Supplemental Material

Distribution and conservation status of bumble bees in New York State, USA

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Table S1. Life history and tongue length morphology of New York's *Bombus* species, grouped by subgenus. Source: Williams *et al.*, 2014.

Table S2. Partner and museum data sources for each *Bombus* sp. compiled during the ESNPS.

Appendix S1. The species profiles that follow cover all 18 *Bombus* species confirmed to be present in New York during the ESNPS and available historical records.

Table 3. Life history and tongue length morphology of New York's *Bombus* species, grouped by subgenus. Source: Williams *et al.*, 2014.

Species	Subgenus	State Rank	Tongue length	Nest Location	Workers Peak Activity	Max Colony Size	General Habitat Preference
B. auricomus	*Bombias*	S2	long	surface	July–August	60	open farmland and fields
B. affinis	*Bombus*	SH	short	underground	July–August	450	woodland, urban parks, and gardens
B. terricola	*Bombus*	S3	short	underground	late July—early August	1,500	wooded areas and wetlands
B. griseocollis	*Cullumanobombus*	S4S5	short	underground	late-June–July	750	parks, gardens, and woodlands
B. rufocinctus	*Cullumanobombus*	S3	short	surface, aboveground	late-July–early August	600	wooded areas, urban parks, and gardens.
B. bohemicus (=ashtoni)	*Psithyrus*	SH	cuckoo	social parasite	Queens: late-May–early-June; Males: August	175	see *B. terricola* and *B. affinis* for habitat preferences
B. citrinus	*Psithyrus*	S2S3	cuckoo	social parasite	Queens: late-June; Males: August	350	see *B. impatiens*, *B. bimaculatus*, and *B. vagans* for habitat preferences
B. flavidus (=fernaldae)	*Psithyrus*	S2	cuckoo	social parasite	Queens: late-June–July; Males: August	150	see *B. rufocinctus* for habitat preferences
B. insularis	*Psithyrus*	SH	cuckoo	social parasite	Queens: June; Males: August	575	see *B. fervidus* and *B. ternarius* for habitat preferences
B. bimaculatus	*Pyrobombus*	S4S5	medium	underground, occasionally aboveground or in cavities	July	775	wooded areas, urban parks, and gardens
B. impatiens	*Pyrobombus*	S5	medium	underground	July–August	1,500	woodland, grassland, farmland, wetlands, urban parks, and gardens
B. perplexus	*Pyrobombus*	S3	medium	underground	July	300	wooded areas, urban parks and gardens, wetlands
B. sandersoni	*Pyrobombus*	S3	medium	underground	July	80	wooded areas
B. ternarius	*Pyrobombus*	S4S5	medium	underground	August	425	wooded areas and wetlands
B. vagans	*Pyrobombus*	S5	medium	underground, occasionally aboveground	late July–mid-August	1,000	forests, wetlands, urban parks, and gardens
B. borealis	*Subterraneobombus*	S3	long	underground	late July–early August	125	wooded areas
B. fervidus	*Thoracobombus*	S3	long	surface, aboveground, occasionally belowground	July–August	600	open grassland, farmland, urban parks, and gardens.

B. pensylvanicus	*Thoracobombus*	S2	long	surface, occasionally aboveground/underground	Aug–mid-September	900	open farmlands and fields

Table 3S. Partner and museum data sources for each *Bombus* sp. compiled during the ESNPS.

Source	*Bombus affinis*	*Bombus ashtoni* (= *bohemicus*)	*Bombus auricomus*	*Bombus bimaculatus*	*Bombus borealis*	*Bombus citrinus*	*Bombus fervidus*	*Bombus flavidus*	*Bombus griseocollis*	*Bombus impatiens*	*Bombus insularis*	*Bombus pensylvanicus*	*Bombus perplexus*	*Bombus rufocinctus*	*Bombus sandersoni*	*Bombus suckleyi*	*Bombus ternarius*	*Bombus terricola*	*Bombus vagans*	*Bombus variabilis*	Total
Published books and papers																					
Blitzer et al. (2016), Grab et al. (2019), Russo et al. (2015), and B. Danforth, Cornell U., unpubl.	226	225	22	456	54	555	50	5	950	2389	2	141	671	15	220		377	840	757		8435
Fetridge et al. (2008)				1		1	1		1	1			1						1		7
Graystock et al. (2020)				1	1		1		1	1			1	1	1		1		1		10
MacKenzie and Eickwort (1996)			2	2			2			3			4					3	1		17
Matteson et al. (2008)				1		1	1		1	1											5
Tumminello et al. (2018)										1											1
Urban-Mead et al. (2021)*				1			3			7									1		12
Museums and universities																					
Ascher (2016)	3	4	15	1	18	4	160	9	37	11		22	2	11	2		8	35	9		351
New York State Museum				1					11	131											143
S. Kornbluth, AMNH, unpubl.				1			3		17	18											39
M. Jacobson, SUNY ESF, unpubl.				37	1		30		166	226				4	4				4		472
Nature preserves, nonprofits, and individuals																					
Albany Pine Bush Preserve, unpubl				2		1			3	120											126
Hawthorne Valley Farmscape Ecology Program, unpubl			2	44	2	2	38		18	173			14	8	8		18		7		332
Richardson, unpubl	640	271	65	1135	200	782	1244	37	2616	7589	5	283	992	58	220	2	937	2050	1229	2	20355
Sharp and Eatman, unpubl.				1			1		1	1			1						1		6

Source	*Bombus affinis*	*Bombus ashtoni* (= *bohemicus*)	*Bombus auricomus*	*Bombus bimaculatus*	*Bombus borealis*	*Bombus citrinus*	*Bombus fervidus*	*Bombus flavidus*	*Bombus griseocollis*	*Bombus impatiens*	*Bombus insularis*	*Bombus pensylvanicus*	*Bombus perplexus*	*Bombus rufocinctus*	*Bombus sandersoni*	*Bombus suckleyi*	*Bombus ternarius*	*Bombus terricola*	*Bombus vagans*	*Bombus variabilis*	Total
Community science and online databases																					
iNaturalist (2021)	1		41	665	98	211	540	13	2291	7690		27	234	23			357	125	68		12384
BugGuide (VanDyk 2022)			10	60	17	20	32	1	63	128		1	51	8			24	32	3		450
Bumble Bee Watch (2021)			6	33	16		8		22	97			3	1			15	4	5		210
Grand Total	870	500	163	2444	407	1579	2595	65	6200	18589	7	475	1975	130	455	2	1739	3089	2089	2	43375

* Data obtained directly from the authors.

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Appendix S1. The species profiles that follow cover all 18 *Bombus* species confirmed to be present in New York during the ESNPS and available historical records. The descriptions summarize distribution, habitat, and life history. Maps were recreated from data presented in White et al. (2022) and authority names are from Ascher and Pickering (2020).

Species Profiles of the 18 *Bombus* Species Confirmed in New York

Bombus (*Bombus*) *affinis* Cresson, 1863

Rusty-patched Bumble Bee
IUCN: CR – NatureServe: G2:SH

Life History and Habitat: Throughout its range, *B. affinis* occupies various communities including meadows, grasslands, habitat near or within woodlands, urban areas and gardens (Wolf et al. 2022, Boone et al. 2023). In New York, most historical *B. affinis* records fell between May and mid-October. Boone et al. (2022) estimated that colony size can range from 251 to 1,341 bees in the Midwest U.S. Queens typically establish nests underground in abandoned mammal burrows, including in urban backyards. They have also been documented in basement foundations of an urban residence and in a semi-wooded, riparian natural area (Williams et al. 2014, Boone et al. 2022). *Bombus affinis* is a short-tongued bee and it has been documented visiting flowers within its range in the following genera: *Veronicastrum*, *Solidago*, *Agastache*, *Eutrochium*, *Eupatorium*, *Cirsium*, *Silphium*, and *Monarda* (Williams et al. 2014, Wolf et al. 2022, Boone et al. 2023).

Distribution and Trends*:* Historically*, B. affinis* had a large distribution from as far west as North and South Dakota, to the upper Midwest, through the northeastern United States, and continuing north into southern Quebec and Ontario (U.S. Fish and Wildlife Service 2021). *Bombus affinis* has experienced drastic declines since the late 1990s and currently occupies approximately 9% of its historical range (Colla and Packer 2008, U.S. Fish and Wildlife Service 2016). It was formerly common in the Northeast; most of the remaining population occurs in the Midwest. In the Midwest, it has been positively associated with natural and developed areas and negatively associated with agriculture (Boone et al. 2023). There is a disjunct population of *B. affinis* in the Appalachians that is associated with high elevation, forested landscapes (Hepner et al. 2024). Historically, *B. affinis* occurred throughout New York with nearly 900 historical records; however, it has not been observed in New York since 1999.

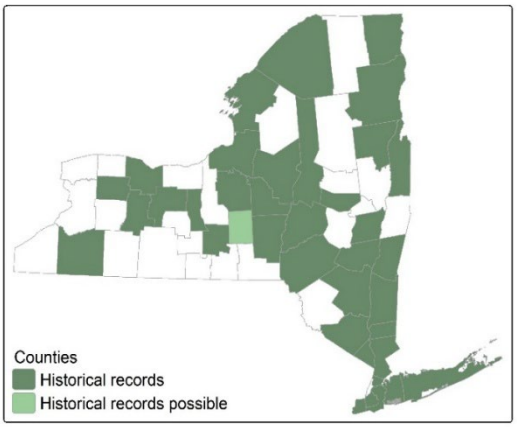


Figure 1: *Bombus affinis* historical records (pre-2000) are represented as shaded counties. Counties where *B. affinis* were not observed are not shaded. There have been no recent observations of *B. affinis.*

***Bombus* (*Bombias*) *auricomus* (Robertson, 1903)**
Black and Gold Bumble Bee
IUCN: LC – NatureServe: G5:S2

Life History and Habitat: In New York and in other parts of its range, this species is typically observed in meadows, fields, and other open habitats (Lanterman et al. 2019). Novotny et al. (2021) found that *B. auricomus* was associated with roadsides that have been restored and planted. In New York, it has been observed in early May and throughout the summer into early October. *Bombus auricomus* nests are typically small, with an upper limit of 60 workers, and are typically located at the ground surface (Frison 1917, Colla et al. 2011, Williams et al. 2014). *Bombus auricomus* is a long-tongued bee and appears to be more of a specialist, collecting pollen from fewer types of flowering plants when compared to other more generalist bumble bee species (Wood et al. 2019). Within its range, *B. auricomus* has been observed visiting *Lupinus perennis*, *Trifolium pratense*, *Aesculus glabra*, and *Rhododendron* spp. (Lanterman et al. 2019).

Distribution and Trends: *Bombus auricomus* is widespread, occurring throughout eastern North America and as far west as the eastern Great Plains (NatureServe 2025). New York is on the northern and eastern edge of its distribution. On average, it is estimated to have declined by 24% and additional surveys are essential to obtain a better understanding of how this species is fairing throughout its range (Hatfield et al. 2015). Declines have varied throughout the species' range; for example, in Michigan *B. auricomus* has seen a 64% range decline (Wood et al. 2019). While it appears to be relatively stable in New York, it is uncommon, as in other parts of its range. *Bombus auricomus* made up just 0.6% of the bumble bee queens observed in an Ohio study (Lanterman et al. 2019) and just 0.09% of bumble bees collected during a nationwide survey (Strange and Tripodi 2019). Historically, this species was primarily seen from central New York and recent iNaturalist and partner records were from the Capital region (Albany and surrounding counties). New species records continue to be found post-ESNPS, including additional *B. auricomus* records from central New York; the maps below display ESNPS records only. *Bombus auricomus* was detected in 29% (18 out of 62) of New York counties.

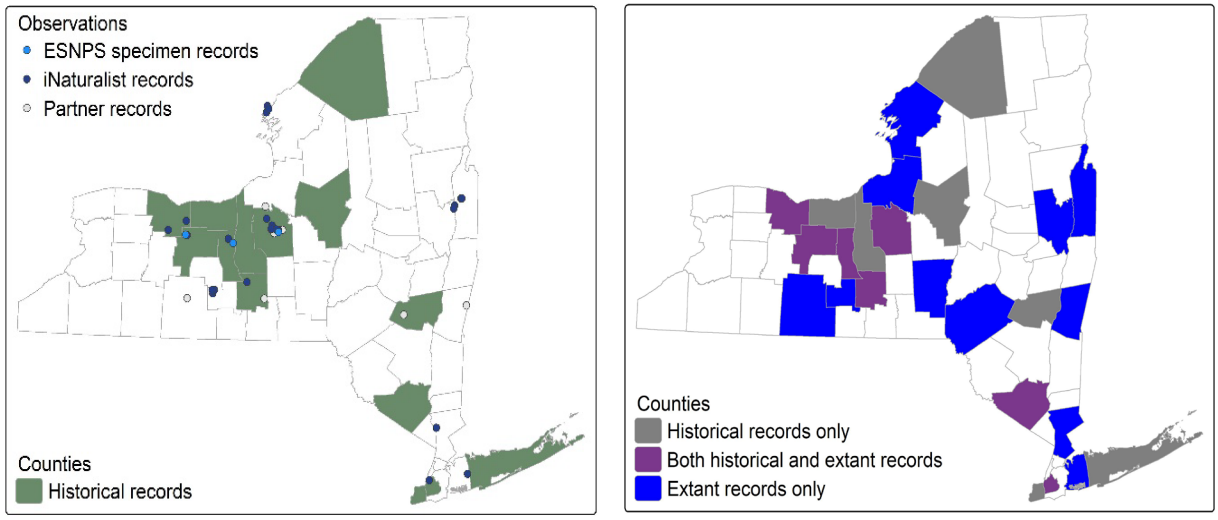


Figure 2: *Bombus auricomus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. auricomus* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *bimaculatus* Cresson, 1863**
Two-spotted Bumble Bee
IUCN: LC – NatureServe: G5:S4

Habitat and Life History: *Bombus bimaculatus* can be found close to or within wooded areas, fields and edges, wetlands, meadows, and in a wide variety parks and gardens (Lanterman et al. 2019, Lanterman Novotny et al. 2021). In Vermont, it was positively associated with grasslands and developed areas and negatively associated with forested land cover (Richardson et al. 2018). In New York, most observations occur from April through August, with a few in early October. Williams et al. (2014) describes it as one of the species with colonies that end the earliest in the summer. Nest locations are variable and can be underground, aboveground, or in cavities (Colla et al. 2011, Williams et al. 2014). *Bombus bimaculatus* is a medium-tongued bee and has been observed in the northeast visiting *Lupinus perennis*, *Taraxacum officinale*, *Lamium purpureaum*, *Glechoma hederacea*, *Trifolium pratense*, *Mertensia virginica*, *Pedicularis candensis*, *Hydrophyllum* spp., *Aesculus glabra*, *Robinia* spp., and *Rhododendron* spp. (Lanterman et al. 2019).

Distribution and Trends: *Bombus bimaculatus* is one of the most widespread and abundant species in the eastern U.S. and into southern Canada (NatureServe 2025). Nationwide, *B. bimaculatus* made up approximately 5% of the bumble bee fauna and recent records suggest populations have tripled when compared to a survey completed 50 years earlier (Strange and Tripodi 2019). This species may be increasing in New York and other parts of its range. There is also evidence this species may be experiencing a range expansion in the northern extent of its current distribution (Sheffield and Palmier 2023). *Bombus bimaculatus* is found statewide and was detected in 94% (58 out of 62) of New York counties.

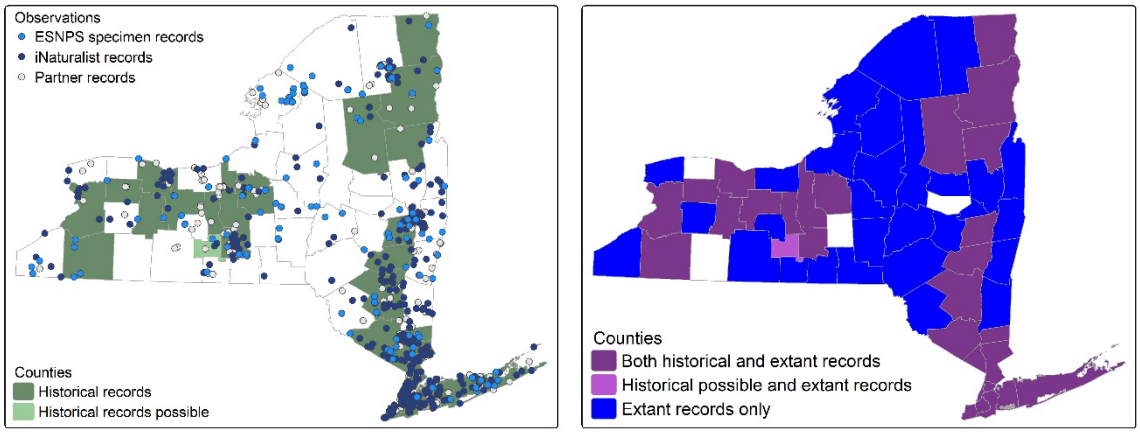


Figure 3: *Bombus bimaculatus is* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between

historical and current sampling (right panel). Counties where *B. bimaculatus* were not observed are not shaded.

***Bombus* (*Psithyrus*) *bohemicus* (=*ashtoni*) (Seidl, 1837)**
Ashton Cuckoo Bumble Bee
IUCN: DD – NatureServe: G4:SH

Habitat and Life History: In the east , *B. bohemicus* is a specialist nest parasite of *B. terricola* and *B. affinis* (Williams et al. 2014, Environment and Climate Change Canada 2022) and can be found in similar habitats as its host. Social parasites, such as *B. bohemicus*, generally appear about one month after their hosts emergence and nest establishment (Lanterman et al. 2019). Historical New York records have been reported from March to October. Cuckoo bumble bees are generally less abundant and have smaller colony sizes than non-cuckoo bumble bees (Bower et al. 2023). Although they do not collect pollen, because their hosts' workers provision the young, *B. bohemicus* has been observed visiting a wide range of floral resources.

Distribution and Trends: *Bombus bohemicus* is a northern species found in the Midwest and eastern U.S. (NatureServe 2025). Apparently declining rapidly throughout its range, presumably linked to declines in its host species (Environment and Climate Change Canada 2022). Across its range, it has been assessed as a Data Deficient species with decreasing population trend (Hatfield et al. 2015). *Bombus bohemicus* has shown a decline in relative abundance in Cape Breton, Canada, representing 3% of bumble bees collected in the 1990s, 0.5% in the early 2000s, and was not detected during efforts in 2013 and 2020 (Dominey 2021). In New York, *B. bohemicus* was historically known statewide, documented in approximately half of the counties with nearly 500 historic records, but has not been detected in the state since 1997.

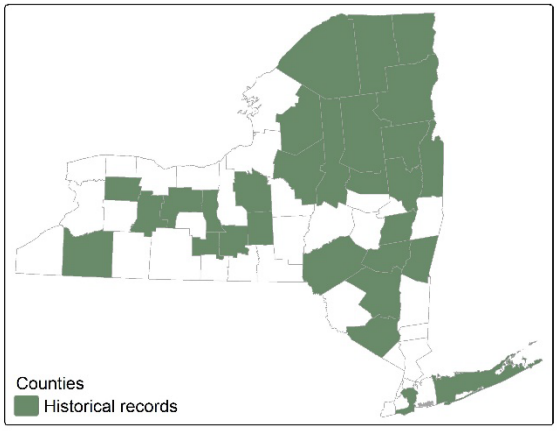
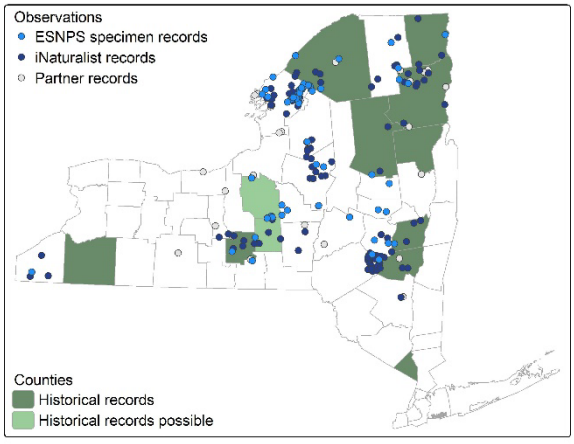


Figure 4: *Bombus bohemicus* historical records (pre-2000) are represented as shaded counties. Counties where *B. affinis* were not observed are not shaded. There have been no recent observations of *B. bohemicus.*

***Bombus* (*Subterraneobombus*) *borealis* Kirby, 1837**
Northern Amber Bumble Bee
IUCN: LC – NatureServe: G4:S3

Habitat and Life History: *Bombus borealis* is typically found close to or within wooded areas including shrublands and wetlands (Williams et al. 2014, Richardson et al. 2018). Brooks and Nocera (2019) observed *B. borealis* twice as often in forested wetlands when compared to disturbed sites. New York records range from May to September. *B. borealis* nests are typically underground with small colony sizes, usually with an upper limit of 125 individuals (Williams et al. 2014). *Bombus borealis* is a long-tongued bee and is associated across its range with *Astragalus*, *Carduus*, *Cirsium*, *Melilotus*, *Rubus*, *Solidago*, *Symphytum*, *Trifolium*, *Vicia,* and *Vaccinium angustifolium* (Colla et al. 2011, Williams et al. 2014, Brooks and Nocera 2020).

Distribution and Trends: *Bombus borealis* is a northern species with a relatively narrow range found in the Canadian Maritimes and eastern U.S. (NatureServe 2025). In a nationwide survey, *B. borealis* made up less than 1% of the bumble bees collected (Strange and Tripodi 2019). This species appears to be uncommon and has experienced declines in parts of its range. For example, in the southern extent of its range in Illinois, *B. borealis* appears to be locally extirpated (Grixti et al. 2008). In a Northeast bumble bee study, it was classified as Data Deficient, representing less than 1% of all *Bombus* collected (Jacobson et al. 2018). However, it appears to be faring better in the northern parts of its range (Gibson et al. 2018). In one study, it made up 5–8% of the relative abundance of *Bombus* collected from Cape Breton, Nova Scotia (Dominey 2021). Recent statewide pollinator survey efforts in Vermont (Richardson et al. 2018) and the ESNPS in New York have found higher numbers of *B. borealis* when compared to historical observations. Museum records of *B. borealis* prior to 2010 were sparse and mainly from the Adirondacks; however, with focused survey effort we gained a clearer picture of its statewide distribution. In New York, *B. borealis* has been detected in 47% (29 out of 62) of New York counties.



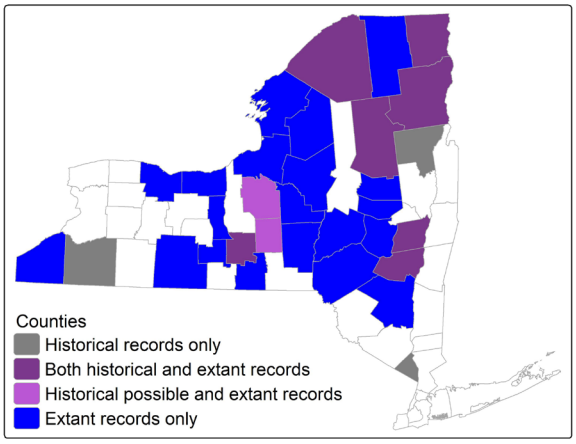


Figure 5: *Bombus borealis* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. borealis* were not observed are not shaded.

***Bombus* (*Psithyrus*) *citrinus* (Smith, 1854)**
Lemon Cuckoo Bumble Bee
IUCN: LC – NatureServe: G4:S2S3

Habitat and Life History: *Bombus citrinus* is an obligatory social parasite of *B. impatiens*, *B. bimaculatus*, and *B. vagans* and can be found where their host is present (Williams et al. 2014). Richardson et al. (2018) found that *B. citrinus* was positively associated with grasslands and negatively associated with forested and developed areas. In New York, *B. citrinus* records are from early May through mid-October. While it relies on host workers to provision the nest, *B. citrinus* has been observed within its range visiting *Centaurea stoebe* ssp. *micranthos*, *Cirsium vulgare*, *Coreopsis lanceolata*, *Echinacea purpurea*, *Eutrochium purpureum*, *Leucanthemum vulgare*, *Ratibida pinnata*, *Rubus allegheniensis*, *Trifolium aureum*, *T. pratense*, and *T. repens* (Rowe 2020).

Distribution and Trends: *Bombus citrinus* can be found in the Midwest and northeastern U.S. into southern Canada (NatureServe 2025). A nationwide survey found that *B. citrinus* made up just 0.12% of bumble bees collected (Strange and Tripodi 2019). While it was assessed as having a stable population trend across its range (Hatfield et al. 2015), it appears to be declining in parts of its range (Dominey 2021). Cuckoo bumble bees are more vulnerable to climate change and usually less abundant than other bumble bee species (Bower et al. 2023). In Vermont, *B. citrinus* experienced a 65% decline in relative abundance (Richardson et al. 2018). *Bombus citrinus* appears to have experienced a slight reduction in its range in New York and is currently known from 42% (26 out of 62) of New York counties.

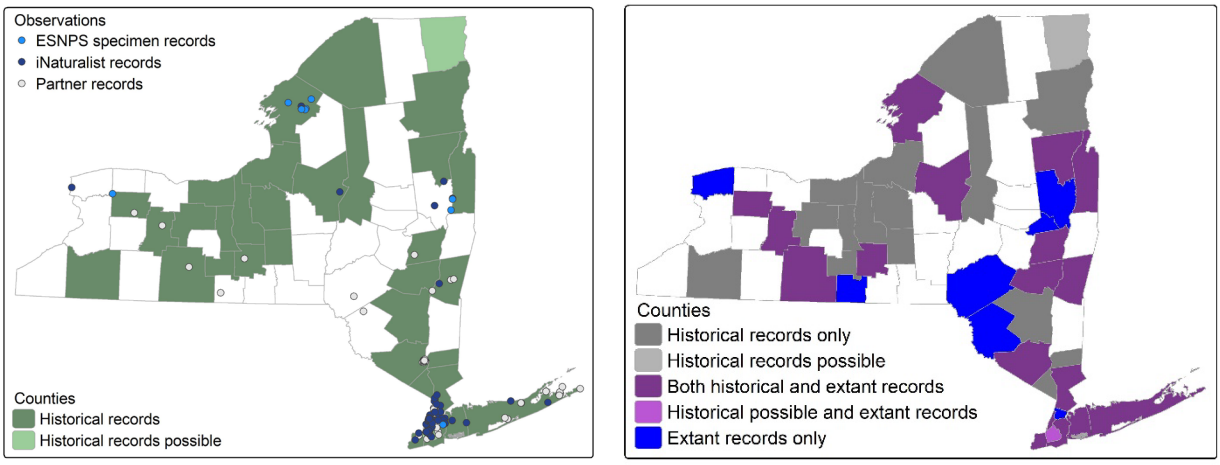


Figure 6: *Bombus citrinus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. citrinus* were not observed are not shaded.

***Bombus* (*Thoracobombus*) *fervidus* (Fabricius, 1798)**
Yellow Bumble Bee
IUCN: VU – NatureServe: G3:S3

Habitat and Life History: *Bombus fervidus* habitat preferences appear to be somewhat range dependent. In Vermont, *B. fervidus* was positively associated with crops and grasslands, and negatively associated with coniferous and deciduous forest types, wetlands, and developed areas (Richardson et al. 2018), whereas in Montana and the Midwest, this species was associated with coniferous forests (Lanterman Novotny et al. 2021, Montana Natural Heritage Program 2025). Queens were reported from open grassland, meadows, gardens, and roadsides (Lanterman et al. 2019). In New York, it is consistently seen from April through October. *Bombus fervidus* nests are typically located on the ground surface or aboveground in deserted mouse nests, tall grass, or haystacks (Williams et al. 2014). It is a long-tongued bee and its preferred plants within its range include *Astragalus*, *Cirsium*, *Helianthus*, *Lonicera*, *Lythrum*, *Monarda*, *Pedicularis*, *Penstemon*, *Trifolium*, and *Vicia* (Williams et al. 2014). Recent studies have shown a significant association with flowers in the Fabaceae family (Gibson et al. 2019).

Distribution and Trends: *Bombus fervidus* is a widespread species known from most of the U.S. but not found in the southeast (NatureServe 2025). In a nationwide survey, *B. fervidus* observations made up approximately 5% of bumble bees collected (Strange and Tripodi 2019). A separate study tracking queens reported *B. fervidus* making up less than 2% of observed queens (Lanterman et al. 2019). Jacobson et al. (2018) estimated that *B. fervidus* has experienced a 50% decline in the northeast. However, its distribution in New York has remained relatively stable and is currently known from 79% of the state (49 of 62 counties), with concentrations in the Hudson Valley, Long Island, and New York City.

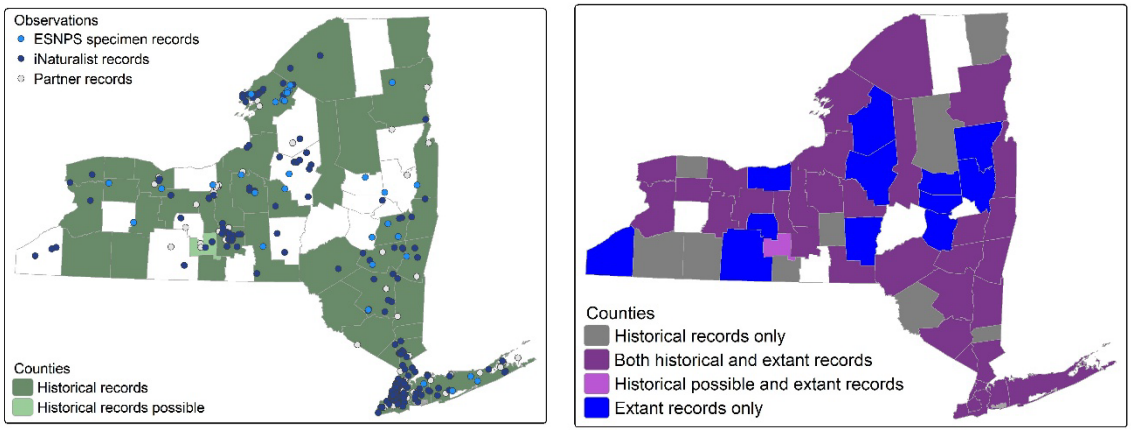


Figure 7: *Bombus fervidus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. fervidus* were not observed are not shaded.

***Bombus* (*Psithyrus*) *flavidus appalachiensis* (= *fernaldae*) (Lhomme and Hines, 2021)**
Fernald Cuckoo Bumble Bee
IUCN: DD – NatureServe: G5?:S2

Habitat and Life History: *Bombus flavidus* is a social parasite of *B. perplexus* and *B. rufocinctus* in the east (Colla et al. 2011). While there has been taxonomic uncertainty surrounding *B. flavidus*, Lhomme et al. (2021) used genetic analysis, chemical composition, and morphological features to recognize *B. flavidus appalachiensis* as a distinct subspecies restricted to eastern North America. Its occurrence is dependent on its hosts' abundance. Brooks and Nocera (2020) found that *B. flavidus* had relatively low abundance in their study likely due to its hosts *B. rufocinctus* and *B. perplexus* being present in low numbers in the forested wetlands surveyed. In New York, it has been consistently seen from mid-June through early August. This species has smaller colony sizes, typically around 150 individuals (Williams et al. 2014). While this species does not actively collect pollen to provision its nest, it appears to be associated with *Vaccinium angustifolium* in the northern part of its range (Brooks and Nocera 2020) and has been noted foraging on *Cirsium*, *Heliomeris*, *Melilotus*, and *Senecio* across its entire range (Williams et al. 2014).

Distribution and Trends: *Bombus flavidus* has a holarctic distribution (Lhomme et al. 2021). In North America, the western and eastern populations appear to be disconnected, and two separate subspecies have been recently recognized. The eastern subspecies, *B. f. appalachiensis*, occurs in the Appalachians up to the eastern boreal regions of North America (Lhomme et al. 2021, NatureServe 2025). In a nationwide survey, *B. flavidus* made up just 0.06% of bumble bees collected (Strange and Tripodi 2019). Generally, cuckoo bumble bees are less abundant and more susceptible to the effects of climate change and other threats when compared to non-parasitic bumble bee species (Bower et al. 2023). *Bombus flavidus* has been assessed as Data Deficient but with a stable population trend (Hatfield et al. 2015). *Bombus flavidus appalachiensis* is more rare than western Nearctic *B. f. flavidus* (Lhomme et al. 2021). This subspecies is considered rare in New York (S2) and was state historical (SH) until being re-discovered in 2014; it has been observed during and post-ESNPS. The maps below reflect the records collected during the ESNPS with approximately 34 historical records and 43 current records (New York Natural Heritage Program 2025). Throughout the ESNPS, *Bombus flavidus* was detected in 18% (11 out of 62) of New York counties; post-ESNPS records have documented *B. flavidus* in 20 counties across the state.

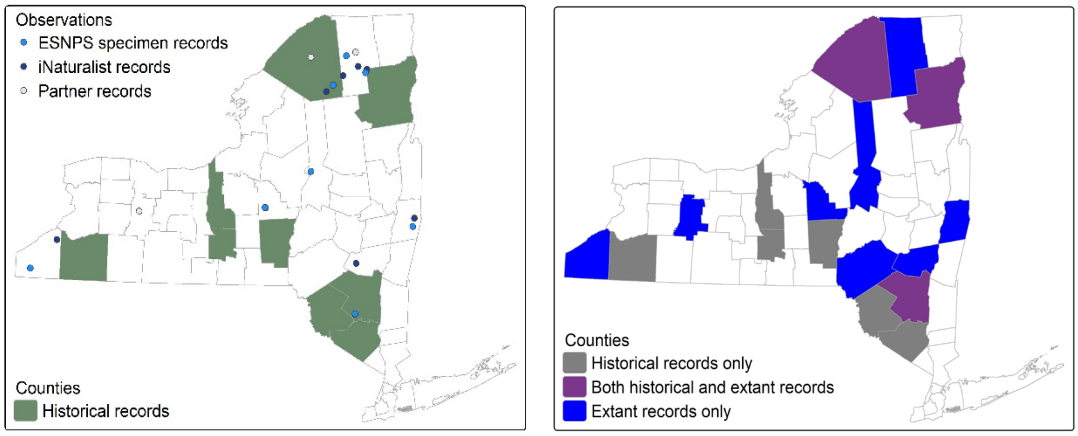


Figure 8: *Bombus flavidus appalachiensis* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. f. appalachiensis* were not observed are not shaded.

***Bombus* (*Cullumanobombus*) *griseocollis* (De Geer, 1773)**
Brown-belted Bumble Bee
IUCN: LC – NatureServe: G5:S4S5

Habitat and Life History: *Bombus griseocollis* is known from open farmland, fields, urban parks, and gardens (Gratton et al. 2023). In Vermont, *B. griseocollis* was positively associated with grasslands (Richardson et al. 2018). In New York, it is consistently seen from late March through September. *Bombus griseocollis* typically nests on the surface of the ground or underground and has been recently documented nesting in a tallgrass prairie restoration at the ground surface under grass domes woven by rodents (Williams et al. 2014, Dolan 2024). It is a medium-tongued bee and is associated across its entire range with *Asclepias*, *Coronilla*, *Dalea*, *Echinacea*, *Lythrum*, *Melilotus*, *Monarda*, *Pontederia*, *Rudbeckia*, *Solidago*, *Trifolium*, *Verbena*, and *Vicia* (Colla et al. 2011, Williams et al. 2014).

Distribution and Trends: *Bombus griseocollis* is one of the most widespread and abundant species in the eastern U.S. (NatureServe 2025). In a nationwide survey, *B. griseocollis* was the second most common species observed, making up over 12% of the *Bombus* species collected (Strange and Tripodi 2019). In the northeast, *B. griseocollis* populations have been assessed as either stable or undergoing an increase in relative abundance (Richardson et al. 2018, Jacobson et al. 2018). *Bombus griseocollis* was detected in 90% of the state (56 of 62 counties).

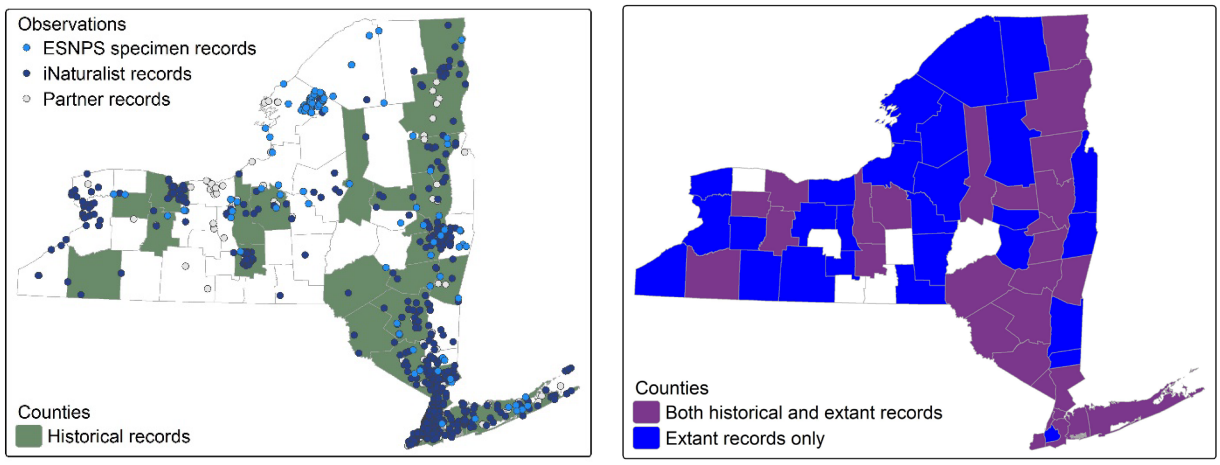


Figure 9: *Bombus griseocollis* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. griseocollis* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *impatiens* Cresson, 1863**
Common Eastern Bumble Bee
IUCN: LC – NatureServe: G5:S5

Habitat and Life History: *Bombus impatiens* can be found in a variety of habitats including grassland, farmland, wetlands, urban parks, gardens, and near or within woodlands (Williams et al. 2014). In Vermont, it had a positive association with grasslands, evergreen forest, and developed areas while being negatively associated with shrubland, and deciduous and mixed forest (Richardson et al. 2018). In New York, it is consistently seen from April through October. *Bombus impatiens* typically nests underground and has large colonies, with up to 1,500 workers (Williams et al. 2014). *Bombus impatiens* is a medium-tongued bee, a generalist, and has the broadest floral range of all New York bumble bee species (Williams et al. 2014, Jacobson et al. 2018).

Distribution and Trends: *Bombus impatiens* is one of the most common and widespread species in the eastern U.S. (NatureServe 2025). In a nationwide survey, *B. impatiens* made up over a third of the bumble bees documented (Strange and Tripodi 2019). In New England, it appears this species has benefited from agriculture and urban development and has become more abundant, expanding its range (Jacobson et al. 2018). *Bombus impatiens* is found statewide and has been detected in 100% (62 out of 62) of New York counties.

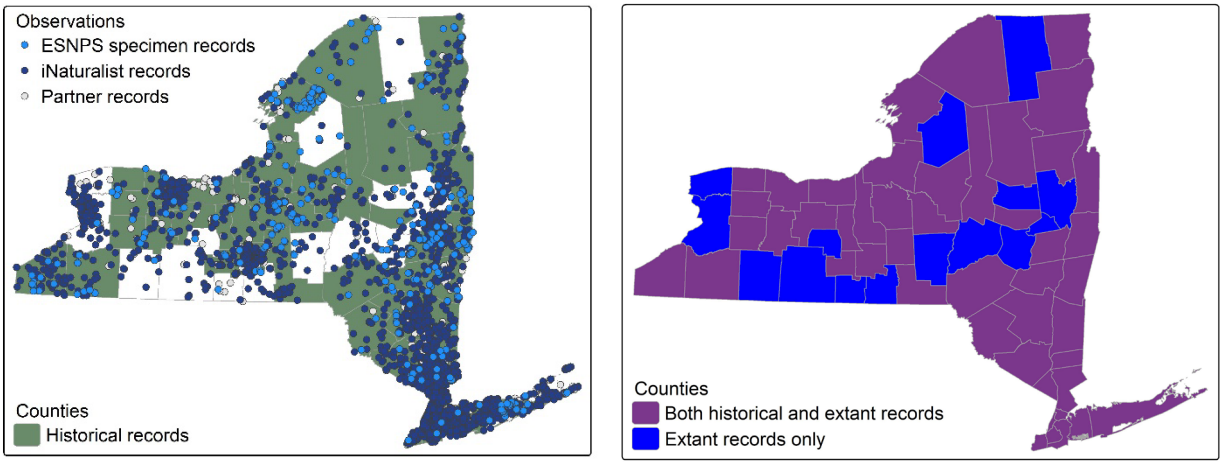


Figure 10: *Bombus impatiens* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. impatiens* were not observed are not shaded.

***Bombus* (*Psithyrus*) *insularis* (Smith, 1861)**
Indiscriminate Cuckoo Bumble Bee
IUCN: LC – NatureServe: G3:SH

Habitat and Life History: *Bombus insularis* is a social parasite of *B. pensylvanicus, B. rufocinctus, B. ternarius,* and *B. terricola* (Colla et al. 2011, Hatfield et al. 2015). Historical records of *B. insularis* in New York are from early August through early September. While it does not provision its own nest, it has been observed nectaring across its range on *Eupatorium*, *Heliomeris*, *Melilotus*, *Rubus*, *Senecio*, *Solidago*, *Trifolium*, *Vaccinium*, and flowers in the Asteraceae family (Colla et al. 2011, Williams et al. 2014).

Distribution and Trends: *Bombus insularis* is found in the mountain west and scattered populations occur throughout the northeastern U.S. and Canada (NatureServe 2025). It appears to be experiencing declines, likely associated with its host species abundance, in parts of its range (Williams et al. 2014, Hatfield et al. 2015). Cuckoo bumble bees are more vulnerable to threats, like climate change, and generally are not as abundant as other subgenera (Bower et al. 2023). *Bombus insularis* made up just 0.06% of bumble bees collected during a nationwide survey (Strange and Tripodi 2019). In New York, it was historically known from Essex County and was not re-detected during the ESNPS.

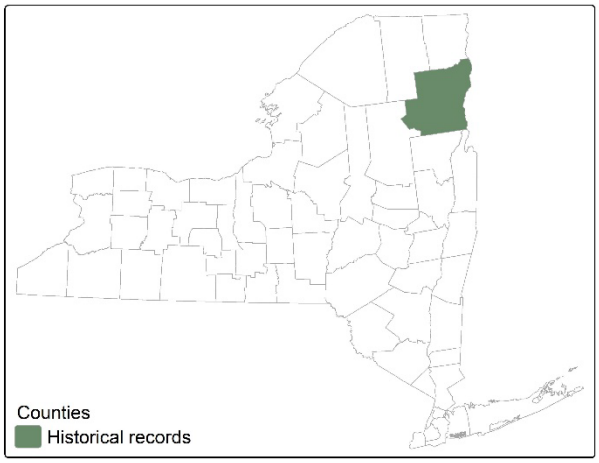


Figure 11: *Bombus insularis* historical records (pre-2000) are represented as shaded counties Counties where *B. insularis* were not observed are not shaded. There are no recent records of *B. insularis*.

***Bombus* (*Thoracobombus*) *pensylvanicus* (De Geer, 1773)**
American Bumble Bee
IUCN: VU – NatureServe: G3G4:S2

Habitat and Life History: *Bombus pensylvanicus* is generally considered to be associated with fields and grasslands (Liczner and Colla 2020). In New York, it has been consistently observed between July and October. It typically nests at the ground surface in long grass but occasionally will nest underground (Williams et al. 2014). It is a long-tongued bee (Williams et al. 2014), and has been documented in the northern and northeastern parts of its range visiting *Vicia cracca*, *Centaurea maculosa*, *Cirsium vulgae*, *Monarda fistulosa*, *Stachys byzantine*, *Trifolium pratense*, and *Asclepias tuberosa* (MacPhail et al. 2019, Lanterman Novotny et al. 2023). This species has a significant association with species in the Fabaceae family (Gibson et al. 2018).

Distribution and Trends: Formerly one of the most widespread species, *B. pensylvanicus* has experienced declines of nearly 90% in parts of its range, particularly in the north (Tyler 2021). *Bombus pensylvanicus* belongs to the subgenus *Thoracobombus*, which has been shown to be significantly infected by the pathogen *Vairimorpha bombi* (=*Nosema bombi*; Tokarev et al. 2020) (Cameron et al. 2011). Researchers believe this pathogen is largely responsible for the rapid decline of this species in much of the Northeast (Schweitzer and Sears 2013). A nationwide survey found that *B. pensylvanicus* made up just over 4% of bumble bees collected (Strange and Tripodi 2019). In Vermont, *B. pensylvanicus* experienced significant declines and may be extirpated in the state (Richardson et al. 2018). Once historically common in New York with nearly 400 historic records from 29 counties (47%), this species suffered catastrophic declines in the 1990s and is currently known from 18% (11 out of 62) of New York counties.

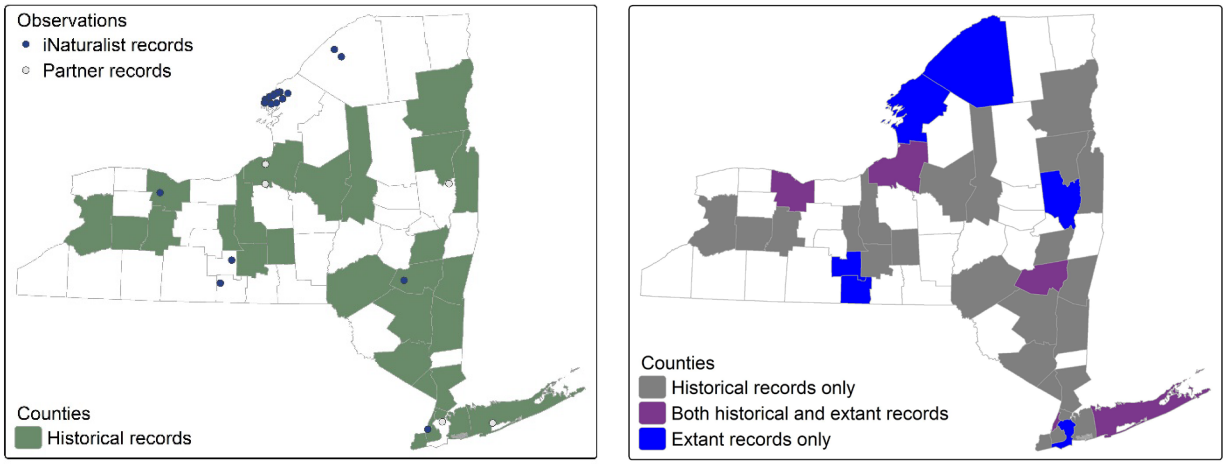


Figure 12: *Bombus pensylvanicus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. pensylvanicus* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *perplexus* Cresson, 1863**
Confusing Bumble Bee
IUCN: LC – NatureServe: G5:S3

Habitat and Life History: *Bombus perplexus* is typically found near or within wooded areas, urban parks, and gardens (Lanterman Novotny et al. 2021). Richardson et al. (2018) found that it is positively associated with wetlands in Vermont. In New York, it has been observed consistently from April through September. Queens typically nest underground and *B. perplexus* is one of the species with colonies that end earliest in the summer (Williams et al. 2014). It is a medium-tongued bee, and its preferred food plants across its range include *Campanula*, *Cirsium*, *Hypericum*, *Lonicera*, *Melilotus*, *Penstemon digitalis*, *Pontederia*, *Tilia*, *Dipsacuss* spp., and *Silphium* spp. (Williams et al. 2014, Lanterman Novotny et al. 2023).

Distribution and Trends: *Bombus perplexus* is known from the eastern U.S. and north into Canada (NatureServe 2025). This species appears to be relatively stable (Colla and Packer 2008, Grixti et al. 2008, Jacobson et al. 2018). Hatfield et al. (2015) found that *B. perplexus* has not experienced serious declines in relative abundance, persistence, or range. In New York, *B. perplexus* appears to occur across the entire state and was detected in 85% of the state (53 of 62 counties).

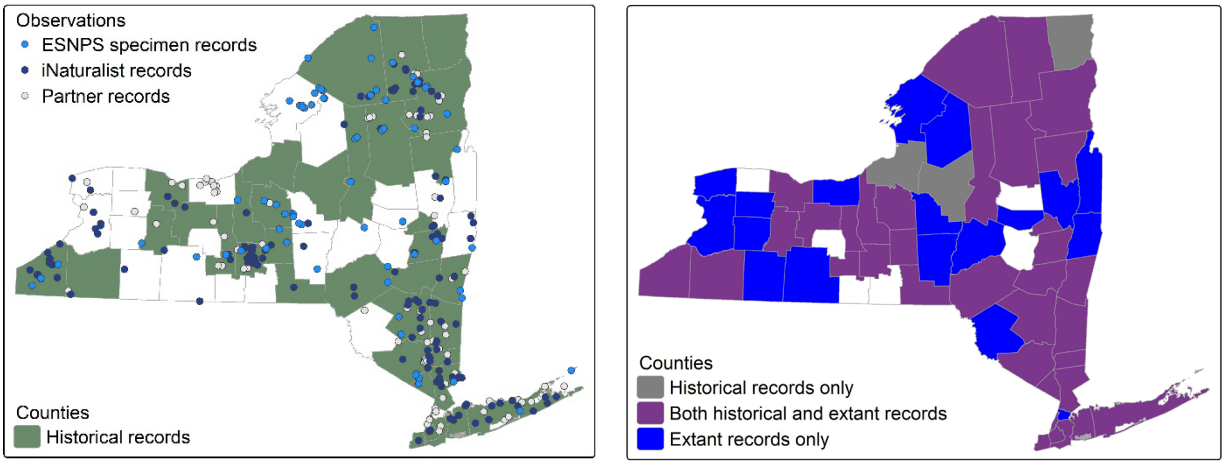


Figure 13: *Bombus perplexus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. perplexus* were not observed are not shaded.

***Bombus* (*Cullumanobombus*) *rufocinctus* Cresson, 1863**

Red-belted Bumble Bee

IUCN: LC – NatureServe: G5:S3

Habitat and Life History: *Bombus rufocinctus* has been observed close to or within wooded areas, urban parks, and gardens (Williams et al. 2014). In Vermont, it was positively associated with cropland and grassland and negatively associated with evergreen and mixed forest (Richardson et al. 2018). In New York, it has been consistently observed from early May to October. *Bombus rufocinctus* typically nests on the ground surface or aboveground (Williams et al. 2014). It is a short-tongued bee, and its preferred food plants within its range include *Chicorium*, *Eupatorium*, *Fragaria*, *Grindelia*, *Helianthus*, *Melilotus*, *Solidago*, *Trifolium*, *Vicia*, and *Viguiera* (Williams et al. 2014).

Distribution and Trends: *Bombus rufocinctus* is widespread across the northern U.S. and Canada (NatureServe 2025). It appears that it has not exhibited rangewide declines in relative abundance, persistence, or range in recent years (Hatfield et al. 2015). However, in the northeast, *B. rufocinctus* was one of the least collected species in a recent survey effort (Jacobson et al. 2018). *Bombus rufocinctus* occurs primarily in the northern parts of the state, with a single record from Long Island, and occurs in 45% (28 of 62) of New York counties.

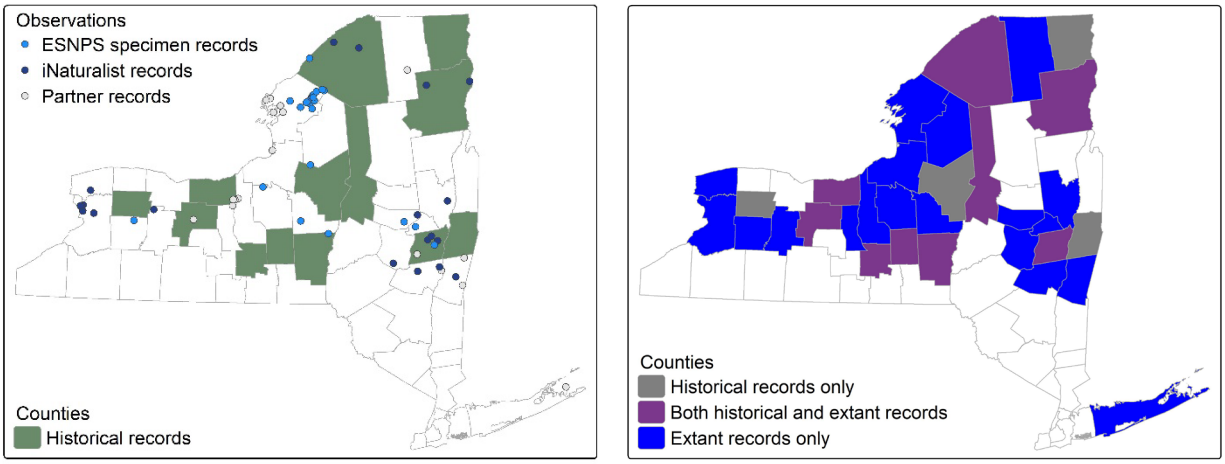


Figure 14: *Bombus rufocinctus* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. rufocinctus* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *sandersoni* Franklin, 1913**
Sanderson's Bumble Bee
IUCN: LC – NatureServe: G5:S3

Habitat and Life History: *Bombus sandersoni* prefers forested sites or near wooded areas (Gratton et al. 2023). In New York, it has been consistently observed from May through mid-September. Queens typically nest underground, and this species has a smaller colony size with a maximum of around 80 workers (Williams et al. 2014). This medium-tongued bee may be associated across its range with *Trifolium pratense*, *Monarda fistulosa*, *Baptisia tinctoria*, *Cirsium vulgare*, *Impatiens capensis*, *Cimicifuga*, *Kalmia*, *Lonicera*, *Lyonia*, *Melilotus*, *Rubus*, and *Vaccinium* (Williams et al. 2014, Varkonyi et al. 2025).

Distribution and Trends: *Bombus sandersoni* is found in the Midwest, northeastern U.S., and Canada (NatureServe 2025). In Vermont, *B. sandersoni* has experienced a decline in relative abundance (Richardson et al. 2018). In Rhode Island, recent efforts detected this species in low numbers from the northwestern portion of the state (Varkonyi et al. 2025). In New York, *B. sandersoni* has been observed in low numbers and was collected across the state occurring in 40% (25 out of 62) of New York counties.

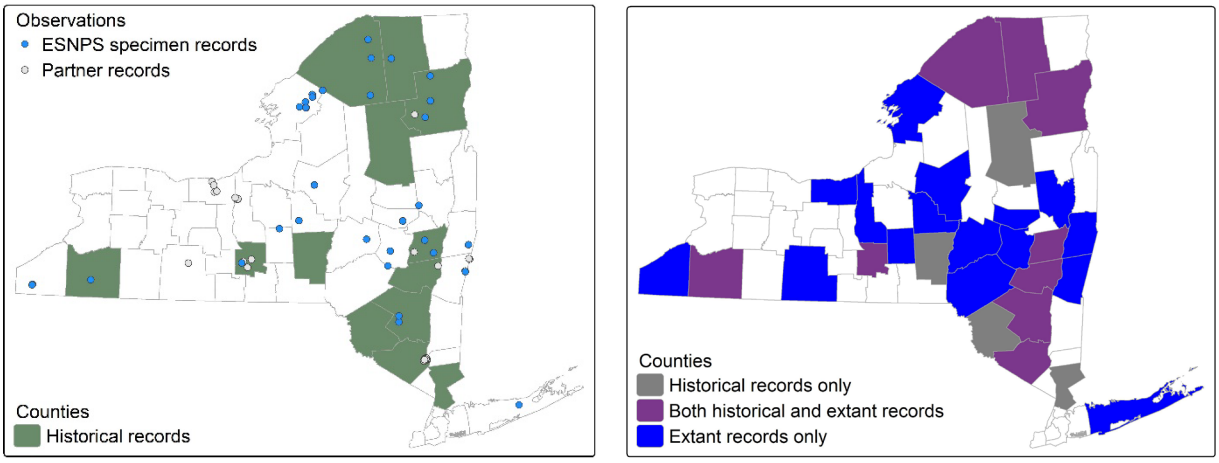


Figure 15: *Bombus sandersoni* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. sandersoni* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *ternarius* Say, 1837**
Tri-colored Bumble Bee
IUCN: LC – NatureServe: G5:S4

Habitat and Life History: *Bombus ternarius* is typically found near or within woodlands or wetlands (Williams et al. 2014). In Vermont, it was positively associated with evergreen and mixed forest and negatively associated with grassland (Richardson et al. 2018). Recent surveys in New York detected this species from as early as April through mid-October. This species typically nests underground (Williams et al. 2014). It is a medium-tongued bee, and prefers food plants across its range in the *Asclepias*, *Claytonia*, *Eupatorium*, *Rhododendron*, *Rubus*, *Solidago*, *Symphyotrichum*, *Taraxacum*, *Trifolium*, and *Vaccinium* genera (Williams et al. 2014).

Distribution and Trends: *Bombus ternarius* is an eastern and northern species (NatureServe 2025). Nationwide, *B. ternarius* accounted for approximately 5% of the bumble bees collected (Strange and Tripodi 2019). Hatfield et al. (2015) found that it has not experienced significant declines in relative abundance, persistence, or range. *Bombus ternarius* was not confirmed to be present in a few counties in southern New York and Long Island where it was historically known. It has been collected across the state and has been detected in 74% (46 out of 62) of New York counties.

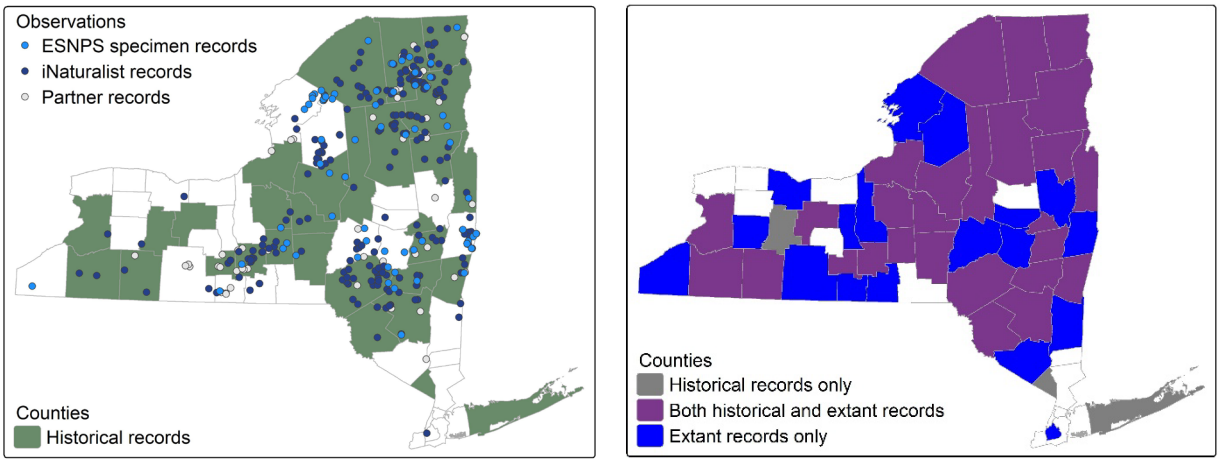


Figure 16: *Bombus ternarius* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. ternarius* were not observed are not shaded.

***Bombus* (*Bombus*) *terricola* Kirby, 1837**

Yellow-banded Bumble Bee

IUCN: VU – NatureServe: G3:S3

Habitat and Life History: *Bombus terricola* is associated with forest, forest-edge, or open habitat (Liczner and Colla 2020). *Bombus terricola* has been positively associated with shrubland and negatively associated with grassland (Richardson et al. 2018). In New York, recent observations of *B. terricola* range from late April through September, with a few records extending into October. This species typically nests underground and has large colony sizes with up to 1,500 workers (Williams et al. 2014). *Bombus terricola* is a short-tongued bee and a recent study found a significant association between *B. terricola* and species in the Fabaceae family (Gibson et al. 2019). *Bombus terricola* appears to serve a unique role due to its interaction with *Aster* spp. that were not associated with any other bumble bee species (Jacobson et al. 2018). Liczner and Colla (2020) found that across its range, *B. terricola* is associated with spring ephemerals including *Viola pubescens*, *V. affinis*, and *Trillium* spp.

Distribution and Trends: *Bombus terricola* is an eastern and northern North American species (NatureServe 2025). Population declines have been documented but we may be seeing a rebound in New York and in other parts of its range. In Nova Scotia, abundance was highest in the 1990s (around 14% of observations), populations declined to approximately 3% in the early 2000s, and then increased to 6-7% between 2013-2020 (Dominey 2021). Populations appear to be shifting to higher elevation sites which may provide short-term refugia (Tucker and Rehan 2017). Its distribution in New York has remained relatively stable and the species is currently known from 74% (46 of 62) of New York counties, generally in the northern and western regions. Recent survey efforts did not detect *B. terricola* from southern New York and Long Island, though it was historically present there.

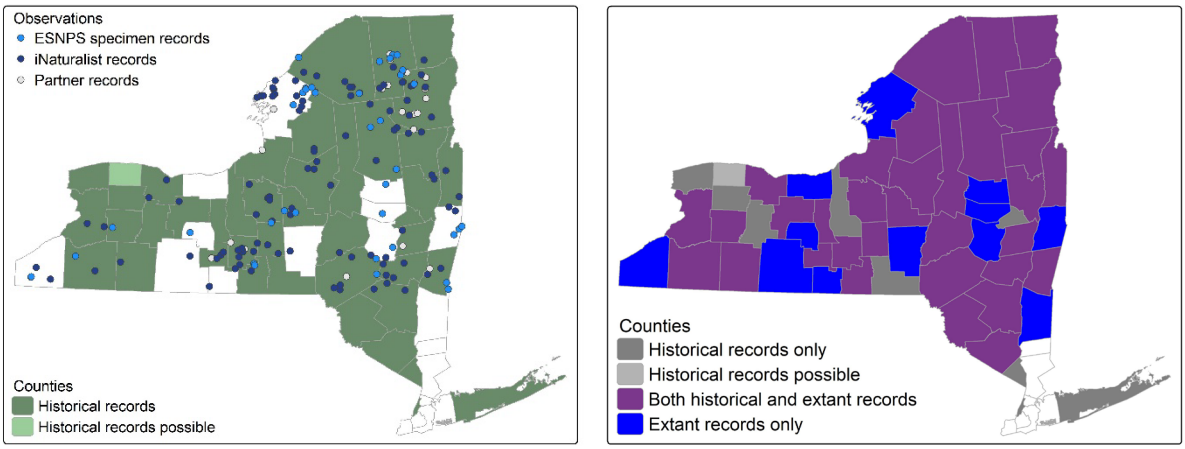


Figure 17: *Bombus terricola* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. terricola* were not observed are not shaded.

***Bombus* (*Pyrobombus*) *vagans* Smith, 1854**

Half-black Bumble Bee

IUCN: LC – NatureServe: G4:S5

Habitat and Life History: *Bombus vagans* utilizes a wide variety of habitats, including forests, wetlands, urban parks, and gardens. In Vermont, it was positively associated with evergreen forest land cover and negatively associated with grassland (Richardson et al. 2018). In New York, this species is active from May through October. *Bombus vagans* typically nests underground, although occasionally aboveground (Williams et al. 2014). It is a medium-tongued

bee and its preferred food plants across its range include asters, *Chelone*, *Cirsium*, *Impatiens*, *Lonicera*, *Monarda*, *Prunella*, *Solidago*, *Trifolium*, *Vicia*, and *Viola* (Williams et al. 2014).

Distribution and Trends: *Bombus vagans* is an eastern and northern North American species (NatureServe 2025). This widespread species has not experienced serious declines in relative abundance, persistence, and range (Hatfield et al. 2015). A nationwide survey found that *B. vagans* made up approximately 5% of the bumble bees collected (Strange and Tripodi 2018). *Bombus vagans* is found statewide and was detected in 85% (53 out of 62) of New York counties.

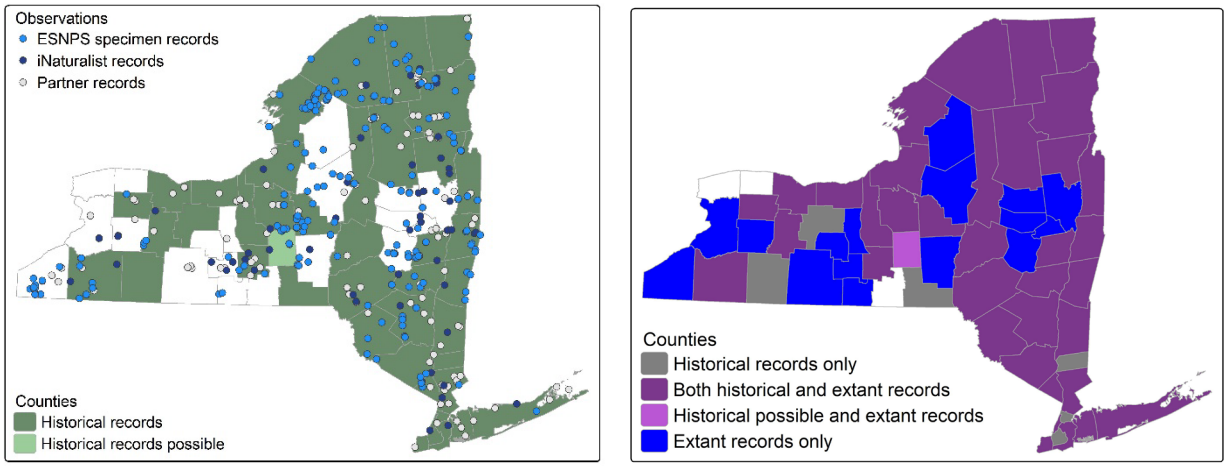


Figure 18: *Bombus vagans* observations from 2000-2021 depicted as dots; historical records (pre-2000) are represented as shaded counties (left panel). County differences between historical and current sampling (right panel). Counties where *B. vagans* were not observed are not shaded.

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