UC SANTA BARBARA

THE Current

August 20, 2008

Andrea Estrada

Researchers Assess Extinction Risks Among Mammal Species

By studying the origins and evolutionary histories of existing mammal species, an international team of scientists, including T. Jonathan Davies of UC Santa Barbara, has found a way to predict each one's evolutionary future as well as the potential impact of current human activity on the world's overall biodiversity. Their research, which could affect how conservation networks protect species that are most at risk, is published in the current issue of the Proceedings of the National Academy of Sciences (PNAS).

Over the last 500 years, more than 70 mammal species have been lost, and a quarter of all existing mammal species are currently in jeopardy of becoming extinct. The PNAS paper sheds important new light on the biodiversity of terrestrial mammals throughout the world and the factors that make species vulnerable to extinction.

"Conservation networks try to protect as much biodiversity as possible," said Davies, lead author of the paper and a postdoctoral fellow at UC Santa Barbara's National Center for Ecological Analysis and Synthesis (NCEAS). "According to our findings, the first priority should be to save the biodiversity we're rapidly losing. But simply focusing on the current most threatened species might not always be the best approach."

Also participating in the research were Susanne A. Fritz, Richard Grenyer, C. David L. Orme, Marcel Cardillo, Georgina M. Mace, and Andy Purvis of Imperial College London; Kate E. Jones and Jon Bielby of the Zoological Society of London's Institute of Zoology; Olaf R.P. Bininda-Edmonds of the Technical University of Munich; and John L. Gittleman of the University of Georgia, Athens.

Several external factors determine a species's vulnerability to extinction, according to Davies, the most significant of which right now are habitat transformation and loss. Others include the species's geographic range; whether or not it lives in a temperate area; and whether or not a high proportion of other mammal species in the area also are threatened. Among the biological traits are size; abundance; age at sexual maturity; annual reproductive rate; and the number of offspring per birth or litter. Species with these traits require significant recovery time following population declines.

"The highest threatened species group right now is primates," said Davies. "They have a slow reproductive rate and they're restricted to particular geographic areas. Pandas also are prone to extinction for the same reasons." Species such as rats, rabbits, and foxes, he noted, are "bulletproof" when it comes to extinction because they can survive practically anywhere and produce many offspring over a short period of time.

"We're also looking at a regional approach to focus on intact ecosystems as well as those that require regeneration," Davies said. "It will cost less to focus on species that are doing well but are vulnerable in the future. Think of it as a healthcare system with some species on life support and other, healthier species needing a vaccination to keep them thriving."

In predicting species vulnerability, the researchers assume the traits and external forces that drive those species to extinction will remain the same over time. However, Davies noted, in the next 50 to 100 years, climate change is going to be one of the biggest factors affecting species survival.

"Areas are limited in the number of species they can contain, and no one knows how that will be affected by climate change," he said. "Scientists don't have a past record from which they can project forward. It's very difficult to predict which species will survive when we don't know what the future climates will be.

"With climate change we're generating a new mass extinction event," he added. "But we have a choice of what our environment will be. We're at a point of having to make crucial decisions."

Related Links

Proceedings of the National Academy of Sciences

National Center for Ecological Analysis and Synthesis

T. Jonathan Davies

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.