

# Human activity threatens billions of years of evolutionary history

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Mary River turtle. Credit: Chris Van Wyk

A ZSL study published in *Nature Communications* today maps the evolutionary history of the world's terrestrial vertebrates—amphibians, birds, mammals and reptiles—for the first time, exploring how areas with large concentrations of evolutionarily distinct and threatened species are being impacted by our ever-increasing 'human footprint'.

Worryingly, the researchers discovered that many regions home to the greatest amounts of unique evolutionary history are also facing unprecedented levels of human pressure, including the Caribbean, the Western Ghats of India, and large parts of Southeast Asia.

Using extinction risk data for around 25,000 species, the researchers also calculated the amount of evolutionary history—branches on the tree of life—currently threatened with extinction: they found at least 50 billion years of evolutionary heritage is under threat, as well as a large number of species for which we lack adequate extinction risk data that may also be threatened—suggesting this is at best an under-estimate.

The greatest losses of evolutionary history will be driven by the extinction of entire groups of closely-[related species](#) that share long branches of the tree of life, such as pangolins and tapirs, and also by the loss of highly evolutionarily [distinct species](#) that sit alone at the ends of extremely long branches, such as the ancient Chinese crocodile lizard (*Shinisaurus crocodilurus*), the Shoebill (*Balaeniceps rex*), a gigantic bird that stalks the wetlands of Africa, and the Aye-aye (*Daubentonia madagascariensis*), a nocturnal lemur with large yellow eyes and long spindly fingers.

Lead author Rikki Gumbs, of ZSL's EDGE of Existence programme and the Science and Solutions for a Changing Planet Doctoral Training Partnership at Imperial College London, said: "Our analyses reveal the incomprehensible scale of the losses we face if we don't work harder to save global biodiversity—to put some of the numbers into perspective, reptiles alone stand to lose at least 13 billion years of unique evolutionary history, roughly the same number of years as have passed since the beginning of the entire universe."



This purplish frog resembles a turtle without a shell. Credit: Sandeep Das / ZSL

This new study highlights priority species for conservation, based on their evolutionary uniqueness and the intense human pressure across the environments where they are thought to exist. Many of these species are also a priority for ZSL's EDGE of Existence programme, which works to conserve the world's most evolutionarily distinct and threatened species from extinction.

The study highlights several weird and wonderful EDGE Species as urgent conservation priorities—including the punk-haired Mary River turtle (*Elusor macrurus*), the Purple frog (*Nasikabatrachus sahyadrensis*), and the Numbat (*Myrmecobius fasciatus*).

It also highlights many lesser known species, about which little is currently understood by scientists, as priorities for further research, with

more than half of the priority lizards and snakes identified currently lacking adequate extinction risk data.

"These are some of the most incredible and overlooked animals on Planet Earth," added Gumbs. "From legless lizards and tiny blind snakes to pink worm-like amphibians called caecilians, we know precious little about these fascinating creatures, many of which may be sliding silently toward [extinction](#)."

Jointly led by ZSL and Imperial College London—with the University of Oxford, Yale University, Tel Aviv University, Ben-Gurion University and On The EDGE Conservation—the study also identifies regions where concentrations of irreplaceable diversity are currently under little to no human pressure, particularly across the Amazon rainforest, the highlands of Borneo, and parts of southern Africa.

Co-author Dr. James Rosindell, from Imperial College London, added: "Our findings highlight the importance of acting urgently to conserve these extraordinary [species](#) and the remaining habitat that they occupy—in the face of intense human pressures."

**More information:** Rikki Gumbs et al. Global priorities for conservation of reptilian phylogenetic diversity in the face of human impacts, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-16410-6](https://doi.org/10.1038/s41467-020-16410-6)

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