Species Status Assessment

Common Name: Petulant leafcutter bee **Date:** 3/12/2025

Scientific Name: *Megachile petulans* **Proposed By:** Katie Hietala-Henschell

Class: Insecta

Family: Megachilidae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

Megachile petulans appears to be a southern North American species with its range extending as far north as the Midwest and Northeast, and as far south as Mexico. This species is experiencing population declines in parts of its range but appears to be stable because of its wide distribution (NatureServe 2021). In New York, it was historically known from four counties; however, recent efforts (2000 and later) were only able to confirm *M. petulans* in just a single county (White et al. 2022). Based on these county level records, the currently known distribution in New York is approximately less than 2% of the state.

Threats facing *M. petulans* populations may include habitat loss from conversion of shrublands to agriculture, fire, logging and wood harvesting, invasive plants and pathogens, pesticides, and climate change (White et al. 2022). Additionally, M. petulans may have reduced reproductive capacity and limited dispersal abilities which may impact overall health and survival (NatureServe 2021). In the face of climate change and other threats, management and protection of suitable habitat will be essential to support this species.

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:** S1 **Tracked by NYNHP?:** No

Other Ranks:

- NYS 2025 SGCN Status: High Priority Species of Greatest Conservation Need
- IUCN Red List: Not assessed (IUCN 2025)
- Northeast Regional SGCN: Not assessed (Northeast Fish and Wildlife Diversity 2025)

Status Discussion:

The conservation status for *M. petulans* was assessed after the Empire State Native Pollinator Survey efforts and this species was ranked as Critically Imperiled (S1) in New York. *M. petulans* occurs in < 2% of New York state, based on a single extant county (White et al. 2022). In addition to its rarity, *M. petulans* appears to be experiencing declines in parts of its range (NatureServe 2021) and threats to this species are medium-high (White et al. 2022). In Michigan, it has been estimated that *M. petulans* has experienced a 33% decline in range (Rowe et al. 2022).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			
Northeastern US	Yes	Unknown	Unknown			
New York	Yes	Declining	Declining	Pre-2000 vs 2000-2022	S1	Yes
Connecticut	No	-	-			
Massachusetts	Yes	Unknown	Unknown		SNR	
New Jersey	Yes	Unknown	Unknown		SNR	
Pennsylvania	Yes	Unknown	Unknown		SNR	
Vermont	No	-	-			
Ontario	No	-	-			
Quebec	No	-	-			

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 and State/Province Ranks (NatureServe 2021); Northeastern US (Northeast Fish and Wildlife Diversity 2025)

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. Leafcutter bees were included in the focal taxa targeted by this survey. The statewide effort resulted in up-to-date information on the occurrence of Megachilids 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):*

Primarily a southern species but extending into the Midwest and northeast. *M. petulans* appears to be experiencing declines in parts of its range including the northwest, central, and Plains regions (NatureServe 2021). In an assessment of historical changes in the Northeast, based on pre-2010 records, it appeared *M. petulans* may have been increasing in relative abundance (Bartomeus et al. 2013). Of the states with conservation ranks, New York, Michigan, and Indiana, *M. petulans* has been assessed as Critically Imperiled, Imperiled, and Apparently Secure respectively. There are many data gaps to fill regarding this species range and conservation status.

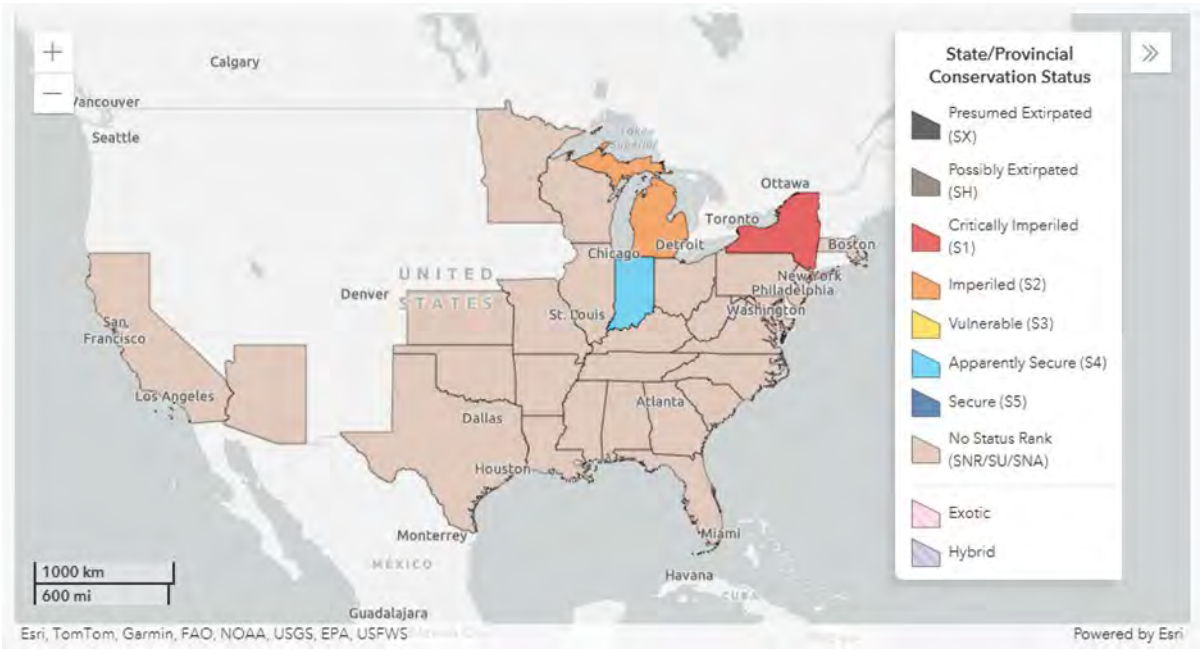

Figure 1. *Megachile petulans* distribution in North America (NatureServe 2021)

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

Megachile petulans has been assessed as Critically Imperiled in New York. It was historically known from Greene, Rockland, Suffolk, Richmond, but was only confirmed in Suffolk County during the ESNPS (White et al. 2022).

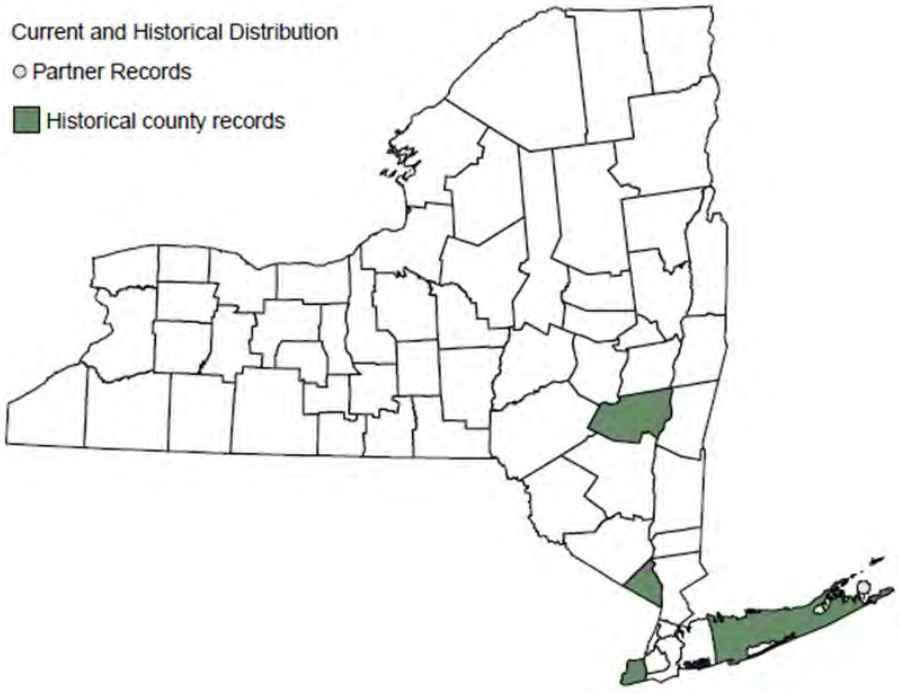

Figure 2. Observations of *Megachile petulans* in New York from 2000 to present depicted as dots; those from 1999 and earlier as shaded counties (White et al. 2022).

Years	# of Records	# of Counties	% of State
Pre-2000	6	4	6%
2000-2021	151	1	<2%

Table 1. Records of *Megachile petulans* in New York.

Details of historic and current occurrence:

Previously known from southern New York, *M. petulans* appears to be extant in less than 2% of the state. The Empire State Native Pollinator Survey effort (2017-2020), specifically partner data, detected *M. petulans* solely in Suffolk County (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	

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):*

a. Suburban/orchard, Urban/edificarian (NatureServe 2021)

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
No	-	-	

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

Habitat Discussion:

In New York, *M. petulans* was observed from Gardiners Island, a small island off Long Island (White et al. 2022). The habitat appears to be an open field or meadow with occasional trees scattered throughout. Species in the genus *Megachile* are generally pollen generalists, however some species are specialized. In parts of its range, *M. petulans* is associated with *Centaurea stoebe, Desmodium paniculatum, Melilotus alba,* and *Monarda fistulosa* (Rowe et al. 2022). It may also be associated with species in the *Salvia* genus (Sharp and Eatman 2019) and *Desmodium glabellum* (Dillenius' Ticktrefoil) (Leif 2013).

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	No	No	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):*

Bees in the *Megachile* genus are commonly referred to as leafcutter bees. Leafcutter bees are important pollinators and can utilize various nesting materials such as leaves and soil and will nest in logs, hollow stems, man-made boxes, and sometimes the ground. Most species will form individual cells with leaves that they cut and provision them with pollen and nectar for their young (Killewald et al. 2019). Most females in this group have pollen-collecting hairs (scopae) on the underside of the abdomen. *M. petulans* is a small bee and females are typically larger (11-12 mm) than males (9-10 mm) (Sharp and Eatman 2019).

M. petulans is a solitary, cavity nesting bee. A recent study found that species in the genus *Megachile* have been documented using 4 mm, 6 mm, 7 mm, and 8-10 mm cavity sizes (Killewald et al. 2019). This species uses cut whole leaf pieces, chewed vegetation, and soil particles to make partitions between cells in their nests.

M. petulans is likely univoltine in northern parts of its range. It has been documented in early June in southern parts of its range (Sharp and Eatman 2019) and late July through early September in New York (White et al. 2022). Leafcutter bees typically spend several weeks mating, building and provisioning nests, and laying eggs. Once the hollow stem, tunnel, or hole is full of provisioned cells, females will cap the end with a plug made up of primarily masticated vegetation.

VI. Threats *(from NY 2015 SWAP or newly described):*

Threats facing stem-nesting bees, like *M. petulans*, include habitat loss from conversion of shrublands to agriculture, fire, logging and wood harvesting, invasive plants and pathogens, pesticides, and climate change (White et al. 2022). Kammerer et al. (2020) found that warmer winters will result in fewer bees and solitary bees are more sensitive to drought conditions, which are predicted in the Northeast due to climate change. Specific threats to this species are unknown, however *M. petulans* may have reduced reproductive capacity and limited dispersal abilities which may impact overall health and survival (NatureServe 2021).

Threat Level 1	Threat Level 2	Threat Level 3	Scope	Severity	Irreversibility	Trend	Certainty
2. Agriculture & Aquaculture	2.1 Annual & Perennial Non-Timber Crops	(agricultural expansion/conversion of shrublands)	R	L	H	Choose an item.	Choose an item.
5. Biological Resource Use	5.3 Logging & Wood Harvesting	-	R	L	H	Choose an item.	Choose an item.
7. Natural System Modifications	7.1 Fire & Fire Suppression	7.1.1 Increase in the fire regime	R	L	H	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.1 Invasive Non-Native Plants & Animals	8.1.2 Terrestrial plants	P	M	H	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.4 Pathogens	-	P	M	H	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	R	L	H	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	(warmer winters result in fewer bees)	W	L	H	Choose an item.	Choose an item.
11. Climate Change	11.4 Changes in Precipitation & Hydrological Regimes	11.4.2 Droughts (solitary bees more sensitive to drought).	R	L	H	Choose an item.	Choose an item.

Table 2. Threats to *Megachile petulans.*

SCOPE: Spatial proportion of the distribution that is expected to be affected in the next 10 years (**narrow**= 1-10%; **restricted**=11-30%; **widespread**=31-70%; **pervasive**= 71-100%).

SEVERITY: The degree of population reduction in the next 10 years that can be reasonably expected from the threat given the current circumstances and trends (**low**=degrade/reduce population by 1-10%; **medium**=d/r population by 11-30%; **high**=d/r population by 30-70%; **very high**=d/r population by 71-100%).

IRREVERSIBILITY: The degree to which the effects can be reduced and the species restored (**low**=easily reversed, at a low cost, and/or within 0-5 years; **medium**=can be reversed with a reasonable commitment of resources and/or within 6-20 years; **high**=can technically be reversed, but not practicably affordable and/or it would take 21-100 years; **very high**=cannot be reversed and species not likely to be restore and/or it would take >100 years).

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: _____ **No:** _____ **Unknown:** _X_

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 *M. petulans.*

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Providing suitable nesting and foraging habitat are crucial for minimize threats facing *M. petulans*. Specific actions to conserve *M. petulans*, and other leafcutter bees, include protecting nesting habitat (e.g., decaying plant materials), ensuring availability of leaves and petals, alternating management activities (e.g., fires and mowing) in nesting areas, providing abundant floral resources in the spring and early summer, avoiding pesticides, and avoiding the use of non-native pollinators in agriculture that could spread pathogens (Young et al. 2016). Establishing inventory and monitoring programs for native *Megachile* spp. will increase our understanding of current distributions and trends in population to inform conservation actions (Young et al. 2016).

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

Action Category	Action	Description
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 *Megachile petulans*

VII. References

Bartomeus, I., J.S. Ascher, J. Gibbs, B.N. Danforth, D.L. Wagner, S.M. Hedtke, and R. Winfree. 2013. Historical changes in northeastern US bee pollinators related to shared ecological traits. PNAS. Available at: https://winfreelab.com/wp-content/uploads/2019/06/bartomeus2013_pnas.pdf

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