

Does second growth mean second-rate?

Forest clearance: primary forest was clear-cut in Jari to make way for plantations. Secondary forest regenerates after eucalyptus is removed.



Luke Parry takes a first look at secondary forest wildlife in the Brazilian Amazon.

There is more to second-growth forests than meets the eye. It appears that these young regenerating forests are home to as many large animals as primary forest. But are these large animals the ones we need to conserve? Brazilian Amazon primary forest is destroyed by clear-cut logging, for pasture, or increasingly, for large plantations of fast-growing exotics like eucalyptus. When the people abandon them, the forests slowly regenerate from the seed bank in the soil, and crucially, seeds dispersed by mammals and birds.

Secondary forests have long been thought of as poor quality and unsuitable for larger mammals and birds. Short spindly trees poking through a cluttered mass of vegetation hardly matches our image of the towering immense trees in tropical forests. However, secondary forests cover a huge and expanding area in the tropics – an area the size of France in Brazil alone. In some countries, like Puerto Rico, they are the only forest type left. The huge size of this new habitat reflects massive destructive pressure on

rainforest. I went to the primary and secondary forests of Jari, in the north-eastern Brazilian Amazon, to survey large mammals and birds.

This is a collaboration between the University of East Anglia, the Goeldi Museum in Belém, Brazil and the Brazilian landowner of my one million hectare study site, Jari Celulose. Working in a mixture of second-growth forest and primary forest the size of Norfolk, gave my colleagues and me the chance to compare the conservation value of secondary forests and nearby primary forest for the first time.

The setting is a story in itself. In the late 1960s, Daniel Ludwig, an American shipping magnate, developed the area for plantation forestry. But shipping purpose-built cellulose factories from Japan, huge deforestation programmes and disease in the plantations bankrupted him. The operation is now Brazilian-owned and has developed a strong environmental agenda. My research is a part of this, along with studies on everything from butterflies and bees to dung beetles and frogs.

The first somewhat challenging task was to cut 20km of transects through primary forest and 20km through secondary forests under 20 years old. Transects are straight paths, around one metre wide, which I later walked along to survey larger birds and mammals. The information I gathered allowed me to calculate the densities of around 30 bird and mammal species in primary and secondary forest. However, data analysis felt a long way off when my colleagues and I were hacking through the forest with machetes. The highlight for me was training for a month with my field assistant, Edivar. He has worked all over

The botfly larva (*Dermatobia hominis*), which made a home in my neck during a lunchtime hammock snooze in the forest.





A nymphalid butterfly rests on *Bellucia*, a common plant species in secondary forests and produces fruits eaten by a range of large mammals, including tapir and brocket deer.

the Brazilian Amazon for my supervisor at UEA, Carlos Peres. Edivar's incredible knowledge of the forest comes from over a decade as a professional hunter. It is refreshing to see that his skills are now being used to benefit conservation. After training I could identify the strange barks and grunts in the forest as the agouti (a rodent), pig-like peccaries, or brocket deer. I could identify various bird species by call and sight, and work out how old the tracks of terrestrial mammals were. Oh, and by this stage it was the height of the Amazonian wet season.

After 500km, a large daily dose of rain, a machete-wounded finger, and four botfly maggot friends living in my neck, the work was complete. The cause of the maggot palava was sleeping in my hammock during lunchtimes in the forest. I was a sitting duck! I thought they were infected mosquito bites. After three weeks I started getting sporadic, agonizing pain, and trickles of blood on my pillow. They were eating me. After five weeks I could feel things moving! If I stopped

breathing, I could hear the maggots' rasping 'orrible breathing. In the end I got them surgically removed, and have them pickled in a jar for posterity.

Meanwhile, back at my work, I discovered that secondary forests have a high number of small primates compared to primary forest. The commonest species included golden-handed tamarins and squirrel monkeys, both rare in the tall, mature primary forests I surveyed. Also common were two types of brocket deer and the elusive tapir, the largest land mammal in South America. A real surprise for us was seeing the incredibly rare bush dog in the secondary forest several times. Almost nothing is known about their conservation status and distribution within the Amazon Basin.

“A real surprise was seeing the incredibly rare bush dog.”

Secondary forests, known as *capoieras* in Brazilian Portuguese, produce a lot of small fruits, favoured by animals such as brocket deer and the tapir. Even though most trees in the secondary forests were only the size of a basketball post, they produced a lot of fruit.

This is mainly because these pioneer species put more effort into producing leaves and fruits than their larger cousins in primary forest. The 50m tall giant trees actually put most effort into the woody trunk, which is of little use to mammals feeding on the ground.

Perhaps my main finding was that many species of conservation importance do not live in these regenerating second-growth forests. I never saw South America's largest primate, the black spider monkey, outside Jari's primary forest. These noisy charismatic monkeys are fussy about which fruits they eat. And because they weigh about 11kg, they can't

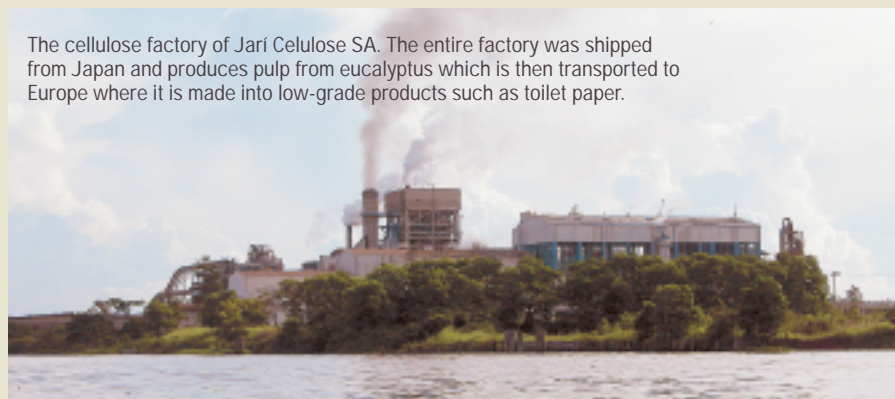


The elusive and incredibly rare bush dog.

easily move about the secondary forests, which are often patchy, with patches of low, scrubby bamboo and road clearings from the days of logging. I also saw few large parrots and macaws in second-growth, probably also related to food availability. The lack of these species limits the ability of secondary forests to conserve wildlife in the Amazon. They are beneficial complements to protected primary forest, but not alternatives.

Time on the ground also gave my colleagues and me the impression that far more needs to be done. It is vital to establish whether secondary forests serve as breeding areas for wildlife, or are temporary feeding areas at certain times of the year. Secondary forests appear to be good hunting grounds for Amazonian forest dwellers, especially since they tend to be found where population pressure is higher. An area urgently requiring more research is how humans use secondary forest. Understanding this will make clear their value to people, and the ability of the wildlife within to withstand hunting pressure. I hope that the combined value of secondary forests to conservation and people may strengthen the case for their protection.

I am pleased to say secondary forests are now receiving the attention they deserve. It now seems that they are important to wildlife though not as adequate alternatives to primary forests. Further ecological and social studies are ongoing. Watch this space!



The cellulose factory of Jari Celulose SA. The entire factory was shipped from Japan and produces pulp from eucalyptus which is then transported to Europe where it is made into low-grade products such as toilet paper.

Luke Parry is a NERC-funded MSc student at the University of East Anglia, Norwich, NR4 7TJ, email: l.parry@uea.ac.uk