

Saving logged tropical forests

Old-growth tropical forests are, biologically, the richest real estate on Earth. Throughout much of the tropics, however, such old-growth forests are rapidly disappearing and are sometimes imperiled even within protected areas. This is elevating the need to conserve human-altered forests, especially those that have been selectively logged.

In many tropical nations, old-growth forests are being replaced by pastures and croplands as well as by fragmented forests, regenerating forests on abandoned land, exotic tree plantations, and selectively logged forests, the latter being particularly extensive. More than 400 million ha of tropical forest are now held in permanent timber estates, and at least 20% of all tropical forests were selectively logged at some level between 2000 and 2005. Logging has been especially widespread in the Asia-Pacific region, and is expanding rapidly in tropical Africa, the Americas, and New Guinea.

In the tropics, timber operations use selective logging rather than clear-cutting. Loggers target a few to a few dozen commercially valuable tree species above a minimum trunk diameter (typically 40–60 cm), leaving other species unharvested. Bulldozers and other heavy equipment are used for building forest roads and extracting timber, but selectively logged forests still retain many of their trees. Logging intensity varies greatly across the tropics, depending on extraction methods, recutting frequencies, and the initial abundance of timber trees. In Southeast Asia, valuable dipterocarp trees are relatively common, whereas high-value species are rarer in the Amazon and Africa. Because logging methods and timber abundances vary widely, selectively logged forests can differ greatly in the levels of damage they experience.

In the past, ecologists have tended to focus on how logging reduces the abundance of disturbance-sensitive wildlife, creating the impression that logged tropical forests harbor only modest biodiversity. However, growing evidence suggests such forests can have unexpectedly high conservation value. A major meta-analysis showed that selectively logged forests in the Amazon, Africa, and Southeast Asia are biologically far more similar to old-growth forests than are various agricultural and agroforestry systems (*Nature* 2011; 478: 378–81). Most wildlife and plant species still persist even after repeated logging, albeit sometimes at reduced densities. Logged forests also store considerable carbon (C) and retain most of the hydrological functions of old-growth forests.

Despite their high conservation value, logged tropical forests are exceptionally vulnerable, in part because the road networks created by loggers facilitate forest conversion. In Indonesia, at least 36 million ha of logged forest – an area slightly larger than Germany – were recently classified as “degraded land” and are now prone to being cleared. Amazonian forests are also more likely to be felled or burned after logging, as are those in many other tropical regions.

An array of strategies is needed to protect logged forests and improve their management. One approach is to simply buy forests after they have been logged: because their timber value is reduced but much biodiversity remains, these can be very cost-effective purchases for increasing the extent of protected area. Funds for such purchases are limited, however, so a greater priority is promoting the sustainability of logging. Many tropical nations are overexploiting their timber supplies; they overcapitalize their timber industries, creating enormous pressure to log too rapidly, or strike deals with multinational timber corporations who often “cut and run”. A better approach is to reduce harvests and develop more domestic wood processing rather than exporting timber as raw logs, as this benefits the local economy.

There is considerable scope for improving logging practices. A key priority is curbing invasions of logged forests by illegal colonists and hunters, by closing or blocking logging roads after harvests, and by increasing governance in frontier areas. Reduced-impact logging can limit damage to forests, improving C storage and future timber yields; culling competing vines or nonharvested tree species can also increase timber yields, with little apparent impact on biodiversity. External subsidies, such as those from international C-trading funds, could help transform logging from a short-term, profit-maximizing strategy to one more oriented toward long-term sustainability.

Logged forests in the tropics are vast and hold great potential for nature conservation. Although they cannot replace old-growth forests, they can be used to enhance conservation at landscape and regional scales by acting as buffer zones around protected areas, improving forest connectivity for wildlife, and providing valuable C storage and hydrological services. Logged forests are intensely vulnerable given the high profitability of competing land uses, such as oil-palm plantations, which have far less value for biodiversity. It is therefore vital that we recognize the critical role of logged forests for conserving tropical nature.



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