COMMENTARY


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Driving a wedge into the Amazon

Things are heating up in the Amazon as the burning season begins. In Brazil, a 30-year-old study of forest fragments is itself threatened by farming, logging and hunting, say **William Laurance** and **Regina Luizão.**

Habitat loss and fragmentation are a pervasive threat to Earth's biodiversity. For those who study such things, the Biological Dynamics of Forest Fragments Project (BDFFP) in central Amazonia has, since 1979, been a scientific Mecca. Two hours north of the city of Manaus in Brazil, this 1,000-square-kilometre study area is home to the world's largest and longest-running experimental study of forest fragments[1–3]. Yet despite assurances from the Brazilian government, the BDFFP is now itself in imminent danger of becoming fragmented by rampant colonization (see map, overleaf). As the agricultural frontier expands, forest burning, logging and hunting are threatening to besiege the study area and drive a wedge deep into a crucial conservation corridor. For the BDFFP, is this the beginning of the end?

The BDFFP is under particular pressure from the Manaus–Venezuela highway. Aside from slicing through the BDFFP, the highway bisects the Central Amazonian Conservation Corridor[4], a budding network of protected and indigenous lands that is one of the most important conservation areas in the entire Amazon basin. These and other protected reserves in Amazonia are coming under increasing pressure as deforestation activity has spiked over the past decade[5]. For those Brazilian and foreign scientists who have studied at the BDFFP — and there are hundreds — the situation is all the more depressing as they fight against government bureaucracies that seem either myopically disinterested or determined to push ahead with forest colonization at any cost. The solution, the scientists believe, is to follow a carefully conceived land-use plan for the region that they themselves helped to devise. This plan, inexplicably, has yet to be released by the federal agency that sponsored it.

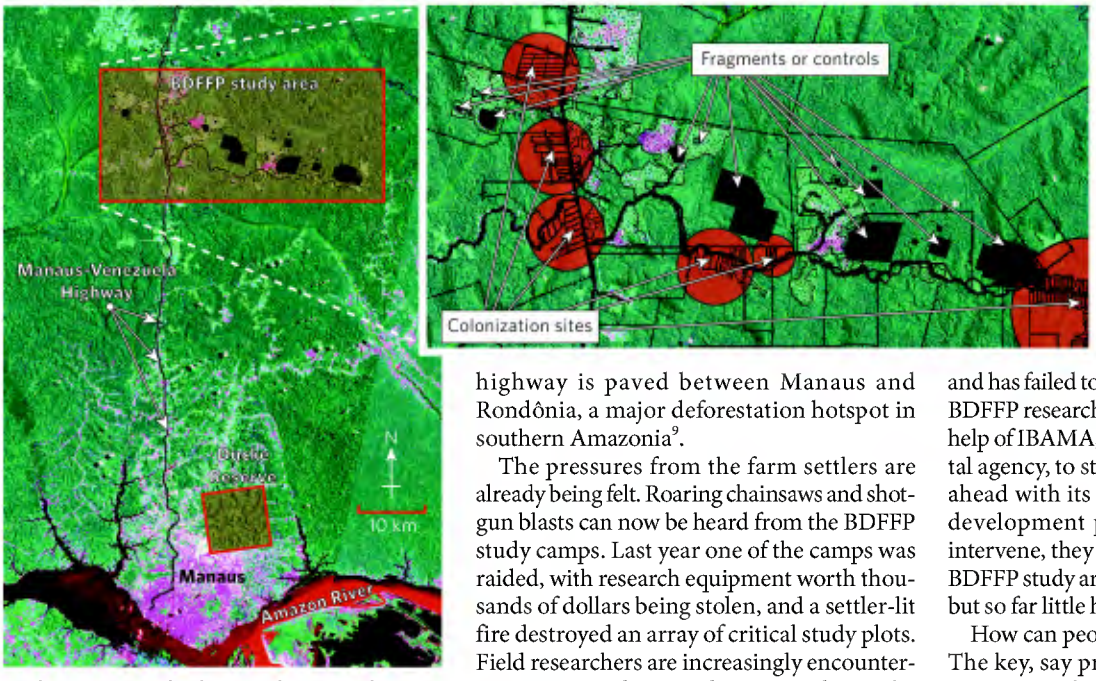
Unique insight

When the BDFFP first got going in the 1970s, it took advantage of a government scheme to promote large-scale cattle ranches in the central Amazon. With the cooperation of the ranchers, BDFFP researchers designed a giant project to study experimentally, for the first time, how fragmented habitats might affect tropical wildlife. Because of poor soils and an end to government subsidies, the ranches have been largely abandoned, but the BDFFP has flourished. Operated jointly by Brazil's National Institute for Amazonian Research (INPA) in Manaus and the Smithsonian Tropical Research Institute in Panama, it has been one of the most productive ecological research projects in the Amazon, generating nearly 500 scientific publications and books, and more than 100 graduate theses.

Why is the BDFFP so special? A key advantage is its rigorous experimental design. Within the study area, isolated but comparable fragments of 1, 10 and 100 hectares were created as the surrounding forest was cleared by the ranchers to create cattle pastures. Because tropical forests are both notoriously heterogeneous and chock-full of rare species, inferring how fragmentation affects such complex communities can be a statistical nightmare. In the BDFFP, however, researchers have surveyed thousands of rainforest species, including trees, birds, mammals, amphibians and various invertebrate groups, both before the forests were fragmented and at regular intervals afterwards. By repeated monitoring of these species and by contrasting them with those in nearby intact forest, BDFFP researchers have gained unparalleled insights into the ecological decay of forest fragments[1–3,6,7]. It is these critical intact forests that are now directly under threat.

In addition to its research mission, the BDFFP has a leading educational role, providing free environmental training courses for up to 100 Latin American students, park managers and political leaders each year. Veterans of these courses now hold strategic positions in many government agencies, universities and conservation organizations in Amazonia. The BDFFP also hosts high-profile visitors, including former US vice-president Al Gore, actor Tom Cruise and numerous members of US Congress and Brazilian officials, who experience the rainforest first hand, trudging to remote field camps and sleeping in the open.

Equally important is that the unfragmented parts of the BDFFP study area feature a fully intact biota, replete with jaguars, pumas, harpy



Urban sprawl and forest colonization north of Manaus, Brazil (left); planned colonization sites near the Biological Dynamics of Forest Fragments Project (right).

eagles, tapirs and other predators and megafauna that have vanished from much of the tropics because of rampant forest destruction and overhunting. Most of the world's leading tropical research centres, such as Barro Colorado Island in Panama, La Selva in Costa Rica, Las Tuxtlas in Mexico and Pasoh in Malaysia, are either isolated forest fragments or islands on which the original megafauna have largely disappeared. Large rainforest predators help to regulate the density of their prey species, and their absence can provoke ecological distortions that reverberate throughout the entire ecosystem[8].

Regrettably, the days of the BDFFP — at least as a bastion for the species-rich Amazonian ecosystem — could be numbered. To promote colonization of central Amazonia, in the 1970s the Brazilian government decreed the city of Manaus to be a free-trade zone, with minimal taxes to encourage investment. The city has since grown explosively, now totalling around 1.7 million people. Urban sprawl and forest colonization — some of it illegal — are consuming expanses of surrounding forest and, like a giant amoeba, the city has all but swallowed the nearby 100-square-kilometre Ducke Forest Reserve (see map).

Mounting danger

Since the late 1990s, the paving of the 1,070-kilometre-long Manaus–Venezuela highway has greatly accelerated forest colonization and logging north of the city. SUFRAMA, a Brazilian federal agency that controls a large expanse of land north of Manaus that includes the BDFFP, has begun settling families in farming plots around the immediate periphery of the study area. At least six SUFRAMA colonization projects involving 180 families are planned for the near future (see map). This could be the beginning of a dramatic influx into the area, especially if a proposed highway is paved between Manaus and Rondônia, a major deforestation hotspot in southern Amazonia[9].

The pressures from the farm settlers are already being felt. Roaring chainsaws and shotgun blasts can now be heard from the BDFFP study camps. Last year one of the camps was raided, with research equipment worth thousands of dollars being stolen, and a settler-lit fire destroyed an array of critical study plots. Field researchers are increasingly encountering gun-toting hunters that encroach into the study area, with one plucky graduate student facing down a truckload of armed men. As such conflicts increase, many fear a possible tragedy — such as the recent murder of two park guards by illegal gold miners in French Guiana, or the 2005 assassination of the American nun Dorothy Stang by Amazonian ranchers.

"We have gained unparalleled insights from the intact forests now under threat."

Time is ticking

Can the BDFFP be saved? The project's staff and researchers are digging in for a fight. They are lobbying SUFRAMA and the Brazilian land-settlement agency INCRA not to establish forest-colonization projects in the area, arguing that the study area is of irreplaceable scientific value, that its nutrient-starved soils are poorly suited to farming, and that INCRA is violating its own formal policy not to settle people on forested land. They also contend that the BDFFP study area, if protected, would secure the most vulnerable part of the planned Central Amazonian Conservation Corridor, which will ultimately span much of Brazilian Amazonia along an east–west axis. Finally, they are working with partners in the Amazonas state government to help establish new protected areas in the region, and with colleagues at INPA and other organizations whose study areas north of Manaus are also being threatened by rapid encroachment.

The most frustrating aspect of the ongoing battle, say the project researchers (a group that includes both of us), is that SUFRAMA completed a comprehensive ecological-zoning study in 2004, to which a number of BDFFP scientists contributed. SUFRAMA is now ignoring its own study — which would have ensured that critical environmental and scientific areas such as the BDFFP were protected — and has failed to release it publicly. In response, BDFFP researchers are attempting to enlist the help of IBAMA, Brazil's national environmental agency, to stop SUFRAMA from charging ahead with its environmentally destructive development plans. IBAMA is obliged to intervene, they maintain, because parts of the BDFFP study area are national protected areas, but so far little has happened.

How can people outside the Amazon help? The key, say project researchers, is to focus attention on the alarming and irrevocable land-use decisions being taken in central Amazonia. Anything that generates publicity, such as newspaper stories and letters to the editor, would be useful. Ultimately, they hope, the Brazilian media will take an active interest, highlighting the strategic importance of this region to the Amazonian conservation corridor and the disappointing response so far from federal officials.

Time is of the essence. The burning season takes off in July and then goes on until November or December. Smoke plumes from forest fires will soon encircle the BDFFP landscape, and settlers, loggers and hunters are drawing ever closer. "We are like the little Dutch boy with his fingers in the leaking dike," says BDFFP researcher José Camargo, "and we are running out of fingers!" ■

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