Chapter 5
Ethnoprimatology of the Tikuna in the Southern Colombian Amazon

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5.1 Introduction

In recent years, scholars studying primates have realized that most primate populations are influenced by people's activities making the animals difficult to study in isolation (Fuentes and Wolf 2002; Riley 2013). Anthropogenic activities which threaten wild primates include, but are not restricted to, overhunting, habitat destruction, retaliatory killing for agricultural crop foraging, collection for the primate pet trade (Cowlishaw and Dunbar 2000), and trade for biomedical research (Maldonado et al. 2009).

Human–primate interactions are influenced by diverse cultural, ecological, and other components which may be unique to geographical regions (Loudon et al. 2006). To deal with complex relationships between humans and nonhuman primates, interdisciplinary research methods are used in, what is commonly referred to as, ethnoprimatology (Fuentes and Hockings 2010; Loudon et al. 2006; Parathian and Maldonado 2010). Ethnoprimatologists study the diverse relationships between nonhuman and human primates often with the goal of furthering conservation aims and use a mixed-methods approach in ecological and ethnographic data collection (Fuentes and Hockings 2010; Papworth et al. 2013). Human–primate interactions occur in all tropical forests but are having an increasingly negative effect on primates (Peres and Michalski 2006; Sponsel 1997). Ethnoprimatologists working in the Neotropics investigate what indigenous groups know about primates and sustainable hunting and how they view and categorize the species they hunt for food (Endo et al. 2009; Papworth et al. 2013; Parathian and Maldonado 2010; Stafford et al. 2016).

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Traditional indigenes managed their game populations using local knowledge and cultural and social taboos to ensure sustainability (Silvius 2004). However, since colonization, the lives of many indigenous peoples have undergone substantial changes that have important ramifications for primate conservation (Silvius 2004). Early colonizers such as missionaries and government agents removed many indigenes from their nomadic lifestyles to settle them in permanent communities. The settlers' exploitation of natural resources from land that indigenes regarded as theirs not only caused extreme conflict but also encouraged indigenes to provide commodities for the settlers moving in to exploit forest resources such as timber (Nimuendaju 1952; Porro 1996; Stearman 1984; Stearman 2000; Zarate 2008). This early contact with western markets drove Amerindians to transform their environment. As a result, indigenous people modified the structure and composition of game species all over the Amazon basin for subsistence and commercial purposes (Terborgh 1999).

Stearman (2000) outlines how Amerindians' social change and modernization have had a detrimental effect on the sustainability of their hunting, namely, sedentarism, population growth, market involvement, and technological enhancements. Sedentarism plays a crucial role in the localized depletion of wildlife. For instance, nomadic tribes are now confined to settlements and are consequently heavy consumers of resources in nearby forests. Their hunting of large, long-lived primate taxa such as atelines is contributing to the drive toward these species' local extinction (Fragoso 1991; Peres 1991). Inhabitants of the Siona–Secoya horticultural villages in Ecuador had to relocate owing to the depletion of game species (Vickers 1983), and there were intra-village conflicts caused by meat scarcity and internal sociopolitical issues among the Yanomamö of Venezuela and Brazil, resulting in the fissioning and relocation of indigenous villages (Good 1987).

The results presented in this chapter form part of long-term research conducted in two Tikuna communities, Mocagua and San Martin, overlapping the Amacayacu National Park, located at the southern part of the Colombian Amazonian trapezium (see Fig. 5.1). These villages provide a comparison of two communities undergoing different rates of environmental and cultural change. Mocagua's strategic geographical location on the Amazon River facilitates access by water, thus decreasing transport costs for tourists and researchers. This, in turn, provides more income for this community. San Martin is located on the Amacayacu River, a tributary of the Amazon, and with the associated higher fuel costs and limited transport availability, access is often difficult, resulting in fewer benefits from tourism and research. The distance from the Amazon also played an important role in the historical acculturation of these communities. San Martin conserves its Tikuna language, while only Mocaguan elders still speak it. Additionally, hunting practices are more traditional in San Martin, where more people rely on hunting. Mocagua has been involved in a Humboldt's woolly monkey (*Lagothrix lagothricha lagothricha*) conservation initiative since 2003, where research and primate tourism are generating alternative income and improving local perceptions of this species for its ecological and economic services (Maldonado and Waters 2017).

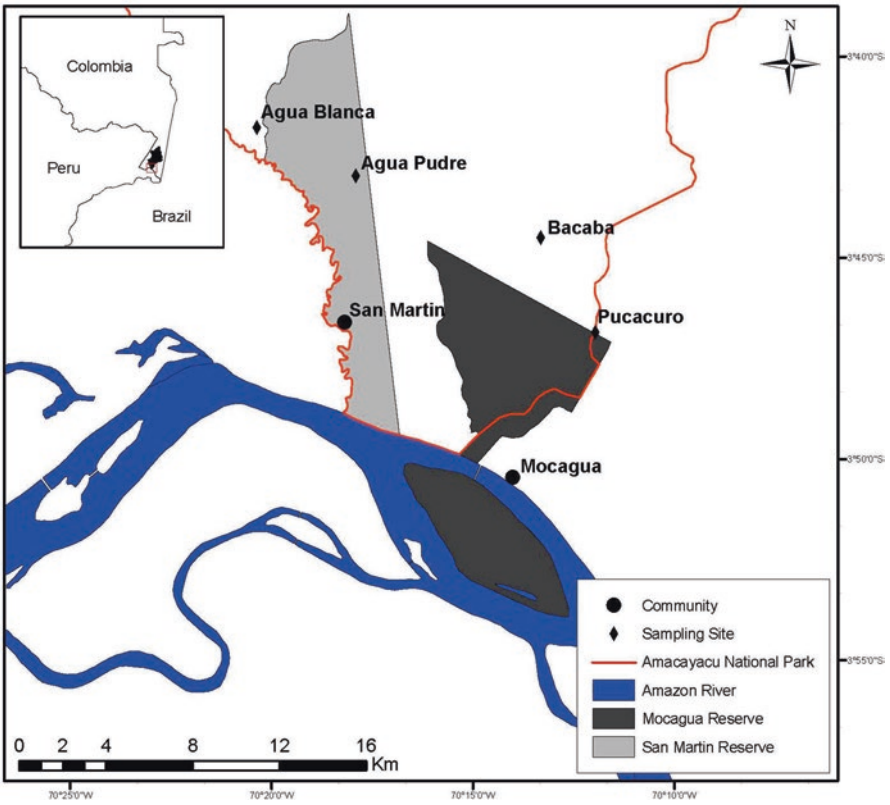

Fig. 5.1 Location of Mocagua and San Martin indigenous territories and the four sampling sites (Agua Blanca, Agua Pudre, Bacaba, and Pucacuro). Source: Maldonado (2012:25)

Qualitative hunting data collection was carried out in three different research periods. In a pilot period covering 25 days of fieldwork in August–September 2003, Tikuna hunters were interviewed, and local agreements and research permits were secured for the implementation of an investigation focusing on Tikuna hunting. An implementation period was carried out from 2005 to 2009. Monthly visits of 5–7 days were conducted in each community for ethnographic data collection by a multidisciplinary research team composed of primatologists, sociologists, anthropologists, biologists, and wildlife veterinarians. The last research period covered 32 days from March to December 2013. During this period, data collection focused on locals' views of the potential depletion of wildlife and the future of hunting in Mocagua and San Martin. A total of 46 hunters and their families were involved in this research. In addition, a randomly selected sample of community members from different gender/age classes attended 12 workshops and 28 community meetings organized by the research team.

A quantitative harvest assessment was conducted in Mocagua and San Martin in order to determine hunting sustainability, to quantify the total biomass extracted by

Table 5.1 Quantitative criteria used to rank the hunting pressure at different sites in Mocagua and San Martin. Source: Maldonado (2012:50)

Study site (coordinates)	Total frequency of hunting trips[1]	Total extracted biomass (kg)	Distance from nearest village (km)	Hunting pressure rank
Bacaba (3° 45′ S, 70° 13′ W)-MOC[a]	113	2,957	11.6	1
Pucacuro (3° 47′ S, 70° 12′ W)-MOC	165	3,657	7.8	2
Agua Blanca (3° 41′ S, 70° 20′ W)-SM[b]	180	6,139	12.5	3
Agua Pudre (3° 43′ S, 70° 18′ W)- SM	369	13,956	6.7	4

[1]During the study period
[a]*MOC* Mocagua
[b]*SM* San Martin

hunters over a 48-month period, as well as ascertain wildlife population densities in both communities. Criteria for ranking hunting sites included the total biomass of game species extracted by hunters at each site, the proximity to Tikuna settlements (number of kilometers), and number of hunting trips. Thus, hunting pressure ranged from 1 (lowest hunting pressure) to 4 (highest hunting pressure) (Peres 1999; Peres and Dolman 2000) (see Table 5.1).

For population density analyses, primate species were ordered by increasing adult body mass and were grouped into three size categories:

(i) Small body size (<1.5 kg): pygmy marmoset (*Cebuella pygmaea*), black-mantled marmoset (*Leontocebus nigricollis nigricollis*), night monkeys (*Aotus* spp.), Ecuadorian squirrel monkey (*Saimiri cassiquiarensis macrodon*), and yellow-handed titi monkey (*Cheracebus lucifer*)
(ii) Medium body size (1.5–4.0 kg): saki monkey (*Pithecia milleri*) and white-fronted capuchin (*Cebus albifrons*)
(iii) Large body size (>4 kg): Colombian howler monkey (*Alouatta seniculus*) (hereafter howler monkey) and Humboldt's woolly monkey (*Lagothrix lagothricha lagothricha*) (hereafter woolly monkey) (Peres and Dolman 2000)

5.2 The Tikuna

Earlier Tikuna were well known as nomadic hunters and gatherers, who specialized in *terra firme* habitats. They occupied the inland forests north of the Amazon River (Rianio 2003). The Tikuna's access to flooded forest (*várzea*) and the islands of the Amazon River was restricted by their neighbor and enemy, the Omagua, the largest indigenous tribe in the area (Acuña 1986; Franco 2006). As a result of early contact by Catholic missionaries in the late 1600s, a smallpox epidemic drastically reduced

Omagua numbers (Nimuendaju 1952). The Omagua, weakened by disease, could not resist the Tikuna's movement into their territory closer to the Amazon (Grohs 1974). In 1768, after the eviction of the missionaries, the Tikuna were recognized as expert hunters and fishermen (Nimuendaju 1952; Porro 1996). In the 1950s, semi-nomadic Tikuna groups living in traditional community houses near Matamata creek and the Amacayacu River were settled by Jesuit missionaries. These missionaries established the first Catholic boarding school in the area, where children were taken from their families and forbidden to speak their native language (Monica Vasquez, personal communication 2009). The villages of Mocagua and San Martin were not formally established until the 1960s (Franco 2006).

During the early 1900s, the Tikuna in Colombia underwent profound changes in their lifestyle due to their involvement in extractive economies such as rubber exploitation, the animal skin trade, illegal red cedar (*Cedrela odorata*) timber extraction, and the massive exploitation of different tortoise species for international markets (Franco 2006; Rianio 2003). During the1960s, the high levels of wildlife trade (mainly primates for the US biomedical research market) drastically affected the Tikuna's traditional use of resources, and commercial hunting was the main source of income in the area (Franco 2006). In the 1980s, the boom of coca impacted on Tikuna society as it became affluent. Traditional activities such as agriculture were abandoned, and alcoholism, prostitution, scarcity of cultivated food, and trafficking of cocaine (Franco 2006; Rianio 2003) were prevalent. As a result of their participation in extractive economies, along with the loss of cultural beliefs and taboos, Tikuna people became disconnected from nature. This disconnection has, in turn, tainted Tikuna views of conservation projects and hindered recent attempts toward cooperation with governmental and non-governmental organizations (NGOs) regarding management and sustainable use of natural resources.

Nowadays, the Tikuna indigenous group is widely distributed along the Amazon River in Peru, Colombia, and Brazil, with an estimated population of 40,000 people, and is one of the largest indigenous groups in the region (Franco 2006; Lopez 2000; Maldonado 2012). Other minority ethnic groups such as the Cocama, Yagua, and Huitoto also share territories with the Tikuna in the study area (Rianio 2003). In the Colombian Amazon, the Tikuna population (~7100 inhabitants) represents only 1.3% of the Colombian population (DANE 2005). Tikuna subsistence relies mainly on low-level slash-and-burn agriculture, hunting, fishing, gathering, and trade. Tourism also provides another source of income (Maldonado and Waters 2017). Some Tikuna are still involved in drug trafficking and illegal logging (Rianio 2003; Zarate 2008).

5.3 Traditional Hunting by the Tikuna

In the past, Tikuna social organization was composed of clans named after terrestrial animals, birds, and plant species (Lopez 2000, 2002). Clans were patriarchal and decisions made by elders (*abuelos*) and *Payé*s. *Payés* were Tikuna shamans and

spiritual and political authorities. Community decisions were made following advice from the *Payés* and the elders. Payés were in charge of mediating between the supernatural world, natural resources, and people (Campos-Rozo 1987) and communicated to the entire community. Nowadays, the main sociopolitical authorities are elected officers of *curaca* (headman/chief) and the *cabildo*. The elections are much influenced by the number of relatives a candidate has in the community rather than his/her leadership skills for the post (Maldonado 2012). As a consequence, current Tikuna communities lack experienced leaders to represent the community's interests. Therefore, corrupt *curacas* are common in the region. This lack of political cohesion may be related to the loss of the spiritual authorities (the *Payés*) as well.

In common with other Amazonian tribes, the Tikuna consider hunting to be one of the most important and respected activities in society, not only for the intrinsic relationship between the hunter, the *Payé*, and the spirits of the forest but also for the provision of meat for the community (Campos-Rozo 1987). This agrees with Stearman's (2000) work stating that the Yuquí and Sirionó indigenous groups in Bolivia accrue prestige through hunting and the provision of meat and not from gathering plants or planting crops which are activities that present little risk, require little skill, and are rarely considered a scarce resource. Hunting brings status to a man among his peers, and these social rewards extend to his close relatives (Stearman 1987, 1989, 1990).

5.4 *Shamans* (Payés)

As with most Amerindian groups, the Tikuna had a close relationship with nature with resource management controlled by the spiritual authorities. These authorities were mainly composed of the *Payés* and elders with their extensive knowledge of nature, such as the location of key resources, game migration and feeding habits, and seasonality of forest resources in their indigenous territory (Campos-Rozo 1987). The role of the shaman in most hunter-gatherer Amerindian tribes was also to provide spiritual protection. They interceded between the social/human world and the unpredictable world of the supernatural (Brightman 2007; Lee and Daly 1999a, b). *Payés* were also the mediators of the spiritual relationship between humans and the "owners of the game" or the "gamekeeper." The gamekeepers are mythological representations of people, animals, or plants who rule, manage, and organize the use of specific natural resources (Campos-Rozo 1987). *Payés* could perform specific rituals, including asking the gamekeeper for permission to hunt a specific animal species, to protect that species from evil spirits, or to protect game from being hunted by other communities or tribes (Brightman 2007). They also performed rituals to protect hunters embarking on hunting treks, to assist them in finding prey, and to protect them from disease. The *Payé*'s relationship with nature included the ability to transform himself into an animal (shape shifting)—the shape of a jaguar (*Panthera onca*) being the most common (Guenther 1999; Reichel-Dolmatoff 1997) (Humberto Gregorio and Leonel Panduro personal communication 2009). Thus, community *Payés* and elders supported and controlled hunting to ensure hunters were successful.

5.4.1 Hunting Taboos

The Tikuna had several ways of ensuring hunting was sustainable. For example, some species of wildlife were subject to hunting taboos, and hunting such species was forbidden by the *Payé* (Campos-Rozo 1987). Most taboos were related to the Tikuna belief that animals have a benign or malevolent spirit or that the animal might have the spirit of a *Payé* (Cardoso de Oliveira 1983). For instance, tapirs (*Tapirus* sp.), hummingbirds (*Trochilidae* sp.), and toucans (*Ramphastos* sp.) are possessed by benign spirits, while night monkeys (*Aotus* sp.), deer (*Mazama* spp.), pacas (*Cuniculus paca*), yellow-footed tortoise (*Chelonoidis denticulata*), jaguars, all snake species, owls, and most raptors have malignant spirits or might be *Payés*. Hunting bans were imposed by the *Payés* during certain months of the year for other common hunting prey to ensure that these species were not overhunted.

Disobeying a hunting restriction or ban made by the *Payé* could bring bad luck during hunting, the disappearance or scarcity of preferred game species, sadness, disease and even the death of the hunter and his family, and the entire community cursed (Reichel-Dolmatoff 1997; H. Gregorio; M del Aguila; L. Panduro, personal communication 2009). For the Tikuna, Tukano, and Yukuna Colombian indigenous groups, hunting of game species such as primates, tapirs, deer, peccaries (*Tayassu pecari*), and curassows (*Crax* sp.) was severely curtailed (Reichel-Dolmatoff 1996; van der Hammen 1992). In contrast, other game species such as pacas, agoutis, and armadillos were not subject to hunting taboos (Reichel-Dolmatoff 1996; van der Hammen 1992). As hunters are predisposed to opportunistic encounters with animals and unusual situations, Tikuna and other Colombian Amazonian societies believed hunters were the community members who had more chance of meeting the gamekeepers, which had important ecological implications (Reichel-Dolmatoff 1996). The gamekeeper protects his territory from overhunting and any other form of depletion (Maldonado 2012; Reichel-Dolmatoff 1996). Therefore, an encounter with him is dangerous, often ending with a punishment manifesting itself as an illness. This encounter usually affects people who are aware of ecological constraints, people who are actively involved in environmental damage, and people who have consciously or unknowingly violated community norms (Reichel-Dolmatoff 1997).

5.4.2 Sacred Areas

For most Amazonian tribes, salt licks represented one of the most sacred environmental areas of the forest (Reichel-Dolmatoff 1997). For the Tikuna, salt licks were the sacred place where the *Payés* met the gamekeeper personified by animals such as howler monkeys, tapirs, jaguars, deer, and macaws (*Ara* sp.) (Campos-Rozo 1987; A. Vasquez, personal communication 2009) The animals and *Payés* gathered at salt licks to talk and to receive instructions about hunting restrictions and bans. Food restrictions relating to species visiting the salt licks were communicated to the *Payé* by one of the species at the party. A party ensued at the end of the meeting

where everyone got drunk (Campos-Rozo 1987; Azulay Vasquez, Leonel Panduro and Mamerto del Aguila personal communication). There are several Tikuna tales about the frequent use of salt licks as meeting locations where important decisions were made by the *Payé* regarding wildlife utilization (Maldonado 2012; Azulay Vasquez, Leonel Panduro and Mamerto del Aguila personal communication 2009). The hunting bans applied by Tikuna at salt licks may have been related to their knowledge of seasonal game migration. For instance, during the dry season, game species rely on the nutrients found in salt licks for long periods of time (Lozano 2004). Thus, source–sink dynamics of game populations were understood and relayed in Tikuna cosmological politics, playing an important role in wildlife conservation. Currently, Tikuna use of salt licks as a place to hunt tapir is very common. During the dry season, hunters establish camps to wait for the animals at night. In Mocagua and San Martin, the Bacaba creek area represents one of the most frequently visited hunting sites, where 30% of the respondents stated that they visited this site at least once a month favoring it as place to hunt large prey (Maldonado 2012).

5.4.3 Food Restrictions

For most of the indigenous groups distributed in the Colombian Amazon, food restrictions (better understood as abstinence, fast, or diet) were common for all members of the community (Reichel-Dolmatoff 1997; van der Hammen 1992). Reichel-Dolmatoff (1996) states that food restrictions were based on the intrinsic relationship between people and nature where humans are allied with nature, and this fact implies the observance of rules of measure. Furthermore, animals have energy that is related to the specific types of environment they live in and to the people who live in the surrounding forests. The differences in animal energies depend to a large extent on the availability and abundance of their food resources. Therefore, these considerations provide the basis for food restrictions and for certain culinary preparations (Reichel-Dolmatoff 1996). Most food restrictions were related to birth control, pregnancy, gestation, childhood, and convalescence. Other food restrictions were related to particular activities involving close contact with nature, such as hunting, gathering, cultivating, and fishing (Campos-Rozo 1987; Reichel-Dolmatoff 1997; van der Hammen 1992).

5.4.4 Use of Primates by the Tikuna

In common with other indigenous groups in Amazonia such as the Guaja (Cormier 2003), Tikuna traditionally kept monkeys as pets where orphaned infants, whose mothers had been killed by hunters, were reared and not traded but kept in the community (Maldonado 2012). The most common primate species reared and kept as

pets by Tikuna were woolly monkey, night monkey, saki monkey, and black-mantled tamarins (Parathian and Maldonado 2010). Additionally, Parathian and Maldonado (2010) report that Tikuna used primate body parts for different purposes. They used howler monkey throat sacs as a medicinal cure for laryngitis. Woolly monkey and saki monkey skins were used to make traditional drum skins to be used for the *Pelazon* festivity which celebrates girls attaining puberty. During this celebration, woolly monkey meat was the most prized and their roasted tails viewed as a delicacy. Like other Amazonian tribes, woolly monkeys represented one of the most important primate species in Tikuna diet and were one of the most overharvested (Peres 1991). Such traditional uses are no longer practiced in most of modern Tikuna society, but some isolated communities do maintain these traditions, especially Tikuna from the Pupuña and Buenos Aires region, north of San Martin. Elderly hunters in Mocagua and San Martin revealed they hunted woolly monkeys only 3 km from the communities where settlements were established. Nowadays only experienced hunters from San Martin are successful in hunting the species. The reported densities of large-bodied primates in San Martin suggest that wild populations are depleted especially within an 8 km radius around the community (Fig. 5.2).

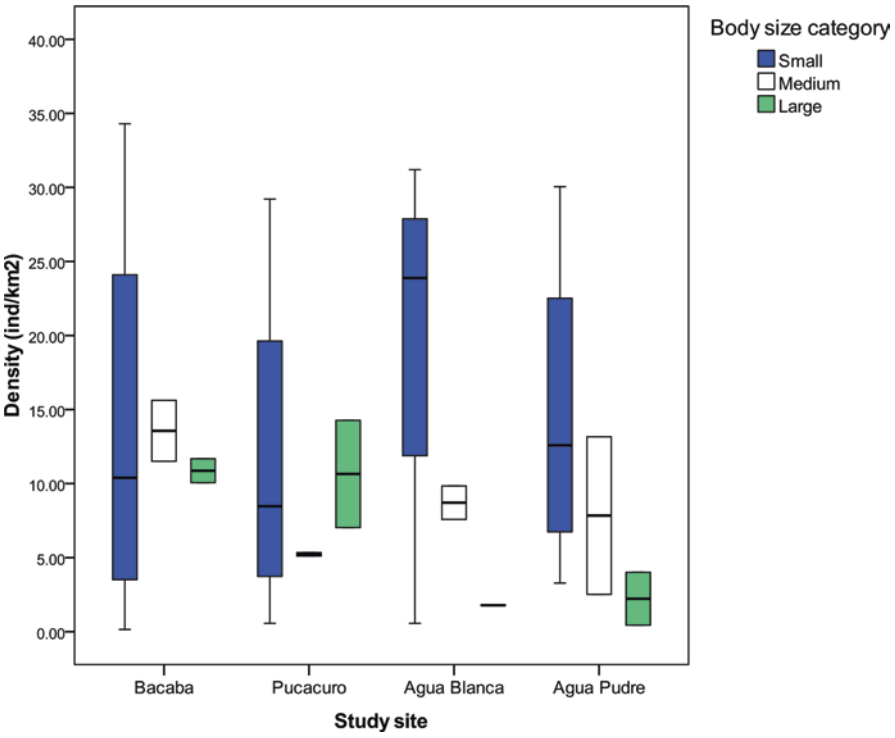

Fig. 5.2 Density of primates by size-class categories at Mocagua (Bacaba and Pucacuro) and San Martin (Agua Blanca and Agua Pudre). Source: Maldonado (2012:94)

Large-bodied primates are highly sensitive and can be the first primate species to disappear at even subsistence levels of hunting resulting in local extinctions (Laurance et al. 2006; Peres 1990, 1991; Stevenson et al. 2005). These species' vulnerability is mainly attributed to their low reproductive rates and long interbirth intervals (Di Fiore and Campbell 2007; Peres 1990). Peres (1990) states that selective hunting may affect ateline sex ratio which influences their long-term population growth.

5.5 Primates in Tikuna Folklore

In Tikuna folklore, most primates are portrayed as intelligent and jovial characters, fostering a respect for the species among local people. For instance, during the *Pelazon* festivity, a member of the community, adorned in a traditional costume made from palm fiber to represent a white-fronted capuchin monkey (*Cebus albifrons*), performs a light-hearted dance to begin the ceremony. White-fronted capuchins symbolize an important character from Tikuna folklore—a monkey who kidnaps a young girl from her community and keeps her trapped in the forest forever (Parathian and Maldonado 2010). Other important roles played by primates happened when the *Payés* went to the salt licks to consult and party with the gamekeeper. Elders stated that *Payés* became drunk with the howler monkeys, which are well known for ingesting the fermented fruits of certain palm species. The howler monkeys' role was to find the fruits ripe enough for such consumption (Azulay Vasquez, personal communication 2009).

In contrast to Tikuna's positive perceptions of diurnal primates, night monkeys are viewed as relations of malevolent forest beings that appear at night to harm people or to take them to another dimension. For instance, in San Martin de Amacayacu, the most traditional community, Azulay Vasquez (one of the community historians), with a great knowledge of the forest, said that night monkeys could be seen at night as humans or night monkeys, but they were bigger and their canines longer and sharper. They approach hunters' camps, mainly during full moon, and leave drinks for hunters. These "potions" make hunters unconscious, so the monkeys can harvest their blood. The belief is that the night monkey descends with a receptacle and removes and stores the blood of the sleeping hunter in a receptacle to take back to feed its group. Several versions exist of how night monkeys take the hunters' blood such as sucking blood from the jugular or state that the night monkeys do not take the blood directly but the potion causes hunters to weaken due to a type of anemia so they cannot return to their villages and die in the forest.

Other Tikuna tales describe that the night monkeys can be seen as very handsome, young men who visit forest users' homes to take young women to their dimension. Women just disappear from their houses and are not seen again. Other versions describe the night monkeys as the guardians of the moon ensuring the moon is never stolen. This suggests the animals have an important role for believers

of this myth as the moon influences women's fertility and determines the best sowing and harvesting dates. In the past, the *Payé*s preferred to gather with the gamekeepers during full moon, trusting night monkeys to be vigilant and take care of the beings involved in the gathering. These myths explain why, for traditional Tikuna, consuming night monkeys was taboo.

5.6 Primate Hunting by Modern Tikuna

The trade in primate meat finances commodities such as medicine, school supplies, and clothing, and meat is also given to the local Catholic boarding school to pay school fees and is mainly consumed by staff members, rather than the children. In addition, meat is sold in order to pay the additional costs incurred during hunting treks (Maldonado 2012). In both communities, primate meat is mainly for consumption by the hunter's family with the rest sold within the community. Hunters affirmed that they only trade in bushmeat at the beginning of the academic year when they need cash to buy school uniforms, etc. However, data collected through participant observation in Mocagua confirmed that meat was also sold to Macedonia, the nearest Tikuna community, for Catholic religious festivities (Maldonado 2012). In Mocagua, wild meat and locally made alcohol (*masato*) are often offered during the *mingas*, where a family invites community members to participate voluntarily in the clearing of land for agriculture, house construction, garden cultivation, etc. Large numbers of people attend *mingas*, when meat is offered (Humberto Gregorio and Azulay Vasquez personal communication 2009).

Atelines, mainly woolly monkeys and howler monkeys, were heavily targeted during the early 1900s as they were used as bait for hunting big cats for the skin trade. Since the early 1980s, Tikuna people at the tri-border area of Brazil–Colombia–Peru have been involved in the trapping of live night monkeys for malaria research in Colombia. This has caused a long-term impact on wild night monkey populations and their ecosystem, owing to invasive trapping methods and associated high deforestation rates (Maldonado and Peck 2014).

A total of 2101 prey items were taken by Mocagua and San Martin hunters, corresponding to 49 species of vertebrates, with a total extraction of some 26,700 kg of game meat. In rank order of preference, the primate species reported as consumed by Tikuna people were night monkey, howler monkey, and woolly monkey (see Table 5.2). These data clearly illustrate how taboos against consumption of primates can be eroded in indigenous societies, with night monkey meat now commonly consumed in the study communities. Such changes in behavior may be a reaction to the depletion of favored prey species such as woolly monkeys as the elders from San Martin acknowledged that the decreased consumption of woolly monkeys was due to the difficulty involved in locating them, rather than a lack of intention to hunt them (Maldonado 2012).

Table 5.2 Primates harvested at Mocagua and San Martin from February 2005 to February 2009, Amacayacu National Park

					Mocagua		San Martin	
Species	Common name	MBW (kg) (±SD)	Total harvest (ind.)	Total extracted (kg)	No. of harvested	Harvest (kg)	No. of harvested	Harvest (kg)
Aotus spp.	Night monkey	1.5	22	33	10	15	12	18
Alouatta seniculus	Howler monkey	6	18	108	9	54	9	54
Cheracebus lucifer	Yellow-handed titi monkey	2.2	12	26	7	15	5	11
Lagothrix lagothricha lagothricha	Woolly monkey	9.6	12	115	1	10	11	106
Saimiri cassiquiarensis macrodon	Ecuadorian squirrel monkey	1.4	11	15	5	7	6	8
Cebus albifrons	White-fronted capuchin	4.5	7	32	3	14	4	18
Pithecia milleri	Saki monkey	2.8	6	17	2	6	4	11
Leontocebus nigricollis nigricollis	Black-mantled tamarin	0.6	6	4	1	0.6	5	3
			94	*350*	*38*	*121.6*	*56*	*229*

5.7 Perceptions of Hunting Today

Hunters from Mocagua and San Martin provided different explanations regarding the decrease in game species (Mann-Whitney U test; $U = 171$, $z = -2.41$, $p = 0.016$). However, respondents agreed that there are significant changes in hunting today. These changes were (i) because animals were scarce and they had to walk long distances to hunt medium- and large-bodied prey ($n = 34$; 74%); (ii) hunters believed that the disappearance of the woolly monkey, the white-lipped peccary, the tapir, and the collared peccary close to their villages was evidence of game depletion ($n = 12$; 26%). Half the respondents ($n = 22$; 48%) stated that the reduction in preferred game species was the result of overhunting, due to an increased human population ($n = 9$; 20%). Other factors influencing the decrease in wildlife reported by respondents ($n = 15$; 32%) were as follows: (i) the use of western hunting weapons, (ii) *Payés* closing the pathways that wildlife takes to communities, (iii) the presence of white people in the forest, (iv) the noise of saws and shotguns, (v) commercial hunting to pay for children's education, and (vi) hunters targeting large prey and driving them away.

Some people had difficulty in understanding wildlife depletion is due to human influence preferring traditional beliefs. For example, some participants' comments during workshops in San Martin highlighted local people's long-held belief that some animals are immortal (e.g., giant armadillo, *Priodontes maximus*) or are incarnations of the gamekeeper. For instance, an elderly woman and her husband (who was the most respected hunter in the community) stated: "Some animals like the woolly monkey, the jaguar, the tapir and the giant armadillo, they never die, [and] they live forever, or only die if the jaguar, boa or people kill them. However, if the jaguar is not killed by people, they go back to their (supernatural) world" (Monica Vasquez and Humberto Gregorio, personal communication 2009). An elder in San Martin stated: "Most of the monkeys, but especially the large ones like the woolly and the howler monkeys, are like people, [and] they reproduce all the time, when they want" (Azulay Vasquez, personal communication 2009). In the workshops, the hunters stated their belief that woolly and howler monkeys had a life span of 100 years, while night monkeys lived up to 60 years. They also believed that these monkeys reproduced every year and that females became pregnant at 1 year old (Maldonado 2012). These hunters' local ecological knowledge of night monkeys conflicts with conventional scientific research which suggests that the Azara's night monkey (*A. azarae*) is more than 4 years old at first reproduction (Huck and Rotundo 2011), while *A. azarae* females and males in non-hunted wild populations have a mean life expectancy of 6.6 years and 6.7 years, respectively (Larson et al. 2016).

Respondents from both communities reported different preferences for animal species kept as pets (Mann–Whitney *U* test; $U = 105.5$, $z = -3.63$, $p = <0.001$). In Mocagua, the most common species kept as pets were the paca (27%), the acouchi (*Myoprocta* sp., 10%), and the white-fronted capuchin (10%). Most of the hunters (58%) in San Martin stated that they did not keep wild animals as pets, but in the past, the most common primates kept as pets were woolly monkeys (33%) and white-fronted capuchins (4%) (Maldonado 2012). Parathian and Maldonado (2010) interviewed other community members who talked about having owned or knowing someone who owned woolly, howler, night, and saki monkeys as pets. During the study period, black-mantled tamarins were by far the most frequently captured species kept as pets in San Martin.

5.8 Primate Watching as Alternative Income

As mentioned above, the Tikuna of Mocagua have been involved in woolly monkey conservation projects since 2003. The Woolly Monkey Project (2005–2010) determined the population status of primates and other game species to define the sustainability of hunting. This resulted in the implementation of a hunting ban which is still in force today. In addition, a primate rescue center was established by a local NGO, where visitors have the opportunity to see rescued monkeys, bringing alternative income to local people and giving them status as a community supportive of primate conservation (Maldonado and Waters 2017).

5.9 Discussion and Conclusion

It is clear that contact with missionaries drastically disrupted the Tikuna's semino-madic lifestyle, forcing them to relinquish their hunter-gatherer lifestyle and causing the erosion of food taboos and restrictions intrinsically linked to their religion, traditional knowledge, and resource management practices. This phenomenon has been widely reported for other Amerindian tribes in the Amazon basin (Brightman 2007; Good 1987; Grohs 1974; Stearman and Redford 1992). The almost total loss of traditional management practices by Tikuna in the southern Colombian Amazon is another example of the inevitable consequences of settler incursion and indigenous participation in extractive economies (Redford et al. 1995). For centuries, Tikuna in the area have tolerated the depletion of their resources and are now actively involved in market economies, where commercial extraction of resources is culturally accepted. Other factors such as population growth, lack of governance and local organization, and the need to formalize land tenure agreements between Tikuna communities also affect their use of resources. It is clear that the Tikuna need access to cash in order to satisfy needs that were never part of their traditional lifestyle in the past, such as formal education, transportation, and access to Western commodities (communication, clothing, recreation).

Experienced hunters from San Martin and Mocagua stated that hunting night monkeys was taboo for traditional Tikuna. Today, for the Tikuna, and for other Amazonian groups and *caboclos*, night monkeys are not consumed owing to the strong and disagreeable odor and taste from their subcaudal gland (Aquino et al. 2009). However, young and inexpert hunters (≤30 years old; $n = 6$; 13%) do not believe, or are unaware of, taboos so hunt night monkeys due to the lack of larger-bodied prey close to communities (Maldonado 2012). The young hunters' behavior demonstrates how increasing erosion of Tikuna taboos and food restrictions leads to the consumption of primates that were not exploited previously, and this, along with the inclusion of undesirable animal species in the Tikuna diet, is expanding game depletion. Young hunters still respect elder hunters to an extent so will not go hunting alone if an elder hunter (relative) has a dream related to snakes or jaguars. The younger hunters accept this as a sign of bad luck meaning they may become lost while out hunting. Older hunters believe that the loss of the *Payés* and their spiritual connection with nature (including the gamekeeper) is one of today's triggers for the depletion of preferred game species because the traditional ways of controlling hunting have disappeared.

All male hunters stated that they always hunted with shotguns, while the two female hunters hunted with machetes and dogs. In both communities, hunters always carry a shotgun and a machete (41%) on hunting trips, while five hunters from Mocagua affirmed they also take a bow (11%), and 20% of the hunters hunt with dogs. Only one respondent, an elderly hunter from San Martin, had a blowpipe but lacked the curare (poison) to use it. The only Tikuna people preparing curare in the area are a couple of elders from the north. Hunters undertake trips on foot in the majority of the cases (52%) or on foot and canoe during the rainy season (41%). Only three elderly hunters preferred the canoe for transportation, mainly because they felt too old to walk (7%).

Social restrictions on some hunting practices endure. For example, during a community meeting in 2013, Mocaguan local authorities voiced concern about younger hunters' use of an unusual hunting tool. The *trampero* is a handmade snare that ties a wire to a shotgun and is activated when an animal or person steps on the wire, triggering the shotgun. Local people thought this was a very dangerous and lazy way to hunt as it did not demand any knowledge or hunting skill and could kill another hunter, and the prey could decompose if its owner did not visit the snare in a timely manner. The elders described the trampero as a shameful way to hunt (Leonel Panduro, personal communication 2009). We reported this practice to the Amacayacu National Park, and the Mocaguan and Park authorities forbade its use.

Parathian and Maldonado (2010) reported that during women's group discussions, the majority of participants suggested that primate meat was still considered an important source of protein for the community. They went on to say that people's diets were changing in accordance with resource availability and the Mocaguan community's decision to protect woolly monkeys made hunting that species socially unacceptable. Kinkajous (*Potos flavus*), three-toed sloths (*Bradypus variegatus*), and two-toed sloths (*Choloepus didactylus*) were appearing in dietary records, and yet, during group discussions with village elders in both communities, participants suggested these meats were traditionally considered taboo. Such decisions may be the result of one or more of the following: a decrease in available preferred prey base, social pressure from the community to refrain from hunting woolly monkeys, and/or a lessening of taboos for the consumption of kinkajous and sloths.

The elders' belief that large primates reproduce "when they want" is commonly held among local people. These local beliefs assist us in understanding local people's skepticism regarding research suggesting that several game species might become locally extinct if hunting continues unsustainably. This situation illustrates a disconnect between local people and conservation scientists regarding wildlife management that has been observed elsewhere (Dowsley and Wenzel 2008; Kreye et al. 2017).

Mocaguan informants, hunters, and other community members believed that hunting would soon die out as older, expert hunters died and younger community members were disinterested in the practice (Bonilla 2014). Even skilful young hunters (19–32 years of age) now work at the Amacayacu National Park, monitoring natural resource extraction, illustrating the paradox of young people getting education and a job, but leaving their traditional culture. This raises concern regarding the disappearance of cultural and social bonds that hunting and meat sharing among the Tikuna represent.

5.9.1 Wildlife Tourism and the Future of Primates

Since the creation of the Amacayacu National Park (ANP) in 1987, the Colombian Park System has been searching for ways to integrate conservation and sustainable use of natural resources that respect traditional Tikuna culture. The Colombian Park

System created the Special Management Regime (REM) of natural resources for overlapping areas between the park and indigenous territories. It is also working toward integrating indigenous and government legislation. In 2005, ANP implemented the "Gavilan Tatao" Tourism program that not only provided training for local people in tourism but also contained a patrolling component where the legal/illegal use of resources was monitored. Today Mocagua and San Martin offer tourism activities at the family level as part of the REM. In 2007, Maldonado and collaborators created an NGO (Entropika Foundation), which provided data on game populations for the implementation of hunting bans and restrictions as part of the REM. Since 2016, ANP and Entropika, with the financial support of the European Union, have worked together in a capacity-building project to improve governability and to establish local tourism initiatives through training and the provision of basic materials and equipment for local people, replicating successful outcomes from the Peruvian side of the Amazon River. The medium-term goal is to provide the technical capacity for local people to meet sustainable tourism standards regulated at the national level by the Tourism and Commerce Ministry and the Colombian Park System Unit.

The 10-year follow up of the hunting ban for woolly monkeys currently applied by Mocagua is intrinsically related to the monetary return that primate tourism represents for 40% of the community, along with the fame they gained from protecting this species. Moreover, our census database suggests a positive correlation between biomass and hunting restrictions supported by sustainable incomes. Primate biomass was significantly higher in Mocagua (398 kg/km^2) than in San Martin (199 kg/km^2), where hunting restrictions were not strictly applied.

However, more positively, primate watching brings welcome tourist revenue and helps local people understand that having robust primate populations brings more community benefits long term (Maldonado and Waters 2017). Younger Tikuna in Mocagua now perceive monkeys as important for the ecosystem (Parathian and Maldonado 2010). Shifting indigenous people's perception of primates from providers of meat or as pets to the animals as beneficial to the ecosystem and providers of tourism revenue may be an effective way to protect such animals. Whether the Tikuna perceive primates as food, pets, or providers of tourism revenue, the animals will continue to occupy an important part in Tikuna life and culture.

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