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 Thoracobomus 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:** Not listed

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)

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

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	
Northeastern US	Yes	Declining	Declining		Watchlist	
New York	Possibly extirpated	Declining	Declining	Pre-2000 vs 2000-2022	SH	Yes
Connecticut	No	-	-			
Massachusetts	Yes	Unknown	Unknown			
New Jersey	No	-	-			
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	No data	Unknown	Unknown			
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 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.

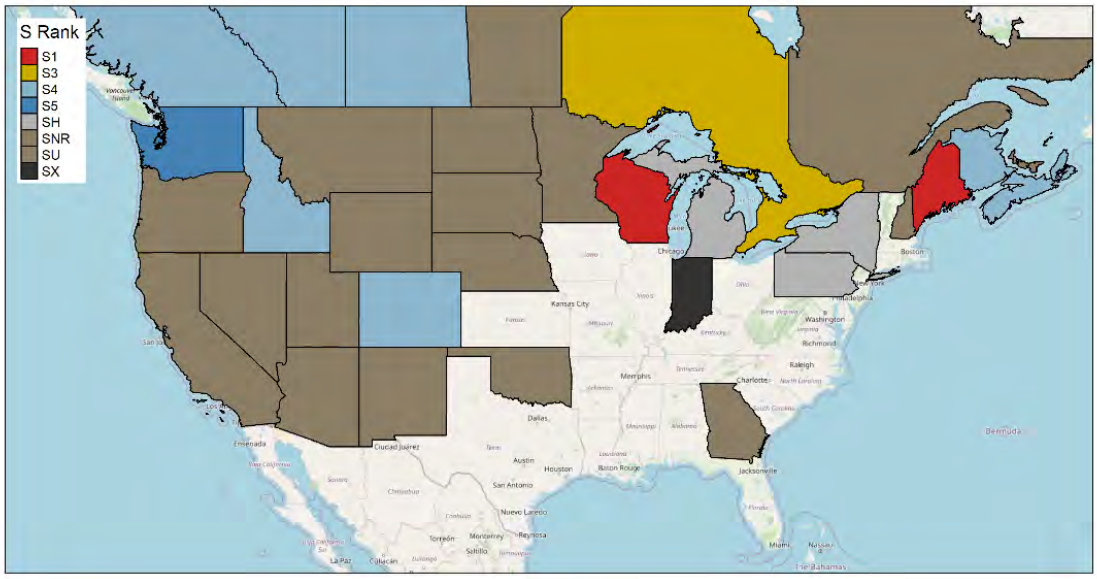

Figure 1. *Bombus insularis* distribution and status (Source: NatureServe 2023)

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	-	-	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):*

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).

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 insularis*.

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.

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
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 insularis*.

VII. References

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VIII. Version history

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