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Humans limit animal movements

Biologists detect reduction in animal movements in areas with a high human footprint

Humans change entire landscapes – by building cities and roads, by farming land and by exploiting natural resources. What effects does this have on animals and their habitats? Using the GPS location data of more than 800 animals, a team of scientists was able to prove a reduction in animal movements in areas with a high human footprint. Movements of mammals in areas with a high human footprint were found to be on average one half to one third the extent of their movements in areas with a low human footprint. The study was conducted by biologists from the Senckenberg Nature Research Society and the Goethe University Frankfurt, in collaboration with the University of Konstanz and the Max Planck Institute for Ornithology in Radolfzell. Their research findings were published in Science on 26 January 2018.

“The closer to humans and their infrastructure, the smaller the habitats used by various types of animals”, summarises Professor Martin Wikelski, director of the Max Planck Institute for Ornithology in Radolfzell and honorary professor at the University of Konstanz. This reduction in animal movements can have significant consequences for ecosystems, for instance a reduction in seed dispersal, changes to food chains and decreasing animal numbers.

Fragmentation of habitats

Martin Wikelski and his colleagues have identified several root causes for this development: Human infrastructure disturbs and fragments the habitats of wild animals, which limits their movements. The biologists believe that animals such as deer or wild boars increasingly retreat to comparatively small areas of woodland surrounded by human infrastructure. “Species such as zebras, which cover large distances in the wild, can no longer exist in close proximity to humans. Spatial restrictions and the fragmentation of their habitats lead to a decrease in the animals’ numbers”, explains Dr Kamran Safi, a biologist working at the Max Planck Institute for Ornithology.

A second reason for this development may have to do with changes to the animals’ behaviour caused by the presence of humans. Animals like urban foxes are more likely to find food when foraging in areas dominated by humans, which means that the distances they need to cover are

much smaller than in the wild. Human hunting parties as well as leisure activities such as running profoundly affect the animals' behaviour: The research results show that wild boars and other species adjust their activity times and territories to evade humans. There is also evidence to suggest that animals such as grouse avoid areas that feature ski lifts, funiculars and alpine sports entirely.

“Movebank”, a new database for animal movements

For their study, the researchers drew on location data collected for more than 800 terrestrial nonvolant mammals from 57 species which were fitted with GPS transmitters. They then compared the GPS data with the “Human Footprint Index” for the areas the animals moved through. The index measures human influence on landscapes.

This global and cross-species comparison was made possible by “Movebank”, a global database of animal movements. “Movebank” was created by biologists working with Martin Wikelski to track movement patterns of animals across the globe. The database is free to use (www.movebank.org) and enables researchers to share and compare animal movement data, for instance to draw inferences about the evolution of the planet's ecosystems.

Original publication:

Tucker et al. (2018) Moving in the Anthropocene: Global reductions in terrestrial mammalian movements. *Science* 26 January 2018

Link: <http://science.sciencemag.org/cgi/doi/10.1126/science.aam9712>

Facts:

- Global study on the influence of the human footprint on animal movements.
- Current publication in *Science*: Tucker et al. (2018) Moving in the Anthropocene: Global reductions in terrestrial mammalian movements. *Science* 26 January 2018
- Survey data: GPS location data of more than 800 terrestrial mammals from 57 species.
- Movements of terrestrial animals in areas with a high human footprint found to be on average one half to one third the extent of their movements in areas with a low human footprint.
- Fragmentation of animal habitats through human infrastructure.
- Possible consequences for ecosystems, for instance as regards seed dispersal, food chains and population sizes.
- Research cooperation between the University of Konstanz, the Max Planck Institute for Ornithology in Radolfzell, the Senckenberg Nature Research Society and the Goethe University Frankfurt.
- Funded by: Robert Bosch Foundation, Max Planck Society

Note to editors:

A picture is available for download here:

<https://cms.uni-konstanz.de/fileadmin/pi/fileserver/2018/Bilder/Yak%202.jpg>

Caption: Yak in Bhutan.

Photo: Dr. Sherub, Max-Planck-Institut für Ornithologie in Radolfzell

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