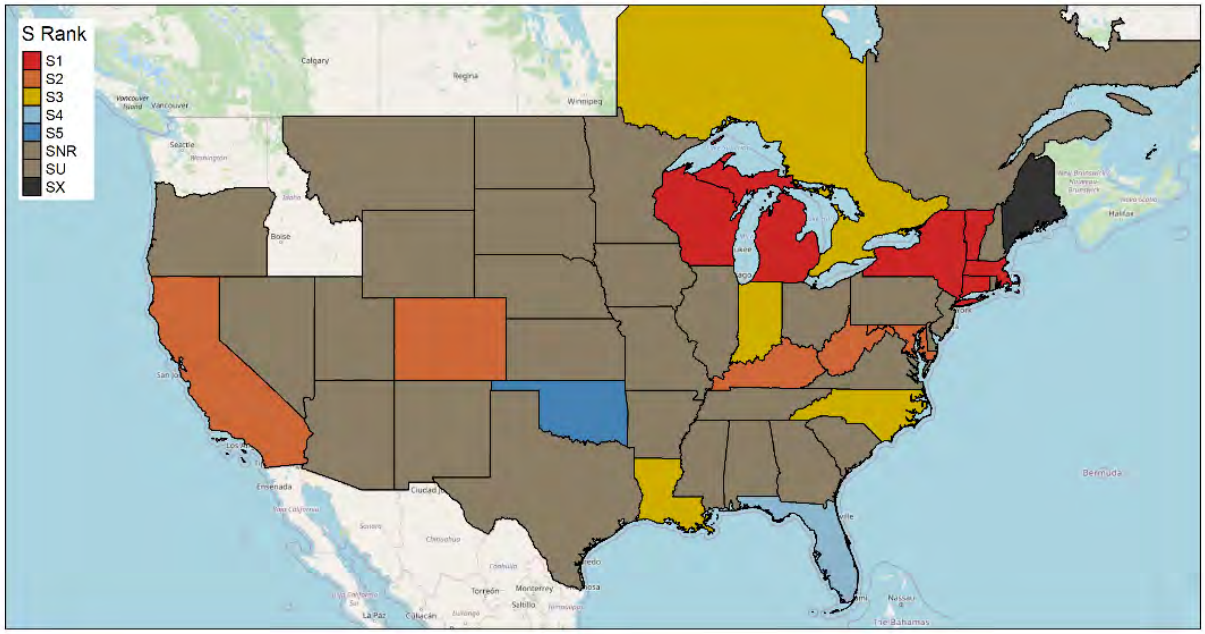

Figure 1. *Bombus pensylvanicus* distribution and status. (NatureServe 2023)

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

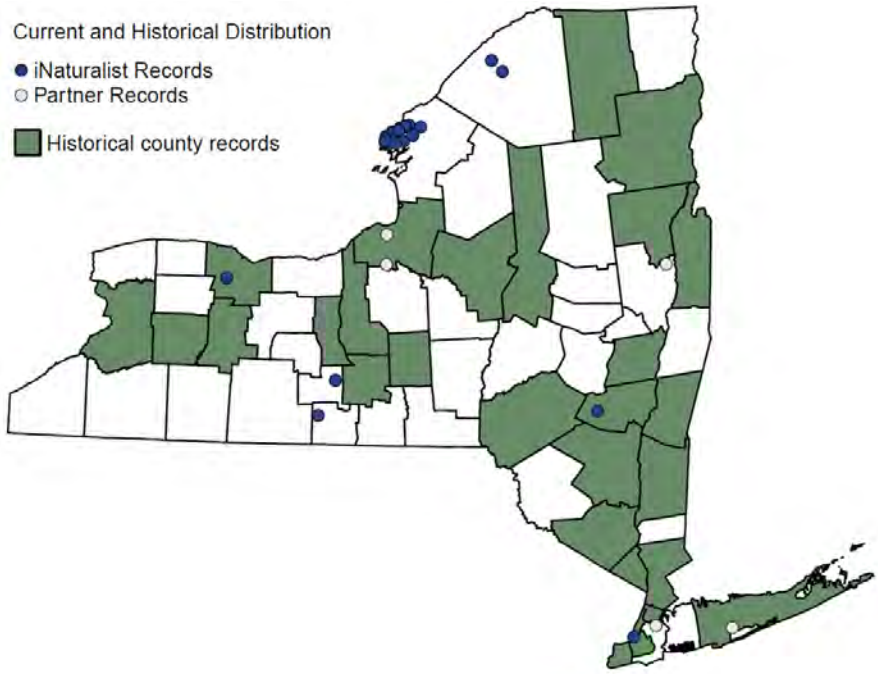

Figure 2. Records of *Bombus pensylvanicus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (White *et al.* 2022).

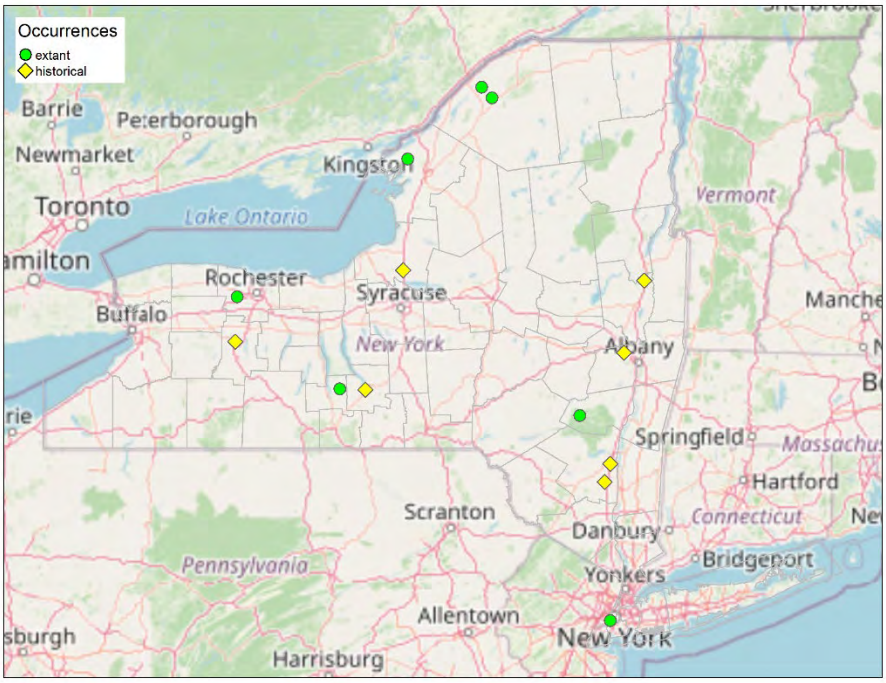

Figure 3. NYNHP element occurrence records for *Bombus pensylvanicus* in New York (New York Natural Heritage Program 2023c).

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

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

Column options
Habitat Specialist, Indicator Species and Pollinator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion

Bumble bees are generalist foragers and need nesting habitat in the spring, flowers for adult and larval nutrition throughout the spring and summer, and sites for queens to overwinter. 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	-	-	Yes	Yes	-

Column options
First 5 fields: Yes; No; Unknown; (blank) or Choose an item
Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

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

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

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 pensylvanicus*.

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. pensylvanicus.*

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.

Action Category	Action	Description
B.3 Outreach	B.3.1.4.0 Public outreach and information	Awareness and communications
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation Planning	Resource and habitat protection
C.6 Design and Plan Conservation	C.6.5.1.3 Develop a conservation, management, or restoration plan for protected private lands	Habitat/Natural process restoration
C.7 Legislative and Regulatory Framework or Tools	C.7.1.3.0 Create, amend, or influence regulation	
C.7 Legislative and Regulatory Framework or Tools	C.7.2.1.0 Create or amend policies	

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

VII. References

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VIII. Version history

Originally prepared by: Erin White
Date prepared: 10/25/2013

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