Articles

THE URGENCY OF FINDING NEW DIRECTIONS FOR PRIMATE CONSERVATION IN WESTERN AMAZONIA

Summary: Primate populations are declining throughout Amazonia due to overhunting. In the Peruvian Amazon, primate captures for biomedical research contribute only between 0.4-2.0% of the primate harvests, while 98.0-99.6% can be attributed to local hunters. In these forests (covering an area of 203,260 km^2) we estimate that between 40,000-200,000 primates are harvested annually. In western Amazonia, conservation efforts must focus on effective ways to curb hunting of primates by local people. Managing wildlife hunting with local communities outside of fully protected areas is likely to result in reduced harvests of primates.

Introduction: Primate populations are declining worldwide due to habitat destruction and overhunting (Mittermeier, 1986). In the western Amazon, overhunting is the major cause of the decline in primate populations (Peres, 1990; Puertas and Bodmer, 1993). In Peru, the impact of live-capture of primates for biomedical research has received much conservation attention (Proyecto Peruano de Primatologia, 1990), but primate conservation in this region must focus more on finding real solutions to the overhunting of primates by rural communities who live outside fully protected areas. During the past ten years there has been considerable attention devoted to environmental education as a means of curbing overhunting of primates in the western Amazon. While this can be successful in some cases, it often fails because market forces overwhelm the effect of education.

Here we present findings that suggest that one means of curbing primate hunting in western Amazonia is through community-based wildlife management. First we show the urgency of reducing primate hunting. We then show how current harvests of primates are linked to the market economy of rural people, and the importance of involving local communities in developing wildlife management programs that integrate economics with primate conservation.

Primate Conservation in Western Amazonia: To set up primate conservation efforts in western Amazonia outside fully protected areas it is necessary to question the focus of primate conservation in the region. The impact of live-trapping of primates for biomedical research has been one focus of primate conservation in the Peruvian Amazon. This market has concentrated on the smaller species such as pygmy marmosets (*Cebuella pygmaea*), tamarins (*Saguinus*), night monkeys (*Aotus*), and squirrel monkeys (*Saimiri*). Populations of small-bodied primates are generally more abundant and have higher reproductive rates than larger-bodied species (Robinson and Redford, 1986), enabling them to recover rapidly from harvesting.

Conversely, curbing hunting of primates by rural people has received little attention in western Amazonia, except for the occasional environmental education initiative. This lack of emphasis on hunting is because killing of primates by local people is illegal in the western Amazonian countries. While legislation aims at controlling hunting of primates, management authorities in this region lack resources to enforce the laws, which even if enforced would cause social conflict between government bodies and rural communities. Primate conservation efforts in the western Amazon should concentrate more on the effects of hunting: considerably more deleterious than harvesting for biomedical research. Hunters usually take larger-bodied primates such as woolly monkeys (*Lagothrix*), howling monkeys (*Alouatta*), spider monkeys (*Ateles*), capuchin monkeys (*Cebus*) and sakis and uacaris (*Pithecia* and *Cacajao*). Populations of these species are less resilient than the smaller primates because they have lower reproductive rates (Robinson and Redford, 1986; Bodmer, 1994).

We estimated the annual offtake of primates by local hunters and compared this to the annual average harvest for biomedical research. Data on hunting of primates came from two study sites in northeastern Peru. One was the 500 km^2 Tahuayo site, which is heavily hunted. There we recorded a total of 515 primates killed over a one year period (Bodmer *et al.*, 1994). The second area was the 250 km^2 Yavari Miri site which is lightly hunted, and where a total of 52 primates were killed during one year. These localities are within the land use category of Production Forests, which in northeastern Peru cover 203,260 km^2 (COREPASA, 1986). Taking these figures as representative of heavily and lightly hunted areas, we estimated that rural communities hunt somewhere between 40,000 and 200,000 primates

Cover photograph by Russell Mittermeier: black howling monkey (*Alouatta caraya*), see page 7

research during ten years (Tapia *et al.*, 1990). The average of 817 primates captured annually means that 98-99.6% of the annual loss to wild populations from these two causes is due to hunting rather than capture.

At least in western Amazonia, hunting is reducing populations to such low levels that local extinctions will become frequent. For example, in the heavily hunted Tahuayo site the biomass of the larger-bodied primates was estimated at 157 kg/km^2, less than half that estimated for the lightly hunted Yavari Miri site, which was 420 kg/km^2 (Puertas and Bodmer, 1993). The species most affected were the woolly monkey, spider monkeys, saki monkeys, white-fronted capuchin (*Cebus albifrons*), and the brown capuchin (*Cebus apella*).

New Directions: Conservation education in the western Amazon is a way of reducing the hunting of primates by rural communities. However, while this has been effective in some restricted areas, it has not produced real changes in the hunting pressures inflicted on primates in the Peruvian Amazon as a whole. Poverty is the reason that conservation education has not produced the expected results. Indeed, hunting of primates is linked to local market economies, and only by integrating these economies with primate conservation can we hope to curb current overhunting.

The value of game meat in local markets is an important factor (Bodmer, 1990). Although primates are only infrequently commercialized, they do play an important part in the economics of game hunters who seek ungulates and large-bodied rodents for their greater market accessibility (selling them for cash) while the primates and other smaller mammals are consumed by the hunters and their families. Thus, the primates are experiencing substantial harvesting as subsistence game.

Primate conservation efforts in western Amazonia will be fruitless unless they take a new direction. The focus must be on currently unmanaged game hunting. The challenge lies in attaining effective management programs in the context of impoverished economies, with management authorities unable to control with effect the rural hunters and small unlicensed meat vendors. Legislation governing wildlife is ineffectual when dealing with these lower income groups, especially in rural areas. By contrast, informal legislation developed by the rural communities themselves can be highly effective. Implementing community-based wildlife management for primate conservation requires the integration of the socioeconomics of local people with the population biology of the primates (Bodmer, 1993).

How might this be done? One example may be found in the Reserva Comunal Tamshiyacu-Tahuayo in northeastern Peru. Studies conducted in this reserve have examined 1) the impact of hunting on mammals, 2) the connections between market sales and subsistence uses of mammals, and 3) ways to develop management programs with local people that incorporate both the biological responses of mammals to hunting pressure and the economic implications involved in converting an unmanaged system to one that is managed (Bodmer, 1993).

Population analyses of game species in the Reserve suggest that peccaries, deer, and large rodents are not currently overhunted. In contrast, populations of primates and tapirs are. Thus, a more sustainable system would require that hunting primates and tapirs should cease, and the harvest of peccary, deer, and large rodents should be set at or below current levels. The communities in the Tamshiyacu-Tahuayo Reserve have established a management program that allows hunters to cull a greater proportion of males of species that are not currently overharvested, while prohibiting the hunting of species which were being overexploited. This male-directed hunt does not increase the current harvest of peccaries, deer and large rodents, because only males are commercialized, while females are used for subsistence. Of interest is that this management program should dramatically curb the hunting of primates, because primate meat will be substituted by meat from female peccaries, deer and large rodents. The management program takes into account the rural communities' needs while simultaneously reducing the hunting of threatened species. It will have short term costs for hunters, but there will be real social benefits, because opportunity costs will be outweighed by benefits incurred from future hunting revenue.

To summarize, we suggest that to conserve primates outside fully protected areas in western Amazonia we need new directions which will consider: 1) that local hunters should be the focus of conservation efforts; 2) that unmanaged hunting *can* be converted to managed hunting; and 3) that wildlife management programs must integrate the socioeconomics of rural peoples with the need to conserve primates.

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Richard E. Bodmer, Tropical Conservation and Development Program, Latin American Studies, 319 Grinter Hall, University of Florida, Gainesville, Florida 32611-5531, USA, **Pablo E. Puertas**, Instituto Veterinario de Investigaciones Tropicales y de Altura, Apartado 621, Iquitos, Peru, and **Tula G. Fang**, Facultad de Ciencias Biológicas, Universidad Nacional de la Amazonía Peruana, Plaza Serafín Filomeno, Iquitos, Peru.

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RECOVERY AND RELEASE OF AN INFANT MURIQUI, *BRACHYTELES ARACHNOIDES*, AT THE CARATINGA BIOLOGICAL STATION, MINAS GERAIS, BRAZIL

Unexplained disappearances of primate infants have been reported from a number of long-term field studies, but rarely do observers encounter living infants which have been abandoned by their mothers and other group members. This report describes one such discovery, involving a 4-month old infant muriqui (*Brachyteles arachnoides*) at the Caratinga Biological Station (EBC), Minas Gerais, Brazil, which was successfully returned to her mother in the wild within 27 hours of contact. Muriquis are among the most endangered primates worldwide, and our active intervention was a conscious effort on behalf of this species' conservation.

At 0750 h on 11 November 1992, observers detected cries and movement from the forest floor close to where the 48-member muriqui group had spent the night. A female infant was sighted; she was cold to the touch, her eyes were closed, and her reflexes were poor. The rest of the group was nowhere in sight. One observer (CN) brought the infant back to the research house while another (LO) searched for the group. The infant was given a blanket for warmth, kept in a dimly lit room, and bottle-fed whenever she cried with a mixture of 20 ml powdered milk (Nutrícia, Fábrica de Laticínios Nutrícia S.A.) and 80 ml filtered and boiled water (Table 1). After the second feeding, the infant's temperature and reflexes appeared to return to normal, and her eyes were open and clear. Examination revealed no visible wounds or broken bones; rough measurements are shown in Table 2.

By early afternoon, the rest of the study group was located and the infant's identity was established by confirming the presence of all other members, which are distinguishable by their natural