New method for modeling free-ranging animal populations finds macaque numbers smaller than expected

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A team of researchers created a new method of modeling to estimate the population of free-ranging animals and in doing so discovered that there

were far fewer numbers of an Old World monkey, the macaque, than expected.

Ph.D. candidate Xueying Zhu, from The University of Western Australia 's School of Human Sciences, was co-author of the paper published in *Science Advances*.

Zhu said accurately estimating population sizes for free-ranging animals using non-invasive methods, such as camera trap images, was limited by the lack of individual identification, small number of areas surveyed and size of datasets.

"Tracking the movement of animals using mark and recapture methods or GPS tagging offers a solution but unavoidably disrupts the species' movement and behavior and requires a lot of scientific resources and trained labor," Zhu said.

"We created a flexible model and used it to estimate the upper limit of the population of the long-tailed macaque; a wild animal which is often considered a pest."

The long-tailed macaque, Macaca fascicularis, is a primate native to Southeast Asian countries, such as the Philippines, Malaysia, Indonesia, Burma, India, Vietnam, Cambodia, Laos and Thailand, and has a long history of living alongside humans.

Researchers created habitat preference maps, based on environmental and GPS data, by using a probability of distribution model and combined it with data from camera traps, line transect distance sampling and direct sightings to produce an estimation.

The study found the long-tailed macaque population could be up to 80% smaller than previously expected.

"We recommend prioritizing and improving conservation measures for this species, continuing to monitor and study trends in its population dynamics," Zhu said.

"Additionally, we are optimistic about the use of citizen science data and encourage its integration into more wildlife conservation to increase the availability of data."

The modeling developed by the researchers is flexible, which makes it suitable to study many species providing a scalable, non-invasive tool for wildlife conservation.

More information: André L. Koch Liston et al, A model for the noninvasive, habitat-inclusive estimation of upper limit abundance for synanthropes, exemplified by M. fascicularis, *Science Advances* (2024). DOI: 10.1126/sciadv.adn5390

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