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

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)

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

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	
Northeastern US	Yes	Unknown	Unknown		Not listed	
New York	Yes	Stable	Stable	Pre-2000 vs 2000-2022	S2	Yes
Connecticut	Yes	Unknown	Unknown		SNR	
Massachusetts	Yes	Unknown	Unknown		SU	
New Jersey	Yes	Unknown	Unknown		SNR	
Pennsylvania	Possibly extirpated	Declining	Declining		SH	Yes
Vermont	Yes	Declining	Declining		S3	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):*

Bombus flavidus is considered widespread in Canada and the nothern 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).

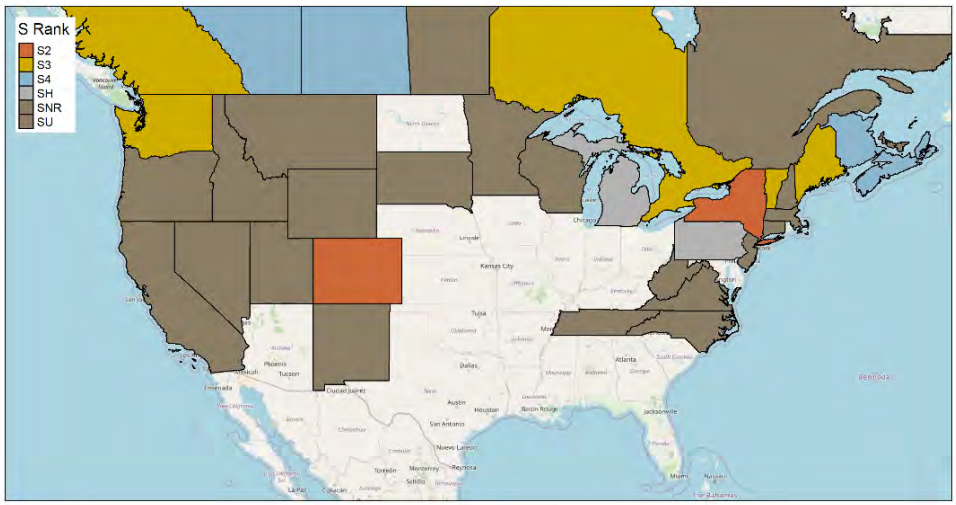

Figure 1. *Bombus flavidus* distribution and status (Source: NatureServe 2023)

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

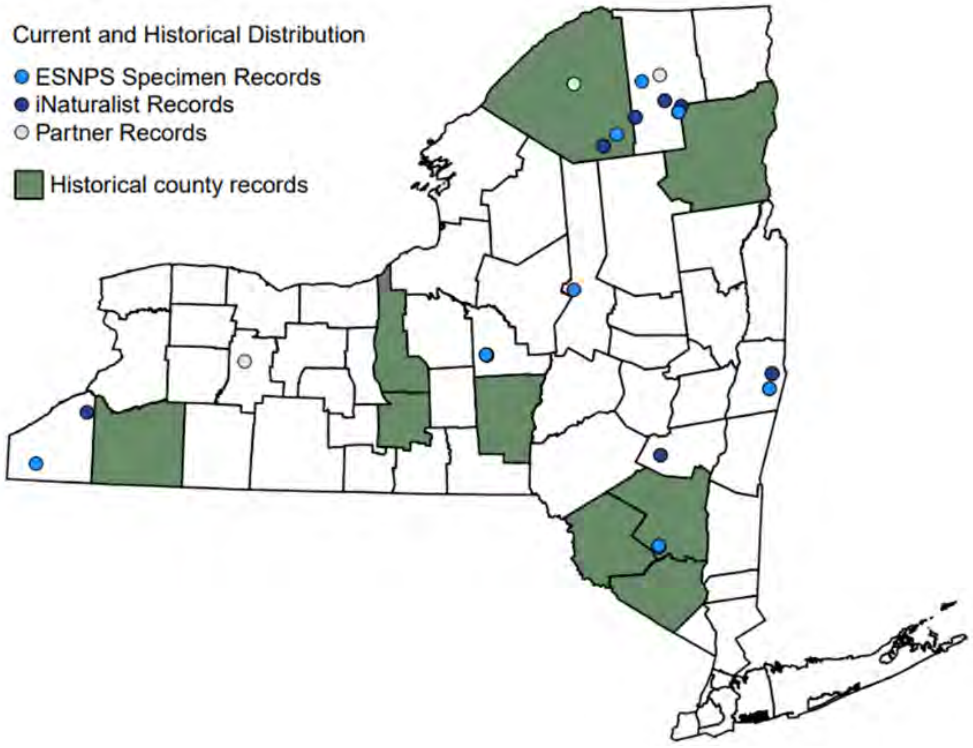

Figure 2. Records of *Bombus flavidus* in New York. Observations from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (Source: White *et al.* 2022).

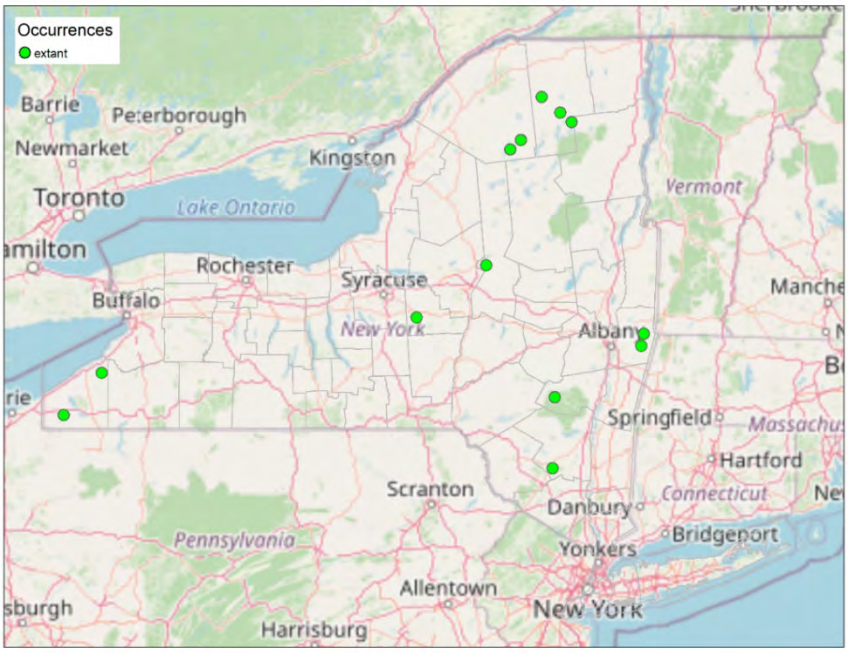

Figure 3. NYNHP element occurrence records for *Bombus flavidus* in New York (Source: New York Natural Heritage Program 2023b).

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	-	-	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):*

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 w*hich 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 Hrncir 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).

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 flavidus*.

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.

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	

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 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