

Decades of bat observations reveal uptick in new causes of mass mortality

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Reports of bat deaths worldwide due to human causes largely unique to the 21st century are markedly rising, according to a new USGS-led analysis published in *Mammal Review*.

Collisions with wind turbines worldwide and the disease white-nose syndrome in North America lead the reported causes of mass death in bats since the onset of the 21st century. These new threats now surpass all prior known causes of bat mortality, natural or attributed to humans.

A comprehensive study reveals trends in the occurrence and causes of multiple mortality events in bats as reported globally for the past 200 years, shedding new light on the possible factors underlying population declines.

"Many of the 1,300 species of bats on Earth are already considered threatened or declining. Bats require high survival to ensure stable or growing populations," said Tom O'Shea, a USGS emeritus research scientist and the study's lead author. "The new trends in reported human-related mortality may not be sustainable."

Bats are long-lived, slow-breeding mammals that play vital roles in most of Earth's ecosystems. Bats are important pollinators and seed dispersers in tropical regions, and serve as the main predators of night flying insects in most parts of the world. Insect-eating bats are estimated to save farmers billions of dollars each year by providing natural pest control.

The researchers combed the scientific literature dating from 1790 to 2015 in search of annual mortality events involving more than 10 bats per event. They then divided these 'multiple mortality events' into nine different categories, spanning a variety of both natural and human causes. In the end, they found and categorized a total of 1,180 mortality events from all over the world, representing more than 200 years of recorded

history.

Prior to the year 2000, intentional killing by humans caused the greatest proportion of mortality events in bats globally; the reasons varied with region, but bats were hunted for human consumption, killed as pests, to control vampire bats, and to protect fruit crops. Although the proportion of intentional killing reports declined in recent times, such acts continue in some parts of the world.

Since the dawn of the 21st century, however, collisions with wind turbines worldwide and white-nose syndrome in North America are the primary reported causes of mass mortality in bats. In additions, storms, floods, drought, and other weather-related factors also historically caused mass mortality, and could increase in the future due to climate change.

Surprisingly, the authors did not find convincing evidence that bats regularly die in large proportion due to infectious diseases caused by viruses or bacteria. This finding comes at a time when increasing evidence points to bats as natural reservoirs of several viruses that cause disease in humans. Despite often being more social than other animals, bats may somehow avoid deaths from diseases that sweep through dense populations.

The authors conclude that bats globally could benefit from policy, education, and conservation actions targeting human-caused mortality.

"Determining the most important causes of bat mortality is a first step toward trying to reduce our impact on their populations," said David Hayman, another author of the study and senior lecturer at Massey University in New Zealand.

More information: Thomas J. O'Shea et al. Multiple mortality events in bats: a global review, *Mammal Review* (2016). [DOI: 10.1111/mam.12064](https://doi.org/10.1111/mam.12064)

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