

Estimates of cheetah numbers are 'guesswork', say researchers

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Current estimates of the number of cheetahs in the wild are 'guesswork', say the authors of a new study which finds that the population in the cheetah stronghold of Maasai Mara, Kenya, is lower than previously thought.

In the early 1900s it was believed that around 100,000 cheetahs roamed the Earth. The most recent estimate by the International Union for Conservation of Nature (IUCN) puts the figure at 6,600 – mainly in

eastern and southern Africa – amid fears that the fastest land mammal is racing to extinction.

However, a team of scientists from the Kenya Wildlife Trust's Mara Cheetah Project, the University of Oxford and the Indian Statistical Institute says this number is simply a best guess, given the difficulty of counting cheetahs accurately.

The researchers have now developed a new method to accurately count cheetahs, which in time will help determine the magnitude of the threats they face and assess potential conservation interventions.

The study is published in the journal *PLOS ONE*.

Lead author Dr Femke Broekhuis, Project Director of the Mara Cheetah Project and a post-doctoral researcher at the Wildlife Conservation Research Unit (WildCRU), Department of Zoology, University of Oxford, said: 'The truth is that estimates of cheetah numbers are only best guesses, because cheetahs are a lot harder to count accurately than one might think. They naturally occur at low densities and move large distances, making them difficult to find.'

'Whatever the exact number, we do know that they are extinct in 20 countries and occupy only 17% of their historical range. We also know the major threats facing cheetahs: habitat loss, human-wildlife conflict, depleting prey and the illegal pet trade.'

'What we have lacked until now is a way to assess whether or not [conservation efforts](#) are effective.'

During a three-month period, researchers in five vehicles extensively covered the Maasai Mara National Reserve and surrounding wildlife conservancies in search of cheetahs. The field team photographed each

cheetah that was seen and identified each individual based on its unique coat pattern. These data were then analysed using an advanced Bayesian Spatially Explicit Capture Recapture (SECR) statistical model. This technique, incorporating information such as identity and location, is more powerful than previous methods used to estimate cheetah numbers.

The study revealed an average of 1.28 adult cheetahs/100km² in the Maasai Mara – an average total of 30 animals. This number is lower than previously thought – around half, in fact. The 'spatially explicit' method used can distinguish 'visiting' animals from those that reside permanently within the surveyed area, avoiding potential overestimation. The researchers compare this to counting the population of Manhattan in the daytime, which would give a vastly inflated figure because of the influx of commuters from neighbouring areas.

The researchers also identified clear cheetah 'hotspots' within the Maasai Mara. The next step is to determine how the distribution of these high-density areas is correlated with environmental variables such as habitat, prey, predators, or anthropogenic factors including livestock grazing.

The results of this study will allow threats and conservation efforts to be quantified and monitored in the future.

Dr Broekhuis said: 'In order to determine the impact that threats and conservation efforts are having on the cheetah population, it is necessary to rigorously monitor their numbers over time. Our results are therefore important, as they provide the baseline data needed to accomplish this.'

'The relevance of this study goes beyond cheetahs in the Maasai Mara. This is the first time that this robust method has been used to estimate cheetah densities, and it is a method that can be applied to other areas and other charismatic species such as lions or even elephants.'

Co-author Dr Arjun Gopaldaswamy, from the Indian Statistical Institute and the Department of Zoology at the University of Oxford, said: 'The method we have used accounts for detection probability and is therefore more accurate than other methods that are currently being used to estimate cheetah numbers. In addition, the modelling approach we have used allows for estimating not only abundance and density, which were of prime interest to us, but also provides vital information about adult sex ratios and sex-specific home range sizes.

'These measures provide crucial insights about big cat ecology that aids their conservation. For example, India has been considering the reintroduction of the African cheetah. Even in a prey-rich area like the Maasai Mara, the density of cheetahs is low, suggesting that the resource requirements for these cats are perhaps much larger than would be available currently in the Indian subcontinent.'

The study's authors say there is an urgent need to rigorously assess the population size of cheetahs in all the remaining strongholds, using advanced methods such as this one. They also suggest that relying merely on best guesses of cheetah numbers at regional levels can seriously mislead [cheetah](#) conservation efforts on the ground.

Provided by University of Oxford

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