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# Notes on the Yellow-tailed Woolly Monkey (*Oreonax flavicauda*) and Its Status in the Protected Forest of Alto Mayo, Northern Peru

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**Abstract:** Populations of the yellow-tailed woolly monkey (*Oreonax flavicauda*) persist in increasingly isolated, threatened cloud forests in scattered areas of the departments of San Martín and Amazonas, in northern Peru. No long-term research has been conducted on this species in more than 20 years. The range of *O. flavicauda* continues to suffer rapid and widespread deforestation. From June to August 2004, I was involved in selecting a site for an extended study of its behavior and ecology. Here I document the species' continued existence and status in the Bosque de Protección (Protected Forest) of Alto Mayo. Three sightings of *O. flavicauda* provided a group size of 17–20 individuals—higher than previous sightings by Mariela Leo Luna in the early 1980s, who observed an average group size of nine. The difficulty we encountered in finding groups in the study area suggests that yellow-tailed woolly monkeys have a large home range. This and its large body size, low density, low reproductive rate, its restriction to cloud forest and its limited geographic range, combined with a high rate of deforestation in the region, make the species especially susceptible to extinction. Urgently needed are a range-wide census of remaining habitat and populations, and educational initiatives and sustainable-use projects to ensure that the Alto Mayo Protected Forest is a truly protected area.

**Resumen:** Las poblaciones del mono choro de cola amarilla (*Oreonax flavicauda*) se encuentran cada vez más aisladas y amenazadas en las áreas esparcidas de los bosques de nubes en los departamentos de San Martín y Amazonas, en el norte de Perú. Ningún estudio a largo plazo se ha dirigido en esta especie en más de 20 años. El propósito de este estudio fue documentar la existencia continuada de esta especie y su estado en uno de sus áreas del hábitat, el Bosque de Protección de Alto Mayo. Un sitio se seleccionó para el estudio extendido de junio hasta agosto, 2004. Se tomaron los datos de comportamiento y ecológicos en esta especie. El medio tamaño del grupo visto (17–20 individuos) era más alto que se han registrados por Mariela Leo Luna en 1982, quien observó un promedio de nueve individuos. Las observaciones limitadas a pesar de la búsqueda extensa y continuada dentro del área sugieren que esta especie tenga un rango grande. El rango grande, su tamaño del cuerpo grande, su baja densidad, su natalidad baja, su especialización en los bosques de nubes y su rango restringido, combinado con una proporción alta de deforestación en esta área se pone esta especie especialmente susceptible a la extinción. Las iniciativas de educación y los proyectos del uso sostenibles dentro del Bosque de Protección son esenciales para esta área. Yo insisto que se tome una medida inmediata para asegurar una área verdaderamente protegido para esta especie, debido a la frecuencia alta de deforestación en la región.

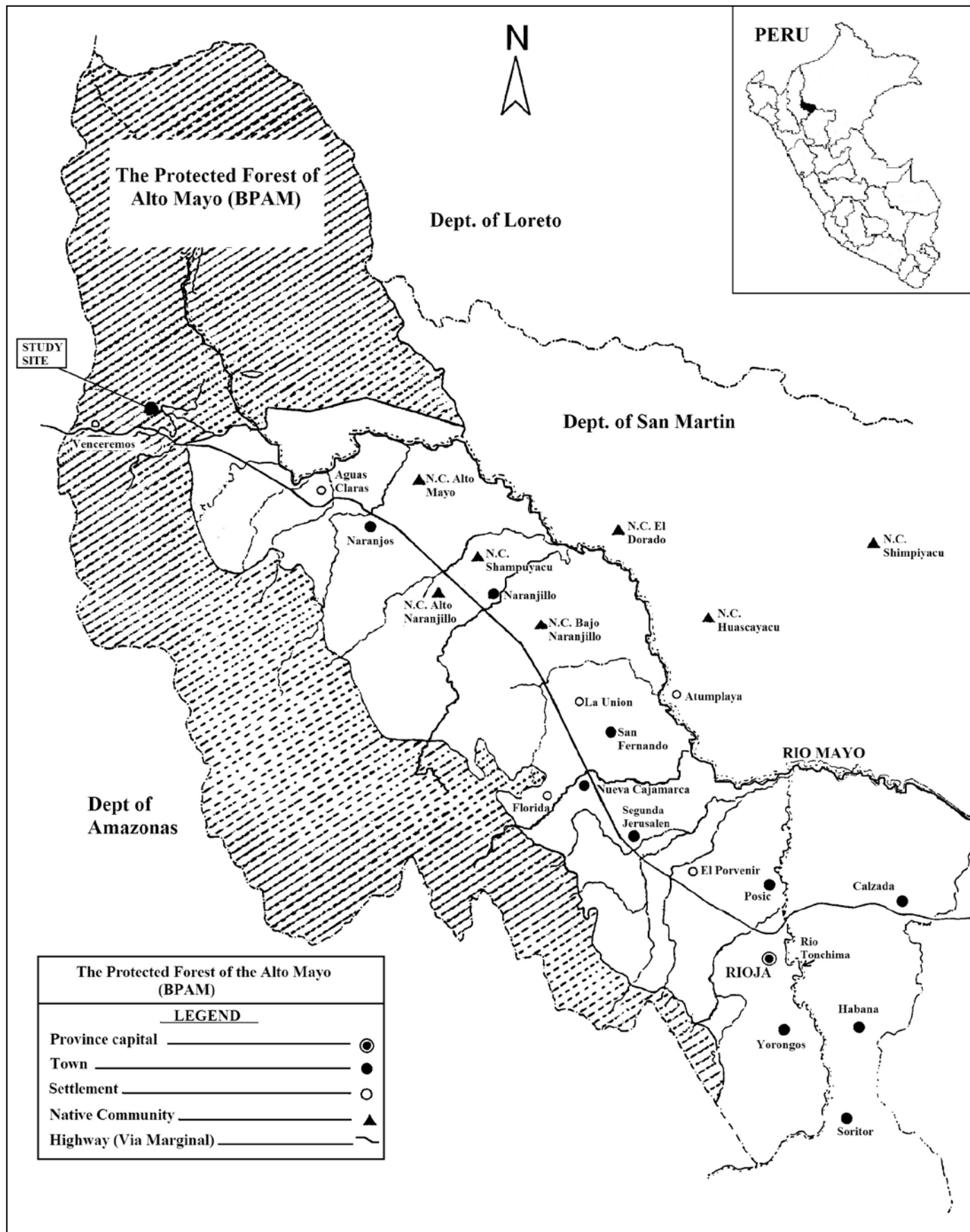
**Key Words:** Primate conservation, *Lagothrix*, New World, Atelidae, cloud forest, behavioral ecology

## Introduction

The yellow-tailed woolly monkey (*Oreonax flavicauda*) inhabits the cloud forests of the northeastern slopes of the Andes Mountains, from 1,500 to 2,700 m a.s.l., in the Peruvian departments of San Martín and Amazonas, between 5°30'–8°30'S and 77°30'–78°00'W (Mittermeier *et al.* 1975, 1977; Graves and O'Neill 1980; Leo Luna 1980; Leo Luna and Ortiz 1981; Parker and Barkley 1981). Restricted to a narrow habitat belt in tropical montane cloud forests, it is the largest

endemic primate found in Peru, as well as among the most endangered and least known (Leo Luna 1987). *O. flavicauda* is threatened by an extremely high rate of clear-cutting of its cloud forest habitat and is listed as Critically Endangered on the 2006 IUCN Red List of Threatened Species (IUCN 2006) and as Endangered on Appendix I of CITES (2005).

The yellow-tailed woolly monkey was first described in 1812 by Alexander von Humboldt. Flat, trimmed skins collected in 1802, which were used as saddle blankets by Peruvian muleteers in the Province of Jaén, consisted the



**Figure 1.** Location of study, Bosque de Protección de Alto Mayo (BPAM), Department of San Martín, Peru. “A” = Location of field site. (Map adapted from the *Boletín Informativo del ANP*: INRENA, 2004).

basis of the description. The name he gave was *Simia flavicauda*. No type specimen was preserved, and Humboldt was under the misconception that they were a species of howling monkey (Fooden 1963). Poeppig (1832) later mentioned monkeys from Yurimaguas (Department of Loreto), which he believed to be the same species (Fooden 1963). In 1925, an animal collector named Watkins collected two specimens from La Lejía (Department of Amazonas); the animals were not identified as *Lagothrix flavicauda* until 1963 by Fooden (Fooden 1963).

In 1926, R. W. Hendeel collected three specimens at Pucatanbo (80 km east of Chachapoyas, Department of San Martín; 1,500 m a.s.l.), and deposited them in the British Museum of Natural History. Oldfield Thomas (1927a) subsequently described the specimens as a new species and subgenus of woolly monkey, *Lagothrix (Oreonax) hendeelii*. Later that year, on the basis of several features of the deciduous dentition of a juvenile specimen, and comparing his observations with Humboldt's description of *S. flavicauda*, Thomas (1927b, 1927c) raised the subgenus to a full genus: *Oreonax hendeelii*. Cabrera (1958) and Hill (1962) also recognized Thomas's name *hendeelii*, but they maintained Hendeel's woolly monkey in the genus *Lagothrix*. Cabrera (1958) particularly pointed out its similarity to the Colombian montane woolly monkey, *Lagothrix lagothricha lugens*. It was Fooden (1963) who, analyzing Thomas's (1927a, 1927b, 1927c) and Humboldt's (1812) descriptions and comparisons, attributed instead Humboldt's name of *flavicauda*, and also considered it a member of the genus *Lagothrix*. It was believed to be extinct in the wild until it was rediscovered by an expedition in 1974 (Mittermeier *et al.* 1975, 1977; Macedo-Ruiz and Mittermeier, 1979). Following a cranial morphological reassessment of the atelids, Groves (2001) returned the yellow-tailed woolly monkey to Thomas's (1927c) genus *Oreonax*. *Oreonax flavicauda* has extremely long, thick, dark reddish-coppery fur, the mouth is surrounded by a characteristic patch of white hair, and there is a small band of yellow hair on the ventral side at the tip of the tail. Adult males have a long golden-blonde genital tuft of fur up to 15 cm in length (Macedo-Ruiz and Mittermeier, 1979). Since its rediscovery in 1974, there has been only one extended study on their behavior and ecology; that of Mariela Leo Luna (1980, 1982a, 1982b, 1987, 1989). Two brief opportunistic sightings of yellow-tailed woolly monkeys were made by Graves and O'Neill (1980) and Parker and Barkley (1981). No long-term study or even monitoring has been carried out on this species since 1982. A short survey was carried out in 1995, recording various sightings of a single group, during an expedition in the Cordillera de Colán, Amazonas Department, Peru (Butchart *et al.* 1995).

The purpose of this study was to investigate the possibility of conducting a long-term behavioral-ecological study on *O. flavicauda* to collect preliminary data, and to examine the current status of this species in the Bosque de Protección (Protected Forest) of the Alto Mayo in the Department of San Martín, northern Peru.

## Sightings of Yellow-tailed Woolly Monkeys

From June to August 2004, we searched for yellow-tailed woolly monkeys at three different sites, one of which was selected for extended study. The Bosque de Protección de Alto Mayo (BPAM) (5°23'04"S to 6°10'56"S, 77°45'53"W to 77°12'17"W) is located in the northern part of the Department of San Martín (Fig. 1) in tropical, humid montane rain forest (Young and León 2000). Estimates of average annual temperature range from 18°C to 24°C (Reading *et al.* 1995). The driest months are from July to September and the wettest from October to April (Nobre *et al.* 1991; Peru, PEAM 2004). The BPAM, created in 1987, is approximately 182,000 ha in size (Dillon and Vega 2003), but there has been much indiscriminate cutting, and the forests there are threatened (Young and León 1995).

The northern part of the BPAM was selected due to ease of access from the main highway (Via Marginal, a two-lane asphalt highway; construction completed in 2003), and on the basis of prior surveys by Leo Luna during 1978, 1980, and 1981, which indicated a high density of *O. flavicauda* in the region of the settlement of Venceremos (Leo Luna 1984) (Fig. 1). We talked to locals about the monkeys, and most of the *campesinos* (farmers) who claimed to have seen them were either hunters or had come across them while cutting trees. Two locations were investigated near the settlements of Aguas Claras and Aguas Verdes, but no monkeys were seen there and the terrain proved extremely steep and rocky. Information given by *campesinos* led us to choose the third site for investigation. It was near the settlement of Afluente, near the confluence of the ríos Serranoyacu and Afluente (5°39'52.0"S, 77°41'34.1"W, 1,243 m a.s.l.). Yellow-tailed woolly monkeys were located in the sector of Playa Azul (5°39'34.6"S, 77°40'37.1"W), a straight-line distance of approximately 3 km northeast into the forest from the main highway. From prior surveys of the BPAM zones, and according to the Holdridge system (1967), the forest of Playa Azul is "Very Humid Tropical Pre-Montane Forest (bmh-PT)." (Peru, ONERN 1976). The monkeys were seen three times at elevations between 1,505 m and 1,545 m a.s.l. in the canopy from 20 to 30 m above the ground. During June and July there were heavy rains, but August was drier, with long periods lacking rainfall. The rains were accompanied by dense fog that hid the upper canopy.

The first sighting (22 June 2004) was at 15:27. Observations ended at 16:30, when the monkeys left the area. The monkeys were first seen on an established trail, about 5 m from it (1,505 m a.s.l.). There were approximately 10–12 individuals in the group. We could not ascertain the exact numbers or the age and sex composition because they were moving too fast. We did see, however, adult males, adult females, subadult males, subadult females, pregnant females, juveniles, and infants. Adult males were distinguished by the large, yellow scrotal tuft (*mechón*) and their larger size. The pelage of the body and face of the adult males seemed to be slightly darker than in the females. Adult females were identified by their large size (roughly equal to that of the males), and a long

and prominent clitoris. They also had a genital hair tuft but it was smaller and less-noticeable. Subadults were more difficult to identify. Some individuals were seen with a smaller genital tuft, lighter reddish-brown body coloration, and were slightly smaller than the adults. Those with no apparent clitoris were scored as subadult males. Note that according to Leo Luna (1982a) subadults do not have a genital tuft. Juveniles were young offspring moving independently, of roughly half the size of adults. They tended to remain near or next to adults. Infants were still dependent on the mother (not moving independently). Both juveniles and infants lack the yellow ventral hairs at the tip of the tail, which characterize subadults and adults. We followed the monkeys along the trail (1,545 m a.s.l.) until an adult male started shaking branches, looking toward us, and giving short barks (Fig. 2).

The second sighting (7 July 2004) was at 15:40 and lasted until 17:30, when the monkeys moved off and we lost them. The group was traveling approximately 10 m from the trail (1,510 m a.s.l.). We located them by their soft grunting noises and because of the movement of branches as they traveled through the canopy. Group size was larger; approximately 25–30 individuals. On seeing us, an adult male started to bark loudly and repeatedly, remaining close to us. The group was followed to a second point along the trail (1,516 m a.s.l.). We observed the monkeys eating fruit from the *sacha caimito* tree (*Lucuma* sp.; Sapotaceae) and *higuerón* (*Ficus* sp.; Moraceae).

The third sighting (11 August 2004) occurred at 07:00. We first heard soft sounds of moving branches in the canopy. We assumed they were leaving from their sleeping site of the previous night. There were approximately 15–16 individuals. At 08:40, the group began to move northwesterly. The monkeys were seen in the following trees: *roble* (*Tabebuia* sp., Bignoniaceae), *higuerón*, *papahuillo* (unidentified), *cascarilla* (*Cinchona pubescens*, Rubiaceae), and *moena* (unidentified, Lauraceae). They eat both the fruits and leaves of *higuerón*, and the leaves of *papahuillo*. At 09:24, a hawk or *gavilan monero*

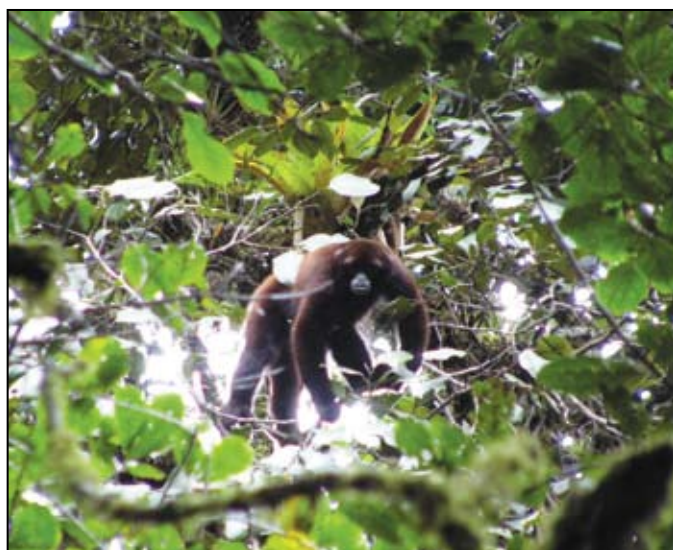


Figure 2. Adult male yellow-tailed woolly monkey (*Oreonax flavicauda*).

(species unidentified, but probably Black-and-Chestnut Eagle *Oroaetus* or a Hawk Eagle *Spizaetus*) flew directly over the monkeys, many of them resting silently in the trees. The entire group immediately began alarm calling. The calls lasted about a minute. At 09:41, the group moved to another point along the trail (1,516 m a.s.l.) and began feeding on the leaves and fruit of *higuerón* (*Ficus* sp.). Individuals would occasionally pick up dead branches covered with moss and inspect them by sniffing or breaking them apart with their hands. They were probably searching for insects. At 11:54, an adult male started to make a sharp bark call. The main group moved away, but some observers stayed behind to watch a subadult female, separated from the rest of the group, and also making a sharp, high-pitched barking noise. From 12:40 until 15:30, we followed this female, who continued calling for about 30 minutes and then rested in a tree for two hours. She then moved off and we lost contact. We heard her calling in the same area in the morning of the next day.

Leo Luna (1982a) reported an average group size of nine, ranging from five to 18 individuals. Butchart *et al.* (1995) saw a group of 10. Graves and O'Neill (1980) and Parker and Barkley (1981) reported group sizes of six and seven individuals, respectively. We saw larger groups—ranging from 17 to 20 individuals, and as high as 30—which may be due to lack of available habitat (less dispersal). The differences in group size may also be merely the result group fissioning or fusing during certain times of year, or when food resources are more or less available in the habitat.

We saw just one other monkey in the area—the white-fronted capuchin, *Cebus albifrons*, on three occasions. Other mammals we saw included *Nasua nasua* (coati) and *Felis concolor* (puma), and we saw signs (tracks or signs of feeding) of *Agouti* sp. (*majaz*), *Dasyprocta* sp. (*añuje*), *Tayassu pecari* (white-lipped peccary), and *Cuniculus paca* (paca). People reported the presence of the spectacled bear (*Tremarctos ornatus*) but we did not see it; however, a recently captured infant bear was being kept as a pet in the town of El Progreso, about 35 km from Afluente. Notable birds seen were the Andean cock-of-the-rock (*Rupicola peruviana*) and the crested quetzal (*Pharomachrus antisianus*). Snakes were more commonly seen in August, the beginning of the dry season. They included *jergón* or fer-de-lance (*Bothrops atrox wiedi*) and coral snakes (*Micrurus*).

### Additional Records

We also visited the town of Vista Alegre, Department of Amazonas, where people reported that *O. flavicauda* was still to be found in the surrounding forests (pristine primary cloud forest). We failed to see them, however. This area would benefit from protected status and carefully managed ecotourism initiatives, and the impression gained was that the local people would be supportive. Recently (11 April 2006), Peruvian naturalists Eduardo Ormaeche and Fernando Angulo encountered a group of four yellow-tailed woolly monkeys during an excursion to the Gocta waterfalls (1,800 m a.s.l.),

about 35 km from Pedro Ruiz, Department of Amazonas, and a 4-hour hike into the forest from the main highway. They watched an adult male alarm-calling and shaking and throwing branches at the observers. This area has great potential for ecotourism because of the scenic waterfalls and other endangered fauna, but some areas of forest are already being lost (E. Ormaeche pers. comm.).

The Aguaruna native community of Yarau, Department of San Martín, is east of the Río Mayo. On showing photos of the yellow-tailed woolly monkeys to several people, they confirmed the presence of the monkeys in the higher altitude cloud forests there (7- to 8-hour hiking distance from the main village). Positive identification was given by detailed descriptions of the monkey, including the *mechón* or genital tuft of the males and the white around the mouth, both characteristics that distinguish them from *L. lagothericha* and any of the other large primates of this region. One member of the community had a headdress made from the skin of a yellow-tailed woolly monkey, shot about a year ago. The fur was extremely thick and of reddish-brown coloration and descriptions of the monkey confirmed the identification. If the yellow-tailed woolly monkeys still exist in the high altitude forests of this region, then this would be an indication of an additional range for this species.

### Conservation Status

The cloud forests of the yellow-tailed woolly monkey are rapidly being cut down and fragmented. Previous studies and surveys (Leo Luna 1982a, 1982b; Butchart *et al.* 1995) as well as my observations, indicate that *O. flavicauda* occurs only in cloud forest above 1,400 m. These forests cover precipitous cliffs, impassable terrain, and are often densely foggy— aspects that militate for their survival. Just during the three months that this study took place, however, two large farm plots were clear-cut in the area where we searching for the monkeys. The deforestation was illegal because the remaining forested land is the property of the state (within the boundaries of the BPAM). Some *campesinos* in the area show strong opposition to outside interference and legislation, fearing that the government will take their land away from them. During my study, I and my Peruvian field guides presented talks and gave out leaflets to inform people of the monkeys' presence and the importance of protecting them. We explained the reasons for my study and, although some continued to be mistrustful, there was also much interest and concern for the forest by other *campesinos*. Educational talks given at the schools raised awareness and much interest. The children were given posters to color and one child made a paper lantern of a yellow-tailed woolly monkey to celebrate the Independence Day festival. It is clear that educational initiatives are an important and necessary facet of any conservation effort in this region.

Most of the *campesinos* we interviewed responded that they did not hunt the monkeys; the main reason being an aversion due to their close resemblance to humans. They hunt mainly agouti and paca (*majaz* and *añuje*), using *trampas*

(traps)—a gun connected to a trap-line. People in other nearby communities (*caserios*) do still occasionally hunt yellow-tailed woolly monkeys (Fig. 3), and one local we interviewed showed us a skin and skull of an adult male that he had kept as a trophy. Occasionally, hunters kill a mother to take the baby for a pet. Even though the monkeys tend to occupy inaccessible and rocky terrain, their large groups, large size, conspicuousness (alarm-calling and branch-shaking), and confiding behavior make them easy targets for hunters when they do enter more populated areas (e.g., forest along highways) or when the locals come across them as they walk to and from their farms. Most locals who collect firewood and timber (*madereros*), fruits, and other forest resources carry rifles.

The *campesinos* of this area, and in all areas in the Bosque de Protección, are immigrants, former *cerranos* (people from the sierras) who fled to the area during the height of guerilla activity (mostly the Sendero Luminoso) during the 1970s and 80s. The prospect of free and unoccupied terrain enticed them further still and stimulated a greater influx that is still growing at an exponential rate. Most of the occupation occurred before the Bosque de Protección was decreed in 1987, but settlers continue to migrate to the area. As a result, the Department of San Martín has the third highest population growth rate in the country (4.7% over 10 years: Instituto Nacional de Estadística e Informática [INEI]—Estimaciones de Población por Departamentos, Provincias y Distritos, 1995–2000; San Martín, Peru).



**Figure 3.** A farmer poses with a recently killed adult male *Oreonax flavicauda*, near the settlement of Afluente (Alto Mayo), Peru.

Most of the *campesinos* of the Afluente settlement either grow coffee or raise cattle (both milk and beef). Contrary to some reports, coca is still being grown in the remotest areas of the forest, although not as intensively as it was in the 1980s and early 90s. There are still large tracts where it is cultivated for processing and sale. *Campesinos* from the Afluente area are fearful of entering areas where coca is being grown (a half day to a day's hike) for fear of being shot or harassed by distrustful, wary coca growers.

The Bosque de Protección has no real protection; it has laws and regulations set on paper, but no enforcement. The forest has only three park guards allotted to its 182,000 ha. Within the Bosque de Protección itself, there is no large expanse of forest left remaining, and very few areas that have not been settled or cultivated. The forest as such is highly fragmented, even at the higher altitudes. The areas that have not yet been farmed are simply too rocky and inaccessible. The soils are extremely poor, and the elimination of the forest creates a serious risk of erosion and flooding, especially in the higher forests (Selva Alta) because of the steeper slopes (most are greater than 70%) where there are coffee plantations. The coffee grown on the slopes is not shade-grown, and all trees are cut. It is estimated that 48.2% of the deforested areas of the Selva Alta is undergoing severe erosion and degradation of soils, with the majority of cases being irreversible (Peru, APODESA 1991).

As such, the BPAM has afforded little protection to the forest and the yellow-tailed woolly monkey. The only other protected area for the species is the Río Abiseo National Park (274,500 ha), in the south of the Department of San Martín. This park also has problems of invasion and deforestation and is currently closed to tourism due to the lack of park management.

Due to the few contacts that we achieved with these monkeys over the three months of the survey (six people over approximately 48 days, hiking from sunrise to sunset), it would seem likely that the species has very large home ranges. All forests in the area have already been reduced to fragments or are currently being degraded. Harcourt (1998) has argued that large home range size is the strongest correlate of vulnerability to logging. This observation, along with their large size (10 kg: Peres 1994) and low average density (0.25 to 1 group per km<sup>2</sup>: Leo Luna 1987) over their geographic range makes them particularly vulnerable to deforestation. Other intrinsic life history variables that increase the likelihood of extinction are its low reproductive rate (assumed to be similar to *L. lagotricha*, which has an interbirth interval of 34 months) and its restricted range (actual potential habitat area is unknown, but in 1987, Leo Luna estimated 11,103 km<sup>2</sup>). The fact that this species has a narrow latitudinal and altitudinal limit and is confined to primary cloud forest indicates that it will not adapt well to change. A current census of the population of yellow-tailed woolly monkeys in the entire remaining forests of the Bosque de Protección and the surrounding forests in the Department of Amazonas is urgently needed. Efforts are needed to create and combine large reserves or parks in both

the departments of San Martín and Amazonas. Widespread and rapid ongoing deforestation throughout its geographic range means that a vital step will be to ensure a truly protected area for this species.

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