

Tenta-se neste artigo examinar, em síntese, as pressões sobre os recursos faunísticos da terra firme na Amazônia como resultado das atividades humanas.

This paper attempts a brief overview of pressures on the faunal resources of terra firme forests of Amazonia as a result of human activities.

Human exploitation of terra firme fauna in Amazonia

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ABSTRACT. A brief overview is presented of human exploitation of faunal resources of the non-flooded terra firme environment of Amazonia, an area which accounts for approximately 95% of the basin. Attention is focused on the trade in wild animal skins, live animals and conservation.

RESUMO. *Utilização humana dos recursos faunísticos da terra firme na Amazônia.* O uso dos recursos faunísticos da terra firme que abrange aproximadamente 95% da área da bacia da Amazônia é examinado. O comércio em peles silvestres, animais nativos vivos é descrito e a importância de conservar e integrar a fauna indígena na economia regional é enfatizado.

INTRODUCTION

CONTRARY TO THE ASSERTIONS OF A NUMBER OF writers (15, 22, 35, 36, 48), terra firme forests of Amazonia, which occupy some 95% of the basin, are not 'virgin', nor are they safe from human destruction. Archaeological sites, revealed as the forest is cleared along the Transamazon highway in Pará (39) and at JARI in Amapá, provide evidence of formerly dense and widespread settlement by aboriginal groups in interfluvial areas. Islands of cerrado and grassland within the forested watershed may be due, in part, to man-made fires (19). Brazil nut and piaçava gatherers, rubber tappers and cat hunters have also penetrated deeply into the interior forests. More recently, 15,000 km of pioneer highways are being bulldozed across the world's largest continuous rain forest creating access for peasants and cattle ranchers.

This paper attempts a brief overview of pressures on the faunal resources of terra firme forests as a result of human activities. Data on the cropping rate and status of many species are entirely lacking; nevertheless, a major theme of

this report is the vulnerability of many taxa in spite of the large areas of forest still standing in Amazonia. A human population of 8 millions dispersed over some 5 million sq. km of the Brazilian Amazon (Amazônia Legal 5.173/66) may create the impression of a demographic void, but market forces and modern technology are enacting potentially serious ecological changes in the region.

WILD SKIN TRADE

Spotted cats, especially jaguar (*Felis onca*) and ocelot (*Felis pardalis*), are sought by cat hunters in spite of protective legislation. In 1967, Brazil passed law 5.197 outlawing the commercial exploitation of all wildlife, and Peru extended protection to wild cats in 1970 (33). In 1973, Colombia prohibited trade in skins or live specimens of jaguars, ocelots, giant otters (*Pteronura brasiliensis*), the Plata otter (*Lutra platensis*), peccaries (*Tayassu* spp.), birds, anacondas (*Eunectes murinus*) and caimans under 1.5 m (9).

In spite of such protective legislation, the large-scale slaughter of wildlife continues. For

example, in 1969 alone, 6,389 jaguar skins and 81,226 ocelot skins were exported from Brazil to the U.S., mostly from specimens killed in Amazonia (40). Brazilian skin dealers were allowed a grace period until April 1971 to liquidate stocks acquired prior to 1967. By employing grossly exaggerated inventories, however, dealers were able to continue purchasing skins and the cropping of wild cats actually increased (10). A similar disregard for restrictions on the trade of cats skins has been observed in Colombia (9). In April 1972, a shipment of 'leathers' en route to Canada from Brazil at New York's Kennedy airport was found to contain hundreds of spotted cat skins (I.U.N.N. *Bulletin* 4(3):11; *Oryx* 12(1)). Another grace period was granted to Brazilian skin dealers by IBDF (Instituto Brasileiro de Desenvolvimento Florestal) from January to August, 1974.

The trade in spotted cat skins in non-Brazilian areas of Amazonia has also exerted considerable pressure on wild populations, although protective legislation has undoubtedly reduced the killing of wild cats in recent years. For example, although approximately 138,000 ocelot and 12,700 jaguar skins were exported from Iquitos between 1946 and 1966 (17), the numbers of jaguar skins reportedly exported from Colombia declined from 1,205 in 1972 to 41 in 1974. The export of ocelot skins apparently dropped from 25,306 to 941 during the same period (9). Of course, official statistics only give a rough idea of the real dimension of the trade since dealers have a vested interest in underestimating the number of skins they are exporting in order to avoid paying duties or penalties. The current annual offtake of jaguars from the Brazilian Amazon is probably in the region of 7,000, whereas some 40,000 ocelots are killed for their pelts (40).

Skins of lesser value, such as those of peccary and deer, are an important source of leather, particularly for Europe. Between 1965 and 1967, for example, Brazil officially exported 841,017 skins of collared peccary (*Tayassu tajacu*) and 1,091,452 hides of white-lipped peccary (*Tayassu pecari*), mostly acquired from kills in the Amazon region (Anuário Estatístico do Brasil). The hunting of peccaries has also been intense in other areas of the Amazon drainage basin. In Peru, for example, 1,706,336 collared peccary skins and 656,717 white-lipped peccary skins were exported between 1962 and 1972 (11,33). Brocket deer (*Mazama* sp.) skins have also been sought after by the hide industry; some 987,797 were exported from the Brazilian

Amazon between 1960 and 1964 (6) and 335,473 from the Peruvian Amazon between 1962 and 1972 (11,33). It is not known what proportion of the kills were also utilized for meat and whether cropping rates are sustainable in the long run.

LIVE ANIMAL TRADE

Medical laboratories and pet dealers have been responsible for a considerable drain on Amazonian wildlife, especially monkeys, although restrictions in both exporting and importing countries have recently reduced the trade. For example, Coimbra-Filho (7) asserts that at least 30,000 monkeys were annually exported from the Brazilian Amazon, but more recently Mittermeier and Coimbra-Filho (25) do not consider the trade very intensive in the same region. In the Peruvian Amazon, a total of 339,548 monkeys were officially exported between 1961 and 1971 (Table 1), though the trade from that region has declined considerably since

TABLE 1 — Exports of monkeys from the Peruvian Amazon, 1961-1971

Year	Total
1961	17,687
1962	27,445
1963	36,817
1964	36,141
1965	26,304
1966	26,818
1967	30,139
1968	44,980
1969	50,045
1970	33,035
1971	10,137
Total	339,548

Note: Squirrel monkeys account for approximately 79% of the trade.

Source: 1961 (17), 1962-1971 (43).

the Peruvian government passed Supreme Decree 934-73-AG in October 1973 banning the export of wild monkeys (Table 2). Squirrel monkeys (*Saimiri sciureus*) account for most of the primate exports (Tables 3-5). As a result of restrictions on the export of monkeys from Colombia and Peru in 1973, the trade shifted to Guyana and Bolivia (Table 2). However, in 1976, Guyana declared a moratorium on the export of native animals and their products pending an

TABLE 2 — Origin of Primate imports into the United States from Latin America by country, 1972-1975

Country	1972	1973	1974	1975
Honduras	—	—	—	98
Nicaragua	525	—	24	308
Costa Rica	—	—	—	10
Panama	—	12	247	929
Colombia	16,124	6,444	2,313	21
Guyana	336	708	1,066	2,940
Ecuador	—	97	—	99
Peru	27,288	22,669	2,251	640
Bolivia	100	333	3,760	4,135
Brazil	100	—	81	—
Paraguay	941	608	1,127	1,881
Total	45,414	30,871	10,869	11,061

Note: Colombia banned the export of monkeys in June 1973 and Peru passed similar legislation in October 1973 (9,30).

Source: 20,21.

investigation into the effects of the trade on wild populations (2). Furthermore, England, Norway and Germany have prohibited the import of monkeys for pet dealers and the U.S. is considering similar legislation (20).

Figures on the trade in live monkeys only represent a fraction of the number actually removed from Amazonia. For example, Grimwood (18) estimates that 4 or 5 die during capture or in compounds for every one exported from the Peruvian Amazon. On a global average, two monkeys apparently die for every one reaching dealers in importing countries (1). Some 10% of the monkeys imported into the U.S. die in dealers compounds (47). At Leticia in the Colombian Amazon, Tsalickis (48) reports a mortality rate of 7% among the 8,587 primates he purchased in 1968.

Cat hunters also make inroads on monkey populations for baiting their traps. Along the Cuiabá-Santarém highway, for example, *gateiros* employ whitebrowed spider monkeys (*Ateles belzebuth marginatus*) (40), and in the Colombian Amazon, both white-browed spider monkeys (*Ateles b. belzebuth*) and woolly monkeys (*Lagothrix lagotricha*) are killed for this purpose (22). Furthermore, hundreds of thousands of monkeys are killed each year for food, especially in the Peruvian Amazon. The impact of primate removal on forest ecosystems is not clear. Several monkey species, particularly *Ateles* spp., *Lagothrix* spp. and *Saimiri sciureus*, are fruit eaters (22,44) and may serve

as important dispersal agents for a number of trees.

TABLE 3 — Exports of monkeys by genus from Iquitos, Peru, 1964

Genus	Number
Saimiri	27,353
Cebus	2,574
Lagothrix	2,081
Leontocebus	1,958
Cebuella	972
Ateles	630
Aotus	356
Cacajao	89
Pithecia	81
Callicebus	54
Alouatta	3
Total	36,151

Note: Discrepancy with 1964 figure in Table 1. Official statistics only give a rough idea of the real dimension of the trade.

Source: 18.

SUBSISTENCE HUNTING

Although it is true that the mammal biomass of Neotropical rain forests is low (12,14), game nevertheless significantly supplements the diet of aborigines and peasants inhabiting terra firme forests of Amazonia (Figure 1). In the

TABLE 4 — Exports of monkeys from Iquitos, Peru, 1972 — September 1973

Genus	1972		1973 (Jan-Sep)		Total
	International	National	International	National	
Saimiri	19,867	93	11,863	1,545	33,368
Saguinus	2,154	109	1,559	371	4,193
Lagothrix	1,943	40	1,498	102	3,587
Cebus	1,738	34	1,531	130	3,433
Aotus	489	15	350	153	1,007
Ateles	225	9	164	48	446
Callicebus	37	11	59	2	109
Pithecia	31	6	35	1	73
Alouatta	—	1	—	—	1
Total	26,488	318	17,059	2,352	46,217

Source: 8.

TABLE 5 — Monkeys exported from Leticia, Colombia, by Tsalickis in 1968

Genus	Number
Saimiri	2,411
Saguinus	2,245
Cebus	157
Cebuella	62
Aotus	46
Callicebus	13
Lagothrix	9
Others	75
Total	5,018

Source: 48.

478,000 sq. km Loreto Department of the Peruvian Amazon, for example the estimated (1972) population of 249,000 people kill at least 370,000 monkeys a year for food (29). Monkeys are also butchered for urban markets. During a six month period in 1973, 8,060 kg of monkey meat was sold in Iquitos markets, mostly attributed to woolly monkeys (29).

Along the Transamazon, the take of wild animals is sufficient in relatively undisturbed forest areas to supply residents of the small villages (*agrovilas*) containing 48-66 houses with some 18% of their protein requirements (41). In a survey of 21 peasant families living along the rio Pachitea in the Peruvian Amazon, Pierret and Dourojeanni (31) estimated that the intake of game was sufficient to supply 460 g meat/person/day, well in excess of protein needs. In a more disturbed environment along the rio Ucayali, a survey of 430 families revealed an average consumption of 52 g game/person/day

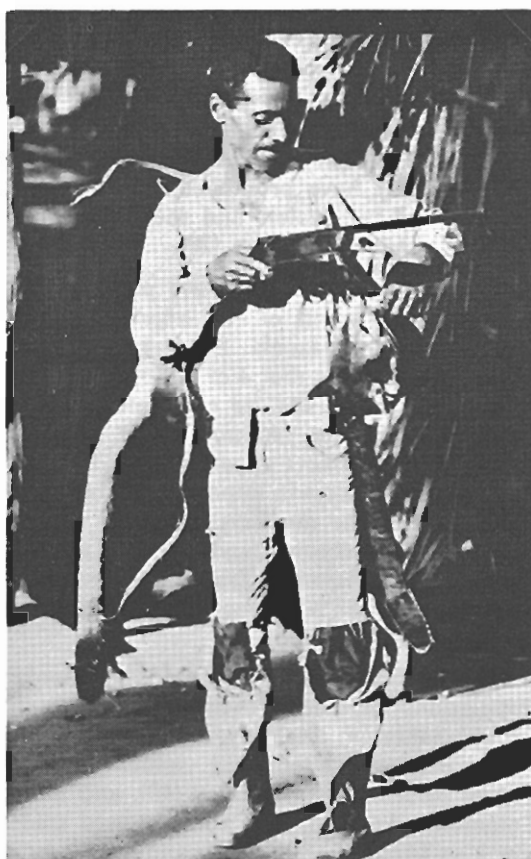


Figure 1. Transamazon colonist with recently killed puma (*Felis concolor*), km 80 Altamira-Itaituba, August 1974.

(32). For aboriginal groups, which traditionally crop more species, the game take is even more important.

In view of the small fish stocks in terra firme streams of Amazonia (13), Terrestrial and

arboreal game is of special significance as a source of protein for settlers. Based on an investigation of the game take in a highly disturbed habitat along the Transamazon, the importance of maintaining mature forest for game populations becomes apparent. In striking contrast to second growth areas of northern South America and Central America where white-tailed deer (*Odocoileus virginianus*) thrive, early seral stages in Amazonia lack large game animals.

CONSERVATION OF FAUNAL RESOURCES

Whereas many aboriginal groups and *caboclos* respect forest and animal spirits, thereby alleviating pressure on game populations (16, 23, 26, 27, 34, 49, 51, 52, 53), migrants to Amazonia from other regions bring an alien culture and do not always adopt the adaptive features of indigenous societies. Pioneer roads, such as the Manaus-Porto Velho, are creating access for settlers ignorant of the cultural and ecological environment of the region. The 'grass rush' into Amazonia, especially in Brazil (46), poses a particularly serious threat to the survival of faunal resources. As of June 1973, SUDAM (Superintendência do Desenvolvimento da Amazônia) has approved cattle projects involving 7 million ha (4). Along the Transamazon alone, 3.7 million ha are being distributed in parcels ranging from 3,000 to 66,000 ha for cattle raising. While it is true that 50% of the area allotted to each concession is supposed to remain in forest in accordance with article 44 of law 4.771/65, in practice enforcement is lax.

Conversion of large areas of forest to artificial pasture may benefit ranch owners and those able to afford beef, but little benefit accrues to the mass of peasants living in the interior who rely on game for a significant portion of their food supply. Neither do ranches provide many jobs for those who depend on forest resources for a living. Furthermore, poorly managed pastures may degrade soils such that forest regeneration is unlikely (24, 37, 42). Cattle raising in the vicinity of urban centers to supply local markets with meat and dairy products is warranted, but the policy of fiscal incentives which encourages the large-scale destruction of Amazonian forests for the sake of beef exports needs to be examined.

Not all development schemes on the terra firme of Amazonia need necessarily destroy game populations. At JARI, for example, broc-

ket deer apparently feed on fruits of the exotic tree *Gmelina arborea* grown in extensive plantations for eventual conversion to pulp (Briscoe, pers. comm.). If deer which feed in such plantations are crooped wisely, the multiple use of the land would not only bolster company profits but also provide much appreciated meat for the workers. Similarly, babaçu palm (*Orbygnia martiana*) could be cultivated for several products such as oil extracted from the nuts, fronds for buildings, the extremely dense endocarp which can be converted to charcoal, and the pulpy mesocarp, a favorite food of agoutis (*Dasyprocta* sp.). Meat from the latter rodent would find a ready market among peasants and restaurant owners (38).

Attempts could be made to domesticate other native animals of the terra firme in order to supplement meat production obtained from cattle, chickens and pigs. Silviculturists might experiment with trees the bear fruit favored by game animals such as tapir (*Tapirus terrestris*), brocket deer, peccaries, and paca (*Agouti paca*). Game farming could be conducted for profit as well as subsistence. In a survey of restaurants in Manaus, for example, Wetterberg *et al.* (50) note that owners are very interested in serving game dishes which they cannot do at present since the commercial exploitation of wildlife is prohibited. Game farms, on the other hand, are legal and would pose little threat to wild populations.

The drain on wild monkey populations for medical research and the pet trade could be averted if they were bred successfully in captivity. However, experiments at rearing squirrel monkeys under semi-natural conditions indicate that there are a number of problems involved, such as high mortality rates, and much more information on the population dynamics of primates in the wild is needed (3, 45).

CONCLUSIONS

Laws prohibiting the exploitation of wildlife in Amazonia are clearly inadequate to protect an important renewable resource. It is unrealistic to expect understaffed government agencies to patrol every river and to check all ports and airstrips in Amazonia. Corruption and political influence are hard to control when the profits are so large, as in the case of spotted cat skins. Where there is a market for wild animals and their products, there will always be a trade. Even if all the countries with territories in Amazonia agreed to ban the export of wildlife, large clan-

destine shipments would still be possible. In 1975, for example, the United Kingdom imported 49,141 ocelot skins from Brazil (5).

The major onus of ensuring that animal exports do not irreparably deplete wild populations rests with importing countries. The U.S. has banned the import of wild cat skins, and skin dealers in Canada, Europe and Japan should moderate their purchases by adopting a strictly controlled quota system, if only in their own interests.

In order for wildlife to survive the demands of society for more space for settlement, industry, agriculture and mineral exploitation, it will become increasingly imperative to integrate native fauna into the national economy. Setting aside large parks to preserve relatively undisturbed ecosystems is laudable but not enough. If society perceives an economic as well as a scientific, aesthetic, and subsistence value in native animals, due to income derived from game farming, sport hunting, tourism, and exports to scientific institutions, then Amazonian wildlife may be at least partially sustained and may contribute to the development of the region. A multiple use approach to resources which includes sustained-yield cropping of wildlife whenever possible, would extend the benefits of development projects to a broader segment of the population.

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