

# LED light pollution is a major turnoff to some North American bats

March 31 2021

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Big brown bat (*Eptesicus fuscus*). Credit: Brock & Sherri Fenton

Light pollution, or artificial light at night (ALAN), is a rapidly spreading form of environmental degradation that currently covers about 50% of the United States and 90% of Europe. It can have wide-ranging impacts to nocturnal wildlife by causing changes in foraging behavior, space use, predator-prey interactions, communication and reproduction. New research published this week in the journal *Ecology and Evolution* demonstrates how disruptive ALAN can be to some bat species of the northeastern U.S.

The effects of ALAN on bats have been well-studied in Europe in recent years, but the topic has received far less attention in other parts of the world, including North America. Furthermore, what is known from North America is largely limited to decades-old observations of bats around street lights that used now-obsolete technologies that have been increasingly replaced by energy-efficient lighting of different spectral composition. To better understand the effects of contemporary lighting technology on some North American bat [species](#), researchers from Great Hollow Nature Preserve & Ecological Research Center (New Fairfield, Connecticut) and Bat Conservation International (Austin, Texas) conducted an experiment in which they artificially illuminated bat foraging habitat in Connecticut with LED floodlights and compared acoustic recordings between nights when the lights were on and when they were off. This allowed the team to directly test the effects of broad-spectrum ALAN on presence/absence, foraging activity, and species composition in a northeastern U.S. bat community, thus providing some of the first information about the sensitivity of these species to LED [light pollution](#).

The researchers observed substantial aversion to the lighting by the big brown bat (*Eptesicus fuscus*) and the imperiled little brown bat (*Myotis lucifugus*), while finding neutral or ambiguous effects on the three other species in the community (eastern red bat [*Lasiurus borealis*], hoary bat [*L. cinereus*], and silver-haired bat [*Lasionycteris noctivagans*]). This

aversion to the lighting by some species but not others caused a significant change in foraging community composition, thereby disrupting competitive balance from natural conditions.

The little brown bat exhibited the strongest aversion to the lighting; the species is also in greatest need of conservation. Little brown bats were present 65% of the time under natural darkness, but only 14% of the time and in significantly lower abundance when the lights were on. "Our results provide clear and concerning evidence that the already-imperiled little brown bat is negatively impacted by ALAN and may therefore experience restricted foraging habitat availability and competitive disadvantages against other bats in [light](#)-polluted landscapes," said Chad Seewagen, the lead author of the study.

Co-author Amanda Adams said, "Because our experiment involved only a small number of residential outdoor floodlights, it shows that even a minimal amount of ALAN can be a significant form of habitat degradation for some North American bats."

As ALAN continues to encroach on natural areas in concert with human population growth and land-use change, light-averse bat species will be increasingly challenged to find dark habitats in which to live. "This raises serious concerns about the impact the [artificial lighting](#) in our towns, around our homes, and on our roads is having on bats, which provide incredibly important ecological and economic services as insect predators," said Dr. Seewagen.

**More information:** Seewagen, C.L. and A.M. Adams. 2021. Turning to the dark side: LED light at night alters the activity and species composition of a foraging bat assemblage in the northeastern United States. *Ecology and Evolution* doi.org/10.1002/ece3.7466

Provided by Great Hollow Nature Preserve & Ecological Research Center

Citation: LED light pollution is a major turnoff to some North American bats (2021, March 31) retrieved 7 July 2024 from <https://phys.org/news/2021-03-pollution-major-turnoff-north-american.html>

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