

Caribbean bats need 8 million years to recover from recent extinction waves

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By compiling and analyzing data on New World Leaf-nosed bats, and close relatives, a team of researchers discovered it would take eight million years for nature to restore bat species lost, and thus mammal diversity in the Caribbean. Credit: Stony Brook University

Islands are natural laboratories of evolution and home to unique species of animals and plants. But since the arrival of humans, islands have lost many species. In the Caribbean alone, more than half of the mammal species went extinct after human colonization. Bats are the most diverse group of surviving mammals. Can nature restore the numbers of species on islands to levels that existed before human arrival? How long would it take for nature to regain this lost mammal diversity?

To answer these questions, a research team led by Luis Valente at the Berlin Natural History Museum (Germany) and Liliana Dávalos, Professor in the Department of Ecology and Evolution of Stony Brook University, compiled data on the New World leaf-nosed bats and their close relatives in a paper published in *Nature Ecology and Evolution*. These bats form an ecologically diverse group that includes the fishing bat, many fig-eating bats, and vampire bats. The group is ideal for studying the effects of recent extinction, as one-third of its species have become extinct in the Greater Antilles over the past 20,000 years.

While there is a debate as to what caused these extinctions, the largest wave of species loss came after human arrival. According to Professor Dávalos, it is hard to know whether or not these extinctions would have happened even without humans, as the number of species on islands results from the balance between species gained through colonization and the formation of new species, and losses from natural extinction. Therefore, the team implemented models —known as island biogeography— including these three processes and based on the evolutionary histories of species both alive and extinct.

They found the number of species in the Greater Antilles had strong equilibrium tendencies over millions of years, and recent extinctions had pulled the system away from this natural balance. The tendency to equilibrium also enabled the team to use computer simulations to find out how long it would take for natural processes to restore the number of

species found only 20 thousand years ago.

"Remarkably, it would take at least 8 million years to regain the species lost," said Professor Dávalos. "This incredibly long time required to restore diversity reveals the staggering consequences of extinctions, many caused by humans, on the long-term ecology of islands."

"Human-caused changes to Earth's ecosystems are accelerating," said Leslie Rissler, Program Director in the National Science Foundation's (NSF) Division of Environmental Biology. "This study offers important information on how those changes will affect the loss and recovery of [species](#) in the future."

More information: Luis Valente et al. Recent extinctions disturb path to equilibrium diversity in Caribbean bats, *Nature Ecology & Evolution* (2017). [DOI: 10.1038/s41559-016-0026](https://doi.org/10.1038/s41559-016-0026)

Provided by Stony Brook University

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