

The risk of extinction is highest for Earth's largest and smallest animals

Humans seem to be favoring medium-sized vertebrates, researchers say, causing 'a radical shift in the living architecture of the planet.'



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African elephants forage at Amboseli National Park in Kenya. (Photo: HordynskiPhotography/Shutterstock)

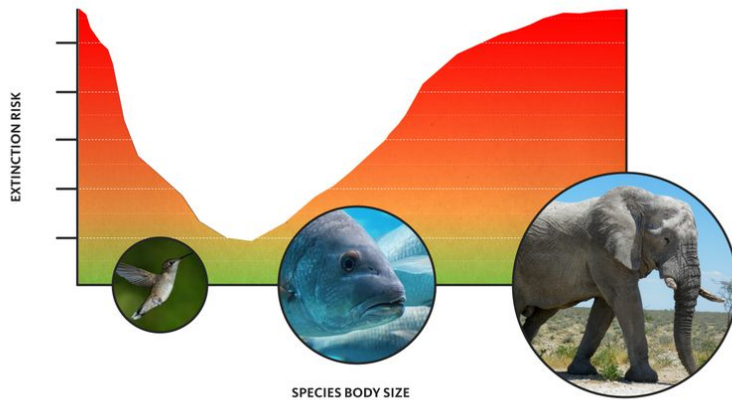
Earth may be [undergoing a mass extinction](#), the first in human history — and the first with human help. Life can rebound from mass extinctions, as it has several times over 4.5 billion years, but many important species will be lost in the meantime.

And since humanity still relies on the ecosystems around it, this isn't just about preserving wildlife for its own sake. Not only do we have a responsibility to protect nature *from* ourselves; we have a big self interest in protecting it *for* ourselves, too.

In a new study, scientists reveal a noteworthy quirk about our current extinction crisis: The animal species at greatest risk tend to be among the largest or smallest. If we let this play out, [the authors write in the Proceedings of the National Academy of Sciences](#), it could dramatically reshuffle the ecosystems that sustain us.

"[H]uman activity seems poised to chop off both the head and tail of the size distribution of life," they write. "This compression of the size distribution of vertebrate life not only represents a radical shift in the living architecture of our planet, but is likely to precipitate consequential shifts in ecological functioning."

The researchers examined more than 27,000 vertebrate animal species — including birds, reptiles, amphibians, fish and mammals — whose extinction risks have been assessed by the International Union for the Conservation of Nature (IUCN). When they compared that risk with body size, here's what they found:



between species' size and current risk of extinction. (Image: Oliver Day/OSU)

A graph showing the relationship

All creatures great and small

This doesn't mean we should ignore mid-sized animals, but it may offer valuable perspective for conservation efforts, especially among lesser-known creatures. Scientists have identified thousands of species at high risk of extinction — largely due to human activities like poaching, pollution and habitat loss — yet many species and habitats are fading too quickly to be studied, let alone protected.

"Knowing how animal body size correlates with the likelihood of a species being threatened provides us with a tool to assess extinction risk for the many species we know very little about," says William Ripple, professor of ecology at Oregon State University (OSU) and lead author of the study, in a [statement](#).

Big and small species tend to be endangered for different reasons, Ripple and his colleagues write. People directly kill many large animals for meat, medicine, myth or convenience — from elephants and rhinos targeted by poachers to sharks and marine mammals caught intentionally or as "[bycatch](#)."

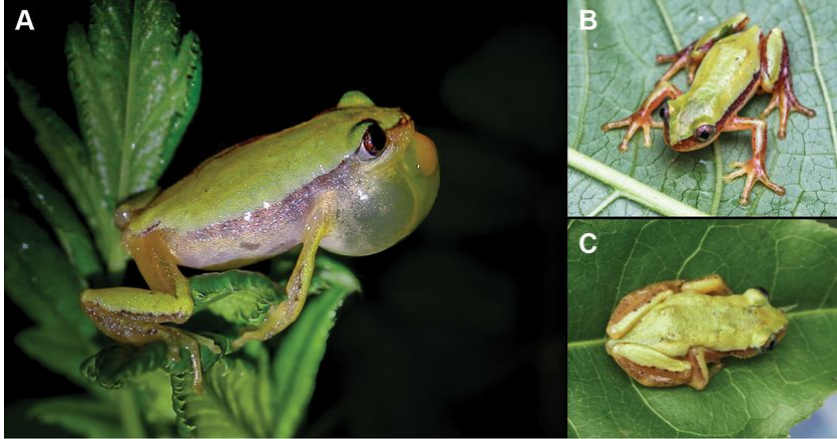


The large Burmese mountain tortoise is endangered by hunting and habitat loss. (Photo: [Rushenb](#)/Wikimedia Commons)

"Many of the larger species are being killed and consumed by humans, and about 90 percent of all threatened species larger than 2.2 pounds (1 kilogram) in size are being threatened by harvesting," Ripple says. At the same time, a wide range of big-bodied vertebrates also live in [dwindling, unconnected shreds of their former habitats](#).

Small creatures are in no less danger overall, yet their decline is even easier for us to overlook. "As a group, large animals generally receive more attention and research focus than small ones," the researchers write. "The overall patterns we report suggest that the vulnerability of smaller vertebrates has been underestimated."

These tiny vertebrates — generally less than 1.2 ounces (35 grams) in body weight — are threatened mainly by the loss or modification of their habitat. "Most of these species are too small to be intensively harvested for human consumption or other exploitive uses," the researchers point out, but that can't protect them from habitat loss. Examples include the Clarke's banana frog, sapphire-bellied hummingbird, hog-nosed bat and waterfall climbing cave fish. The situation is particularly dire for small species that require freshwater habitats, the study found.



Clarke's banana frog, native to Ethiopia, is endangered by habitat loss from logging, human settlement and agriculture, including coffee plantations. (Photo: [Mertens J, Jocqué M, Geeraert L, De Beenhouwer M](#)/Wikimedia Commons)

These findings illustrate how different conservation strategies are needed for large and small wildlife, according to the study's authors. "For the large species, there is an urgent need to reduce direct killing and consumption of harvest-sensitive species," they write. "In contrast, for the small-bodied species, freshwater and land habitat protection is key because many of these species have highly restricted ranges."

Humans have come to depend on a wide range of "[ecosystem services](#)" provided by wild animals, from food and raw materials to subtler perks like pollination and pest control. If we let these service providers become extinct, the researchers write, the ecological upheaval could create "important and everlasting evolutionary effects to many components of the ecosystem."