

## Conserve intact forest landscapes to maximize biodiversity, reduce extinction risk

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CORVALLIS, Ore. — A new global analysis of forest habitat loss and wildlife extinction risk published today in the journal *Nature* shows that species most at risk live in areas just beginning to see the impacts of human activities such as hunting, mining, logging and ranching.

The researchers argue that these intact areas deserve higher priority for limited conservation dollars than areas already impacted heavily by human activity even though species are also threatened in the impacted areas.

“We have seen declines in species in landscapes that have already lost a massive amount of habitat,” said Matthew Betts, lead author and professor in the College of Forestry at Oregon State University. “But we found much more support for what we call the initial intrusion hypothesis. It’s the initial hit caused by roads going into tropical forests and the human activities that follow that is most substantial. These are also the spots with the greatest sheer numbers of species.”

Betts and a team of researchers at Oregon State and BirdLife International, a nonprofit organization, reached their conclusions by analyzing global datasets of forest habitat and species extinction risk. Betts and Christopher Wolf, an Oregon State Ph.D. student in forest ecosystems and statistics along with six co-authors, used forest data assembled by Matthew Hansen at the University of Maryland and categories of extinction risk for 19,432 vertebrate species, the so-called Red List, maintained by the International Union for the Conservation of Nature.

Hansen’s data indicate that forest is continuing to be lost at high rates (about 1.5 million square kilometers, or 371 million acres, per year). Most of those changes occur in the tropics. South American rainforests account for nearly half of global forest loss. In total, the new analysis shows that 37 percent of the world’s forests have been converted to other land uses.

“It should be quite obvious that forest loss increases the risk of species being listed,” said Betts. “But our work provides the first global quantitative link between forest loss and forest species decline.”

However, the question the researchers asked was this: Should conservation efforts be focused on areas where forest habitats have already been lost and species might be reaching a threshold, or on forests that are largely intact and are only just beginning to be affected by development?

At Oregon State, Betts started the Oregon Forest Biodiversity Research Network to use big datasets to answer such questions. In his research in Costa Rica and elsewhere, he has studied the impact of forest clearing on hummingbird pollinators and on other bird species.

It’s likely, Betts added, that heavily impacted areas have already gone through what scientists call an “extinction filter.” Species that are sensitive to development may have previously been eliminated.

High-risk hot spots for forest biodiversity, the researchers wrote, exist in southeast Asia, particularly Borneo, the central-western Amazon and the Congo basin in Africa. Population growth, bushmeat hunting and trapping, and resource extraction in response to consumer demand may fuel future extinction risks in such areas, said Betts.

An ongoing debate among scientists and policymakers focuses on whether conservation programs should prioritize forests already affected by development. “Granted that there’s no such thing as a place that hasn’t been touched by humans in some way due, for example, to a changing climate,” said Betts. “But then there’s the view that humans can quite tightly co-exist with nature assuming that we undertake certain ameliorative measures, that as long as we’re softer on the Earth, we can still have productive landscapes for agriculture. Our paper suggests that we would be helped by having these intact forest landscapes well protected.”

Dedicating some areas to intensive production may allow other areas to be preserved as habitat, said Taal Levi, co-author and assistant professor in Fisheries and Wildlife at Oregon State. “There are many potential benefits to concentrating our environmental impact by intensifying drivers of land-use change, such as agriculture and forestry, in exchange for gazetting large remote undisturbed reserves. A disproportionately large impact arises from the first disturbance to forests.”

Co-authors included William Ripple, Kimberly Millers, Adam Duarte and Ben Phalan at Oregon State; and Stuart Butchart at BirdLife International.

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