Endangered species, languages linked at high biodiversity regions

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Biodiversity hot spots -- the world's biologically richest and most threatened locations on Earth -- and high biodiversity wilderness areas -- biologically rich but less threatened -- are some of the most linguistically diverse regions on our planet, according to a team of conservationists.

"Results indicate that these regions (hot spots and high biodiversity wilderness areas) often contain considerable linguistic diversity, accounting for 70 percent of all languages on Earth," the researchers report in this today's (May 7) early online edition of the Proceedings of the National Academy of Sciences. "Moreover, the languages involved frequently are unique to particular regions, with many facing extinction."

Currently, biologists estimate yearly losses of species at a rate 1,000 times higher than historic rates. Linguists predict that by the end of the 21st century, 50 to 90 percent of the world's languages will disappear.

"Paul Ehrlich likened the loss of species to removing the rivets in a plane's wings," said Larry J. Gorenflo, associate professor of landscape architecture, Penn State. "How many rivets can you remove before the wing falls off and the plane falls out of the sky? Similarly, how many species can you lose before an ecosystem fails? Unfortunately, stopping species loss in a world of 7 billion people is extremely challenging.

"We conducted this study to understand more about the people living in areas important for biodiversity conservation."

Previous research indicated a connection between language diversity and biodiversity, but the datasets were geographically imprecise. Now, Gorenflo, working with Suzanne Romaine, Merton Professor of English Language, Merton College, Oxford University, U.K.; Russell A. Mittermeier, president, and Kristen Walker-Painemilla, vice president, social policy and practice, Conservation International, used recently compiled global data showing the geographic locations of more than 6,900 languages compiled for geographic information system (GIS) applications by Global Mapping International. They used the locations of hot spots and high biodiversity wilderness areas compiled in GIS form by Conservation International.

"We looked at regions important for biodiversity conservation and measured their linguistic diversity in an effort to understand an important part of the human dimension of these regions," said Gorenflo.

The researchers first looked at diversity on a regional level. Locations with an exceptionally high number of species unique to that location that also has a loss of habitat of 70 percent or more -- hot spots. Comprising only 2.3 percent of the Earth's surface, intact habitat in the 35 hotspots contain more than half the world's vascular plants and 43 percent of terrestrial vertebrate species.

In these 35 hotspots, the researchers found 3,202 languages -- nearly half of all languages spoken on Earth. These hotspots are spread throughout the world's continents with the exception of Antarctica.

They also examined linguistic diversity in five high biodiversity wilderness areas, whose remaining habitat covers about 6.1 percent of the Earth's surface and contains about 17 percent of the vascular plant species and 6 percent of the terrestrial vertebrate species. These regions contained another 1,622 languages. As in the case of the hotspots, many languages are unique to particular areas and are spoken by relatively few

people, making them susceptible to extinction.

"What ends up happening when we lose linguistic diversity is we lose a bunch of small groups with traditional economics," said Gorenflo. "Indigenous languages tend to be replaced by those associated with a modern industrial economy accompanied by other changes such as the introduction of chain saws. In terms of biodiversity conservation, all bets are off."

If losing species biodiversity is like losing rivets from an airplane, losing languages can also have a profound effect. According to Gorenflo, losing these languages can lead to the loss of a lot of environmental information that becomes inaccessible as the words, culture and language disappear.

"I think it argues for concerted conservation efforts that are integrated and try to maintain biodiversity and cultural diversity," said Gorenflo.

He suggests that without cultural and linguistic diversity, which is increasingly appears to be tied to biological diversity, biodiversity loss likely will continue at alarming rates.

"In many cases it appears that conditions that wipe out species wipe out languages," said Gorenflo.

The researchers do not know why areas of endangered species concentration and endangered languages coexist. Possibly indigenous cultures, supported by their languages, create the conditions to maintain species and keep the ecosystems working.

"I think basically this study helps to establish these areas of high biodiversity as the world's most important landscapes," said Gorenflo.

The researchers believe their study is a starting point to explore the

relationship between biological and linguistic-cultural diversity. This will also help develop strategies for conserving species and languages in areas where rich diversity of both exists.

"We want to being to look at selected places with high biological and linguistic diversity to begin to explore the connections between the two, such as Tanzania, where there are 130-plus languages," said Gorenflo. "Also, the Indo-Burma hotspot in Southeast Asia, where there are nearly 400 languages, and the island of Vanuatu in the Pacific with 100-plus languages."

Provided by Pennsylvania State University

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