



State Status: State endangered

Global and State Rank: G3 (Vulnerable) / S1 (Critically Imperiled)

Family: Apidae (bees)

Total Range: The American bumble bee is found throughout much of the United States and southern Canada. Populations seem to be absent from the mountainous regions of the western United States, and more recently in areas at the northern margin of its historical range, including Maine and Vermont (NatureServe 2025). It also occurs in northern Mexico (Williams et al. 2014).

State Distribution: In Michigan, American bumble bee is primarily found in the southern half of the lower peninsula. Along the Lake Michigan coast, observations have been made as far north as Leelanau County and further inland, as far north as Clare County. American bumble bee has been documented in a total of 16 counties in the lower peninsula since 2017 (Miller et al., in review). Contemporary observations have been sporadic across the state range and populations are presumed to be small and

isolated. American bumble bee has not been documented in the upper peninsula (Wood et al. 2019, Rowe et al. 2023).

Recognition: American bumble bee occurs in three castes which may be observed depending on the time of year: Queens (May/June), workers (June/July), and males (August/September). Queens are relatively large, ranging from 2.1 to 2.5 cm (.83 to .98 in). Workers are average sized at 1.4 to 1.8 cm (.55 to .71 in), and males are slightly larger than females at 1.6 to 2.2 cm (.63 to .87 in). Body hair is short and even and ocelli are high on the face, above the eyeline. Queens and workers are similar in appearance. Characteristics of queens and workers include a **black face and top of the head**; thorax with yellow along the anterior section and black posteriorly, occasional yellow hairs mixed in on upper thorax; **thorax with a distinct black band between the wings**. The first abdominal segment (T1) is usually yellow on the lower half, and T2 and T3 are always yellow with the remaining abdominal segments black. In males T1-T3 are similar in appearance to queens and workers but tend to have more interspersed yellow hairs throughout and additional yellow hairs on the remaining abdo-



men and orange hairs at the abdomen base. Male faces are mostly yellow, with scattered black hairs (Mitchell 1962, Williams et al. 2014, Eckhardt and Rowe 2023).

Similar looking bumble bee species include the black and gold bumble bee (*B. auricomus*) and yellow banded bumble bee (*B. terricola*). However, only the black and gold bumble bee significantly overlaps in distribution in Michigan (Rowe et al. 2023).

Best Survey Time: Surveys typically involve capturing foraging bumble bees with an aerial net and identifying the individual species (Colla and Packer 2008, Grixti et al. 2009). Observational or visual surveys are also common, and generally require two to three good photos for identification (Xerces 2014). Surveys are generally completed as bumble bee community surveys rather than targeting specific species due to the overlaps in foraging and nesting habitats of bumble bees in Michigan. An individual survey should last at least 1 person hour to increase the likelihood of documenting this rare species within the broader bumble bee community.

Queens, workers, and males can generally be found foraging from floral resources in May/June, June/July, and August/September, respectively.

Habitat: American bumble bee favors prairies and grasslands and is rarely associated with extensive forests. It is a long-tongued bumble bee species and exhibits generalized nectar and pollen gathering behavior and can be found in prairie/savanna, dunes, marshes, forest edges, farmland and urban areas. Food plants include milk-vetch (*Astragalus*), thistle (*Cirsium*), dogwood (*Cornus*), prairie-clover (*Dalea*), coneflower (*Echinacea*), sunflower (*Helianthus*), caltrop (*Kallstroemia*), blazing-star (*Liatris*), blazingstar (*Mentzelia*), rosinweed (*Silphium*), nightshade (*Solanum*), clover (*Trifolium*), and vetch (*Vicia*) (Di Trani et al. 2006). In Michigan, known foraging resources include milk-vetches (*Astragalus* spp.), thistles (*Cirsium* spp.), dogwoods (*Cornus* spp.), prairie-clovers (*Dalea* spp.),

and sunflowers (*Helianthus* spp.), among other species based on pollen analysis (Wood et al. 2019). Based on contemporary collection records, most occurrences have been documented on species in the following families: Asteraceae (7), Lamiaceae (3), and Fabaceae (2) (Miller et al., in review). Nests are above ground among tufts of long grass but occasionally occur underground in old rodent burrows. This species can also occupy agricultural landscapes, however associated pressures such as ground management and pesticides may restrict populations in these environments. Most American bumble bee queens overwinter in rotten wood or underground (COSEWIC 2010).

Biology: The lifecycle of American bumble bee is like that of other eusocial species of bumble bees in Michigan. It is best to think of American bumble bee biology and life cycle at the colony level, as opposed to the individual level. After emerging from hibernation, queens are responsible for starting the colony by locating a suitable nesting site, laying the first batch of eggs and collecting spring pollen and nectar resources to feed these offspring during development (Goulson 2010). The individuals within a bumble bee colony divide up specialized tasks to keep the colony functioning during the summer months. Worker bumble bees (females) are the primary pollen and nectar foragers during the duration of colony activity. They also assist the queen by caring for developing offspring. Males usually leave the colony once developed in search of a mate of the same species from a different colony. Colonies typically reach peak size in mid-summer before declining in the fall, with new queens emerging to mate and overwinter. Unlike honey bees, bumble bee colonies are annual, with only fertilized queens surviving the winter (Goulson 2010). American bumble bees are primarily active outside of the colony during the daytime, when temperatures are above 55°F (13°C) and there is little to no rain.

Conservation/Management: Common and widespread in distribution prior to the late-1990s, the American bumble bee (along with other species



of bumble bees) has recently experienced declines throughout its historic range (Colla et al. 2012). In Michigan, the range of *B. pennsylvanicus* has decreased by approximately 98% compared to historic populations (Wood et al. 2019, Rowe et al. 2019). These losses are primarily attributed to three main threats: the widespread use of neonicotinoids (a pesticide group highly toxic to bees) on cropland since the early 1990s; both nesting and foraging habitat loss due to increased urbanization and agriculture, particularly the conversion of pasture to corn and soybeans; and the spread of pathogens from bumble bees used as pollinators in commercial greenhouse operations to wild populations nearby (Colla and Packer 2008, Grixti et al. 2009, COSEWIC 2010, Cameron et al. 2011). Conservation strategies for American bumble bee center around preserving healthy natural habitat areas, reducing pesticide/herbicide use, and promoting native wildflower reestablishment within urban and agricultural landscapes. Additionally, planting hedgerows and restoring native grasses along field margins, and in urban parks and residential yards provides habitat for small mammals, whose abandoned holes may in turn become bumble bee nesting and hibernating habitat (Goulson 2010). The seasonality of wildflower bloom is important as well, and resources should be selected to target each life stage of the American bumble bee colony (Rowe et al. 2018). While the response of American bumble bee to prescribed fire is unknown, it is presumed that this management activity should occur in early spring, prior to nest site selection, or late fall, during queen hibernation (Tai et al. 2022).

Research Needs: In Michigan, there is a limited understanding of American bumble bee at the population level. Documented occurrences of American bumble bee are primarily members of the worker caste, during the middle of the colony life cycle (Miller et al., in review). Additional surveys are required to document 1) presence of queen bumble bees in spring, including habitat used for overwintering/nesting and nutritional floral resources, 2) population size, spatial distributions and patch use, metapopulation functionality, and 3) susceptibility

to anthropogenic disturbance factors such as pesticide exposure, land-use change, and loss of key floral resources. Addressing these research needs would bolster targeted conservation efforts and allow managers and practitioners the tools to inform effective habitat management for American bumble bee.

Related Abstracts: *Bombus affinis*, *Bombus auricomus*, *Bombus terricola*, dry-mesic prairie, mesic prairie

Selected References:

- Cameron, S.A., J.D. Lozier, J.P. Strange, J.B. Koch, N. Cordes, L.F. Solter, and T.L. Griswold. (2011). Patterns of widespread decline in North American bumble bees. *Proceedings of the National Academy of Sciences* 108: 662-667.
- Colla, S. R. and Packer. L. (2008). Evidence for decline in eastern North American bumblebees (Hymenoptera: Apidae), with special focus on *Bombus affinis* Cresson. *Biodiversity and Conservation* 17: 1379-91.
- Colla, S. R., Gadallah, F., Richardson, L., Wagner, D., and Gall, L. (2012). Assessing declines of North American bumble bees (*Bombus* spp.) using museum specimens. *Biodiversity and Conservation* 21: 3585-3595.
- Di Trani de la Hoz, J. (2006). Phenology of *Bombus pennsylvanicus* sonorinus say (Hymenoptera: apidae) in central Mexico. *Neotropical Entomology* 35, 588-595.
- The Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2010. COSEWIC assessment and status report on the Rusty-patched Bumble Bee *Bombus affinis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 34pp.
- Eckhardt, S. and Rowe, L. (2023). Michigan Bumble Bee Identification Reference Guide. Web access: <https://mnfi.anr.msu.edu/pdfs/Michigan->



- [Bumble-Bee-Reference-Guide.pdf](#). Accessed 16 January 2025.
- Goulson, D. (2010). *Bumblebees: Behavior, Ecology and Conservation*. Second Edition. Oxford University Press, New York. 317pp.
- Grixti, J. C., Wong, L. T., Cameron, S. A., and Favret, C. (2009). Decline of bumble bees (*Bombus*) in the North American Midwest. *Biological Conservation* 142: 75-84.
- Miller, S. Z., Rowe, L. M., Widdicombe, L., and Isaacs, R. New records of the American bumble bee, *Bombus pensylvanicus*, in Michigan. *The Great Lakes Entomologist*, in review.
- Mitchell, T. B. (1962). Bees of the eastern United States. II. Technical bulletin (North Carolina Agricultural Experiment Station), 152, 1-557. [Megachilidae, Anthophoridae, Apidae s.s.].
- NatureServe. (2025). NatureServe Explorer page for American bumble bee (*Bombus pensylvanicus*). Web access: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.744953/Bombus_pensylvanicus. Accessed 16 January 2025.
- Rowe, L., Gibson, D., Landis, D., Gibbs, J., and Isaacs, R. (2018). A comparison of drought-tolerant prairie plants to support managed and wild bees in conservation programs. *Environmental Entomology* 47: 1128-1142.
- Rowe, L., Cuthrell, D., and Enander, H. (2019). Assessing Bumble Bee Diversity, Distribution, and Status for the Michigan Wildlife Action Plan. Michigan Natural Features Inventory. Report 2019-33.
- Rowe, L., Cuthrell, D., Earl, D., Eckhardt, S., and Enander, H. (2023). Michigan Statewide Bumble Bee and Habitat Surveys. Michigan Natural Features Inventory. Report 2023:21.
- Tai, T. M., Kaldor, A., Urbina, D., and Gratton, C. (2022). Within-year effects of prescribed fire on bumble bees (Hymenoptera: Apidae) and floral resources. *Journal of Insect Science* 22, 7.
- Williams, P. H., Thorp, R. W., Richardson, L. L., and Colla S. R. (2014). *Bumble Bees of North America: an Identification Guide*. Princeton University Press. 208 pp.
- Wood, T. J., Gibbs, J., Graham, K. K., and Isaacs, R. (2019). Narrow pollen diets are associated with declining Midwestern bumble bee species. *Ecology*, 100, e02697.
- Xerces Society for Invertebrate Conservation. (2014). *Natural Areas and Rangelands: Pollinator Habitat Assessment Guide*. Web access: https://xerces.org/sites/default/files/publications/14-045_03_HAG_Natural-Areas-and-Rangelands_web.pdf

Abstract Citation

Rowe, L. 2025. Special animal abstract for *Bombus pensylvanicus* (American bumble bee). Michigan Natural Features Inventory, Lansing, MI.

Copyright 2025 Michigan State University Board of Trustees.

Michigan State University Extension is an affirmative-action, equal-opportunity organization.

Funding for abstract provided by Michigan Department of Transportation.

