Species going extinct 1,000 times faster than in pre-human times, study finds

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Credit: Wikipedia.

(Phys.org) —University of Georgia ecologists John Gittleman and Patrick Stephens are contributors to a major new study that finds that species are going extinct today 1,000 times faster than during pre-human times—a rate an order of magnitude higher than the previous estimate.

The study, which was led by Jurriaan M. de Vos of Brown University,

appears in the journal *Conservation Biology*.

The researchers were able to establish the faster current extinction rate by pinning down a more accurate pre-human, or background, rate, explaining that estimating recent rates is straightforward, but establishing a background rate for comparison is not.

"Being able to look at the pre-human, or background, rate of extinction is important," said Gittleman, dean of the Odum School of Ecology and UGA Foundation Professor of Ecology. "We now know that the current rate of extinction is worse than we thought because the background rate is an order of magnitude slower than the original estimate. Having a real rate of extinction will allow us to look at causal mechanisms much more carefully."

They found that the background rate of extinction was slower before humans existed by comparing the number of species that died out with the number of new species that emerged. The researchers calculated that the background rate of extinction was 0.1 extinctions per million species years-meaning that one out of every 10 million species on Earth became extinct each year during that time.

The previous estimate was one extinction per million species years, which skewed the current rate, making it appear to be only 100 times faster during human times. With the new data, the researchers hypothesize not only that current extinction rates are 1,000 times higher than natural background rates of extinction but that future rates are likely to be 10,000 times higher.

The earlier estimate was calculated by a team of researchers in 1995 that included Gittleman and was led by another co-author on the new study, Stuart Pimm of Duke University. It was based chiefly on an examination of the fossil record.

The current study makes use of new techniques and databases that were not available when the earlier estimate was made.

Like the previous study, it incorporates the fossil record, but also uses novel analytical computer models to estimate extinction rates from phylogenetic, or evolutionary, trees—essentially maps of the genetic history of a group of organisms. In this new, more rigorous study, both sets of evidence converge on the same—lower—estimate of the normal background rate of extinction.

"Twenty years ago, not to mention during Darwin's time, most evolutionary trees had missing branches and missing species," said Gittleman. "Now we've got much more comprehensive evolutionary trees where all the species are included, mainly due to much better molecular techniques."

One such tree, which Gittleman helped construct, traces the evolutionary history of the world's known mammal species. It was used in the new study as a source of high-quality data to ensure that the analytical models were accurate.

For Gittleman and Stephens, an assistant research scientist in the Odum School, the extinction rate study is a continuation of research focused on biodiversity conservation.

Gittleman recently co-authored a paper, published in *Science*, with Pimm and others looking at global rates of species extinction, distribution and protection to learn where threats to species are expanding and help inform protection efforts. An earlier study analyzed information on international funding for biodiversity conservation and modeled its distribution to show which countries have major conservation finance shortfalls.

More information: DE VOS, J. M., JOPPA, L. N., GITTLEMAN, J. L., STEPHENS, P. R. and PIMM, S. L. (2014), "Estimating the Normal Background Rate of Species Extinction." *Conservation Biology*. doi: 10.1111/cobi.12380