Chapter 41

Mamirauá Reserve

Primate-based Flooded Forest Conservation in the Amazon

Nelissa Peralta, Hani R. El Bizri, Fernanda P. Paim and João Valsecchi

Introduction

Tourism is a fast growing industry worldwide, and often associated with social, economic and environmental impacts, especially in rural areas (Mowforth & Munt 1998). Despite its negative effects, a segment of the industry – ecotourism – has been endorsed as one strategy to promote the conservation of natural areas, linking it to economic returns for local people (Stronza & Pegas 2008). In the Amazon, there are hundreds of ecotourism enterprises that claim to conserve natural areas and their biodiversity, while also producing economic and social benefits to rural populations. In Brazil, ecotourism has been incorporated into national protected area management plans as a means of attributing economic and social value to biological diversity (MMA 2004). As ecotourism relies on natural areas and their 'watchable' species as its main asset base (Wunder, 2000), it provides an incentive for the conservation of those species that are considered to be tourist attractions.

Large charismatic mammals and birds are taxonomic groups that attract ecotourists to particular sites (Cousins 2007; Okello 2008). Primates are among the major ecotourism attractions, especially in tropical forests (Ross & Wall 1992; Weber 1993). In the Amazon, although there is great potential for primate tourism (with 122 primate species in the biome), only a few ecotourism sites rely on primate sightings. One of these sites is the Mamirauá Sustainable Development Reserve in Brazil. Its establishment is closely linked to primate conservation, since the main justification for creating the protected area was the need to protect two primate species (*Cacajao calvus calvus* and *Saimiri vanzolinii*) from local threats. In this chapter, we assess the role of primate conservation and ecotourism in the formation and protection of the Mamirauá Reserve.

Primate-based Formation of the Mamirauá Sustainable Development Reserve

In 1983, the primatologist José Márcio Ayres arrived in the region of what is today the Mamirauá Reserve to study the primate *Cacajao calvus calvus* (Figure 41.1). There, he found one of the most specialized primates in the Neotropical region, whose distribution range is entirely within the white-water river floodplains or *várzeas* (Ayres 1986a). Right from the start, his fieldwork revealed the vulnerability of *C. calvus calvus* from threats to its habitat, mainly from logging since, in the west Amazon, most timber was extracted from *várzea* (Ayres & Johns 1987) and, secondarily, commercial fishing. Another of the region's primate species also vulnerable to habitat loss is *Saimiri vanzolinii*, described by Ayres as having the smallest distribution among South American primates (Ayres 1985). Ayres's research also showed the importance of floodplains to the speciation processes in Amazonian primates (Ayres 1986a; Ayres & Clutton-Brock 1992), recognizing thereby that the maintenance of gene flow and ecological and evolutionary processes should be as important as species diversity when selecting priority areas for conservation (Pinedo-Vasquez & Dávalos 2011).

His studies on primates were important to the development of river-refuge hypotheses (Ayres & Clutton-Brock 1992; Pinedo-Vasquez & Dávalos 2011) and to the conception of conservation based on ecological corridors (Ayres 1986b; Ayres *et al.* 2005). Furthermore, his work showed the importance of *várzea* and the presence of endemic primates in this habitat and their vulnerability to habitat destruction. These were the foundations for a proposal to create a protected area in the region. The protected area was established by the Amazonas State Government and comprised the whole of the then known distribution range of *C. calvus calvus* and *S. vanzolinii* – an area of 11 240 km² located within the confluence of the Solimões, Japurá and Auatí-Paraná rivers (Figure 41.2). In addition to these two species, nine more primate species were then protected by the reserve, representing four families and eight genera (Ayres 1985, 1986a, 1986c, 1995; Ayres & Johns 1987; Hershkovitz 1984, 1987; Paim & Queiroz 2009; Valsecchi 2005; Vieira *et al.* 2008; Table 41.1).

The reserve was created as an Ecological Station, a very restrictive category of protected area that does not allow human presence or natural resource extraction (MMA 2004). But anthropological studies carried out by Deborah Lima showed that the area was inhabited by local populations that depended on and had historically used locally available natural resources, and were themselves engaged in a social movement for preservation of the area's lakes (Lima-Ayres 1992). This reinforced Ayres's support of the presence of local people in protected areas, whose livelihoods depended on biodiversity (Ayres & Best 1979). Their main concern was to actually reconcile conservation and development goals: 'protected areas should be seen as an element in a regional human development strategy,

https://doi.org/10.1017/9781316466780.042

Figure 41.1 The white bald-headed uakari, a primate species whose distribution range falls entirely within the white-water floodplains (*várzea*) in the Mamirauá Reserve. Photo: Felipe Ennes.

considering and incorporating within costs of protection, the needs of local communities and relating social and economic benefits to the sustainable use of local natural resources' (Ayres *et al.* 2005, p. 23).

To recognize that by involving and providing economic incentives for local people would conservation be successfully achieved, he worked towards the creation and implementation of a new category of protected area. The Sustainable Development Reserve[1] was created in 1996, and defined as a natural area that allows the residence of traditional populations, whose livelihoods are based on systems of sustainable use of natural resources, developed along generations and adapted to local ecological conditions, and which perform a fundamental role in the protection of nature and maintenance of biological diversity (MMA 2004). Mamirauá Ecological Station was then changed to this new category of protected area, a Sustainable Development Reserve.

The challenge afterwards was to create a strategy that would incentivize local people to continue to protect and use resources sustainably. During the early nineties, researchers and local leaders set out to elaborate and agree upon a zoning system and set of norms for the use of natural resources. In 1996, a management plan was published. The zoning system destined a core area as a totally protected zone, where human settlements and use of natural resources were prohibited. Surrounding this core area was a sustainable-use zone, where most of the settlements were located and economic productive activities could be carried out. A set of alternative income activities was also proposed as incentives for conservation; among these activities were fisheries management, forest management and ecotourism (SCM 1996). These economic activities would offset pressure from locally threatened natural resources and raise household incomes (SCM 1996). An ecotourism enterprise was planned in Mamirauá, within the totally protected zone near the Mamirauá Lake (Figure 41.2), an area subject to pressure from large fishing vessels that were extracting tons of fish at a time.

Community-based Ecotourism and Conservation

Ecotourism is a segment of the tourism industry advocated as a market tool for conservation (Gossling 1999; Stronza 2007). It is an important source of funding for protected areas, and it has grown especially in developing countries (Davenport *et al.* 2002; Hartshorn 1995). Ecotourism can be seen as a non-extractive strategy to promote the conservation of forests and primates (Care for the Wild International and Pro Wildlife 2007). Ecotourism enterprises usually entail natural areas as destinations and the promotion of biodiversity conservation in those areas, with socioeconomic benefits going to local people (Boo 1992; Honey 1999; IES 1994; Kiss 2004). For practitioners, ecotourism should generate associations between socioeconomic benefits to local populations, and the endorsement of conservation strategies in those natural areas where the projects are developed (Peralta 2013).

In Mamirauá, ecotourism has been in existence since 1998. Seven communities are directly involved in the ecotourism project. The lodge that hosts guests was named after the white bald-headed uacari (*C. calvus calvus*). The Uakari

https://doi.org/10.1017/9781316466780.042

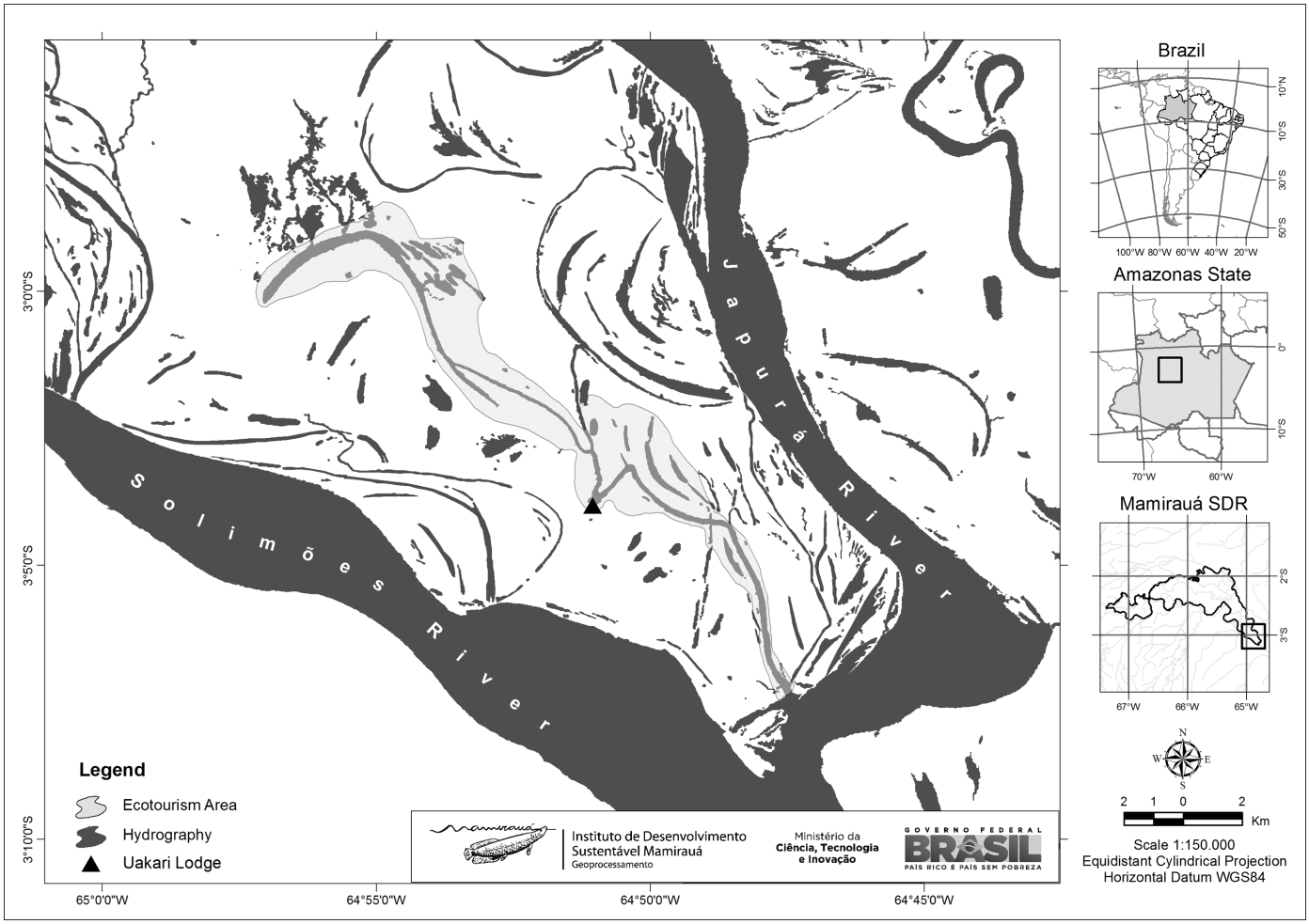

Figure 41.2 Map showing the area designated for ecotourism and the location of the Uakari Lodge in the Mamirauá Sustainable Development Reserve, Amazonas, Brazil.

Floating Lodge has been hosting visitors to Mamirauá since 1999. Seventy per cent of its guests are international visitors and 30% are Brazilian nationals. Travellers visit the natural area due mainly to its natural and cultural attractions – especially good primate-viewing opportunities. Tourists engage in a combination of activities, including excursions to trails and lakes in order to observe wildlife, visit local communities to get to know and understand the local way of life, and visit research stations, where they interact with researchers.

Local inhabitants participate in ecotourism activities working and managing the lodge, planning and evaluating activities, selling agricultural produce and fish to the lodge, hosting visitors and selling handicrafts to visitors to their communities. Since 2002, in the years when the enterprise generated profits, these were shared among the seven communities involved. Communities invested half of the profits to local development projects and the other half in the protection of the area.

A true ecotourism project must minimize its negative impacts, especially in a protected area. To do so in Mamirauá, a visitor management system was established integrating a set of norms, recommendations and good practices. Only 1000 people per year (and 20 people at a time) are allowed at the Uakari Lodge. Trails can only be visited in small groups of up to six people. Large boats are not allowed into the area, and the means of transport must be restricted to motorized canoes using low horsepower engines at low speed. Taking into account that impacts are related not only to the total number of tourists but also to their behaviour towards the environment and local population, information on the norms of the protected area prior to arrival is part of the Uakari Lodge visitor management system. Outings can only occur with the presence of a local guide, and guides are trained extensively to inform visitors of the appropriate conduct during the various activities carried out in the protected area.

Some measures have also been taken to minimize negative social impacts of the activity. Ecotourism was not implemented to substitute traditional economic activities, but to be an extra source of income. In order to not affect other economic activities, a rotation system of work was planned, and other more traditional economic activities, like fishing, agriculture and handicrafts production, are encouraged in synergy with tourism. Specific rules and recommendations were elaborated by locals to guide the conduct of tourists in their communities.

https://doi.org/10.1017/9781316466780.042

Table 41.1 Primate species whose occurrence was confirmed in Mamirauá Reserve.

Family	Species	Common name
Aotidae	*Aotus cf. vociferans*	Night monkey
Atelidae	*Alouatta juara*	Red howling monkey
	Ateles chamek	Black-faced black spider monkey
Callitrichidae	*Cebuella pygmaea*	Pygmy marmoset
Cebidae	*Saimiri vanzolinii*	Black-headed squirrel monkey
	Saimiri macrodon	Ecuadorian squirrel monkey
	Saimiri cassiquiarensis	Humboldt's squirrel monkey
	Sapajus macrocephalus	Large-headed capuchin
Pithecidae	*Cacajao calvus calvus*	White bald-headed uacari
	Cacajao calvus rubicundus	Red bald-headed uacari
	Pithecia cazuzai	Cazuza's saki

Other good practices are related to the employment of alternative technologies for minimum environmental impacts, such as a system of solid waste management, rainwater collection and the use of renewable energy, such as solar power.

In order to investigate impacts of ecotourism activities on local fauna, a trail monitoring system was implemented. Between 2001 and 2004, data were collected by local guides on 765 tourist trail excursions. On these outings, all primate sightings were registered, as well as records of two species of cracids *Mitu tuberosum* and *Crax globulosa* (CRACIDAE) and the black-fronted nunbird *Monasa nigrifrons* (BUCCONIDAE). About 24 000 sightings were registered in total, with more than half (55%) representing five species of primates (*A. juara*, *C. calvus calvus*, *S. vanzolinii*, *S. cassiquiarensis e S. macrocephalus*). Average sighting rates did not significantly differ over the years (ANOVA statistical testing). From 2005 onwards, the monitoring system changed so as to exclude tourist outings. Two groups of trails were monitored. One group included trails that allowed for intensive tourist use and the other group were of trails where tourist had their access restricted (Paim *et al.* 2012; Storni *et al.* 2007). The study showed that densities of the primates *A. juara*, *S. macrocephalus*, *S. vanzolinii* and *C. calvus calvus*, have been stable between 2007 and 2010, and that their use of areas with tourist trails was adequate (Paim *et al.* 2012). Primates were chosen as the focal taxon for this monitoring programme, because their presence is an indicator of habitat quality, and because the ecosystem services they provide are essential for humans (e.g. Chapman & Onderdonk 1998; Chapman & Peres 2001; Lambert & Garber 1998).

In Mamirauá, four primate species accounted for the majority of hunted mammal biomass between 2002 and 2005 (Valsecchi 2005). Lopes *et al.* (2012) showed the red howler monkeys (*A. juara*) were the preferred game meat in three out of four communities of their study area in Mamirauá. Between 2002 and 2010, 286 individuals of *A. juara* were hunted, representing 3% of the total biomass hunted in the reserve (Valsecchi 2012). Despite this pressure, *A. juara* hunting levels are considered sustainable (Queiroz & Valsecchi 2005).

Tourism has generated around US$800 000 for about 100 families over the years (1999–2011). Although economic benefits have not been high, the income that tourism did provide was important, since locals' annual average family income was US$3319 in 2005 (Peralta *et al.* 2009). The value of tourism was demonstrated by a study that found that average buying power grew by 148% in one of the communities directly involved with tourism (Peralta 2005). Another study found a 34% difference in average income between communities that were involved with ecotourism and those who were not (Peralta 2013). A great amount of income was generated to women and young people, who had previously more restricted access to income-generating activities.

One problem faced by the project has been the instability in the flow of guests to the lodge. Demand is very elastic and is affected by external factors (such as foreign currency exchange rates and the transport infrastructure available). Since the beginning of its operations, the lodge visitor numbers had shown an average annual growth rate of 25%. But in the years 2006 and 2007 the local airport closed down, and this impacted visitation in subsequent years. Another challenge is the lack of formal education of employees and temporary staff, who live locally in rural areas with poor schooling. Although there was success in developing local skills in guiding tours, hotel housekeeping, and other services, in general, locals still lack experience in marketing, product development and financial management, which have been provided by the institution that offers long-term technical assistance to the lodge (Peralta 2013).

But a linkage between tourism and the preservation of the area did occur (Peralta 2013). Locals related the protection of Mamirauá Lake system to tourism. And tourism provided an economic incentive for locals to protect the area and thwart external threats, such as large fishing vessels from urban areas. It has been a motivation for those who benefited from tourism to try and maintain the protection status of a lake that they saw as important for ecotourism activity. One problem is that, despite attempts to diffuse economic benefits as much as possible, due to logistical problems and the instability of tourist demand, only four out of seven communities enjoyed the bulk of the benefits. Those who did not see the activity as profitable to themselves justify destining the lake to fishing management and not to total protection (Peralta 2013).

Conclusions

The Mamirauá Reserve has won the Best Ecotourism Destination Award from Conde Nast Traveler Magazine. It also received a prize for Sustainable Tourism from the Smithsonian Magazine and United States Tour Operators Association (USTOA) Conservation Traveler's Foundation. Community participation and the scientific basis of the project

https://doi.org/10.1017/9781316466780.042

were fundamental to its achievements. The Uakari Lodge is a clear example that ecotourism, if well planned and carefully monitored, may be an effective tool for conservation. It is a direct source of income that is related to the area's preservation and serves as an incentive for the protection of the natural area by local people. Research on primate population densities, habitat use and extraction by people have remained stable since ecotourism was implemented suggesting that it is a sustainable non-extractive activity. Evidence also suggests that given adequate levels of protection, and additional economic opportunities, traditional forms of natural resource use by people in protected areas can be maintained.

Acknowledgements

We are grateful to the Ministry of Science, Technology and Innovation in Brazil for their financial support and to the Community-Based Tourism Programme of the Mamirauá Institute for partnership in collecting data. We are especially thankful to local people, research assistants and guides, all of them responsible for biodiversity conservation in the area.

Note

1 Corresponding to the IUCN category VI.