From Alaska to Australia, hundreds of languages around the world are teetering on the brink of extinction—some being spoken only by a single person, according to a new study.

The research has revealed five hotspots where languages are vanishing most rapidly: eastern Siberia, northern Australia, central South America, Oklahoma, and the U.S. Pacific Northwest (see map of the hotspots).

"Languages are undergoing a global extinction crisis that greatly exceeds the pace of species extinction," said David Harrison, a linguistics professor at Pennsylvania's Swarthmore College.

Harrison and Gregory Anderson, both affiliated with the Living Tongues Institute for Endangered Languages in Oregon, traveled the world to interview the last speakers of critically endangered languages as part of the National Geographic Society's Enduring Voices Project.

(National Geographic News is a division of the National Geographic Society.)

More than half of the world's 7,000 languages are expected to die out by the end of the century, often taking with them irreplaceable knowledge about the natural world, Harrison said.

"Most of what we know about species and ecosystems is not written down anywhere, it's only in people's heads," he said.

"We are seeing in front of our eyes the erosion of the human knowledge base."
Slow Deaths

In the last 500 years, an estimated half of the world's languages, from Etruscan to Tasmanian, have become extinct.

But researchers say the languages of the world are now vanishing faster than ever in recorded history. More than 500 languages may be spoken by fewer than ten people.

Some tongues have disappeared instantly, with small, vulnerable communities wiped out by natural disasters.

But in most cases, languages die a slow death, as people simply abandon their native tongues when they become surrounded by people speaking a more common language.

Of the 50 native languages remaining in California, none is taught to schoolchildren today.

"Languages not being learned by children are not just endangered—they're doomed," said Lyle Campbell, a linguistics professor at the University of Utah in Salt Lake City.

This summer, the Enduring Voices researchers traveled to Australia, whose aboriginal languages are among the world's most endangered.

In the Northern Territory (see map), the team documented three speakers of Magati Ke. (Hear a man speaking Magati Ke.)

In western Australia, they found three speakers of the little-known Yawuru language.

Deep in the outback, they also located a man with rudimentary knowledge of Amurdag, a language previously declared extinct.

"Australia is amazing, because humans have been there for 50,000 years, and they represent an unbroken link to the past in a way that other places on Earth don't," Swarthmore's Harrison said.

"You can really glimpse human prehistory and the mythological beliefs and systems that they have produced and passed on orally with absolutely no recourse to writing of any kind."

Hotspots Identified

To identify the five hotspots, the researchers did not target specific languages but looked at entire language families in trouble.

They used three main criteria to establish if a region should be considered a hotspot for languages extinction:

- the diversity of languages spoken
- the level of endangerment to the tongue
- and the scientific documentation of a language

Bolivia, they found, has twice the language diversity of all of Europe. But the diversity is increasingly threatened by dominant languages such as Spanish.

"This is a radically new way of looking at language diversity globally," Harrison said.

Hotspots tend to have been settlement colonies and strung along migration routes, noted Anderson, Harrison's colleague on the project.
"[Among] the top five hotspots, the major similarity is that they are the last bastions of the languages in areas that were successfully colonized in a settlement colony," he said.

Campbell, the University of Utah linguist, said the Enduring Voices researchers' work is "highly commendable."

But, he added, focusing on a few language hotspots may be misleading, because there are many other areas with languages in similar peril.

"Essentially all Native American languages are under threat," he said. "And in the rest of Australia, most of the Aboriginal languages have already become extinct."

Gary Holton is an expert on Alaskan languages at the University of Alaska Fairbanks.

"As we enter a time of mass language extinction, we will find that our definition of what counts as a language and who counts as a speaker will change," he said.

Some people who have only partial knowledge of a language may be considered speakers of the tongue once the older, fluent generation has died, Holton said.

The death of one language may also give birth to another language, he said.

Recently he came upon a language in southeastern Indonesia called Illu, now remembered by only a few elderly speakers. It was once likely a dialect of Lamma, a Papuan language spoken on just one island.

"But as other related dialects have become extinct, Illu is now viewed as a distinct language," Holton said. "Thus, what was once a dialect becomes a language."

**Secret Information**

When a language is lost, centuries of human thinking about animals, plants, mathematics, and time may be lost with it, Swarthmore’s Harrison said.

"Eighty percent of species have been undiscovered by science, but that doesn’t mean they’re unknown to humans, because the people who live in those ecosystems know the species intimately and they often have more sophisticated ways of classifying them than science does," he said.

"We're throwing away centuries' worth of knowledge and discoveries that they have been making all along."

In Bolivia, Harrison and Anderson met with Kallawaya people, who have been traditional herbalists since the time of the Inca Empire.

In daily life the Kallawaya use the more common Quechua language. But they also maintain a secret language to encode information about thousands of medicinal plants, some previously unknown to science, that the Kallawayas use as remedies.

The navigational skills of peoples in Micronesia, meanwhile, are similarly encoded in small, vulnerable languages, Harrison said.

"There are people who may have a special set of terms ... which enable them to navigate thousands of miles of uncharted ocean ... without any modern instruments of navigation."
Children Hold Languages' Future

Harrison said children are often the ones who decide to effectively abandon a native tongue.

"Children are little barometers of social prestige," he said.

"They understand implicitly that if they live in an environment where two languages are spoken, one of them is less valued than the other, and they will speak the more valued language."

Anderson, of the Enduring Voices Project, agreed that social pressures play a prominent role.

"Language endangerment happens when a community decides that their language is somehow a social or economic impediment," he said.

"The areas that are most severely [at risk] are those where these shifts have been going on for several generations already, so it's nearly complete."

The only way to ensure the survival of a language, the pair said, is to ensure that six-year-olds feel it is valued.

"It's not really the parents who have control—it's actually the children who have the power to make a decision that will affect the community and affect the future of their language," Harrison said.

Harrison said he was encouraged by an experience he had in Australia, when he and other researchers witnessed a woman in her 80s, one of only three speakers of Yawuru, teaching the rare language to a class of schoolchildren.

"The children had elected to take the course—no one forced them," he said. "When we asked them why they were learning it, they said, 'This is a dying language. We need to learn it.'"

The lesson was about plants, which serve important medicinal purposes in Aboriginal culture.

"The woman waved the plants in front of the children and would say something in her language about it, and they would repeat back," Harrison said.

"It was just an amazing thing to capture that moment of knowledge transmission," he said. "That inspired us greatly."

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More than half the world's 7,000 languages are expected to go extinct by 2100, experts say. The regions where languages are dying fastest are eastern Siberia, northern Australia, central South America, Oklahoma, and the U.S. Pacific Northwest, according to a new study.

Among the world's disappearing tongues is northern Australia's Magati Ke—still spoken by "Old Man" Patrick Nanudjul (far left), who is in his 70s (hear him speak). Map from National Geographic Maps (Source: Living Tongues Institute for Endangered Languages); Photograph courtesy K. David Harrison © 1996-2008 National Geographic Society. All rights reserved.