Species Status Assessment

Common Name: Northern amber bumble bee **Date Updated:** 1/12/2023

Scientific Name: *Bombus borealis* **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 borealis (northern amber bumble bee) belongs to the subgenus (Subterraneobombus), 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.

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. borealis* 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).

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 borealis* is known to nest underground and feeds on thistles, vetches, asters, *Prunella*, *Symphytum officinale*, and *Eupatorium* (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:** G4

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

Other Ranks:

-NYS 2025 SGCN Status: High Priority Species of Greatest Conservation Need

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

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

Status Discussion:

Bombus borealis has populations in northern, eastern, central, and western New York that have remained relatively stable over time but remains absent from southern New York (White *et al.* 2022). 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. However, the species remains threatened by habitat loss, pesticides, and urbanization (Schweitzer *et al.* 2012) as well as pollution and invasive species (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	
Northeastern US	Yes	Unknown	Unknown		Not listed	
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S3	Yes
Connecticut	Yes	Declining	Declining		S1	Yes
Massachusetts	Yes	Unknown	Unknown		SU	
New Jersey	No					
Pennsylvania	Presumed extirpated	Declining	Declining		SX	Yes
Vermont	Yes	Increasing	Increasing		S4	
Ontario	Yes	Stable	Stable		S5	
Quebec	Yes	Unknown	Unknown		SNR	

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).

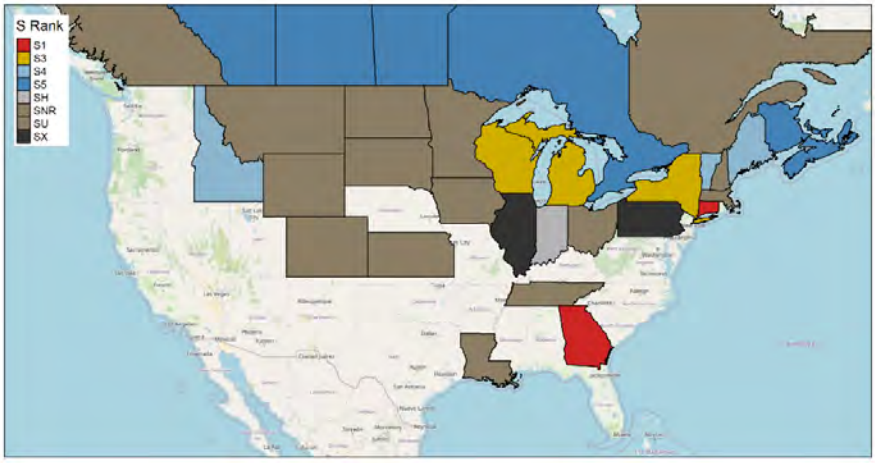

Figure 1. *Bombus borealis* distribution and status
(Source: NatureServe 2023)

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

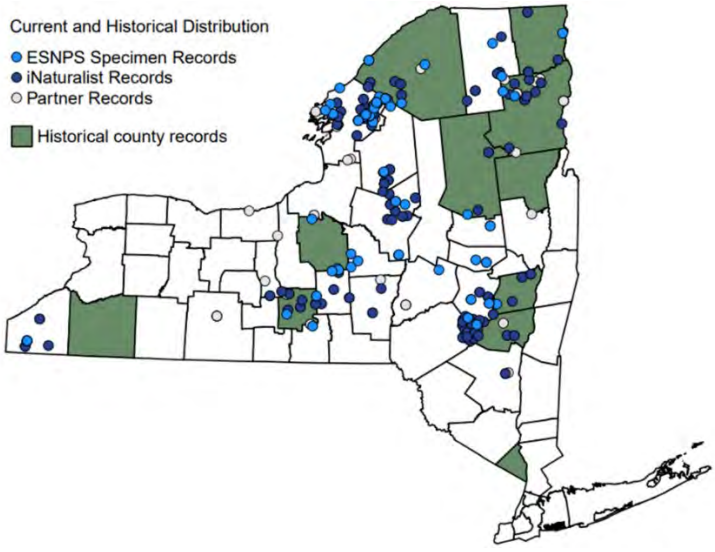

Figure 2. Records of *Bombus borealis* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

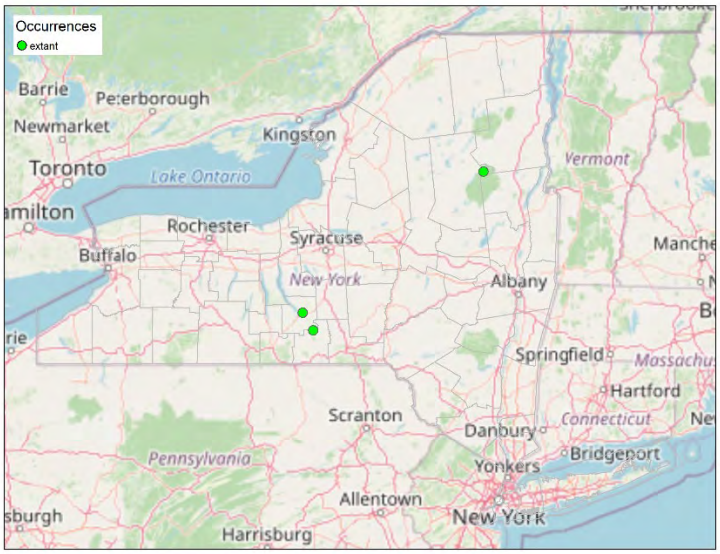

Figure 3. NYNHP element occurrence records for *Bombus borealis* in New York (Source: New York Natural Heritage Program 2023c).

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. borealis* 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

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

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

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:

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

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 Hrncir 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).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
1. Residential and Commercial	1.1 Housing & Urban Areas	(habitat loss)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species			Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution			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			Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 2. Threats to *Bombus borealis*

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*.

Action Category	Action	Description
B.3 Outreach	B.3.1.4.0 Public outreach and information	Awareness & Communications
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation planning	Resource/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	

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

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

VII. References

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