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Abstract: The decline of the jaguar in the 1970s reflected the large trade in their skins. Since 1973, when the species was listed on Appendix I of the Convention on International Trade In Endangered Species of Wild Fauna and Flora (CITES), the threat from the commercial skin trade has abated. However, habitat destruction and opportunistic killing continue. If the jaguar is to persist into the future, local people must be convinced that conserving jaguars has long-term benefits for them.

Status of the jaguar—1987

Wendell G. Swank and James G. Teer

The decline of the jaguar in the 1970s reflected the large trade in their skins. Since 1973, when the species was listed on Appendix I of the Convention on International Trade In Endangered Species of Wild Fauna and Flora (CITES), the threat from the commercial skin trade has abated. However, habitat destruction and opportunistic killing continue. If the jaguar is to persist into the future, local people must be convinced that conserving jaguars has long-term benefits for them.

The jaguar *Panthera onca* was placed on Appendix I of the Convention on International Trade in Endangered Fauna and Flora (CITES) in 1973 and is considered 'Vulnerable' by the International Union for Conservation of Nature and Natural Resources (IUCN). The decline in numbers of spotted cats in Central and South America in the 1970s was attributed to the large number of cats taken for the fur trade (Smith, 1976; Caldwell, 1984). Shipments to the United States, which was the greatest importer, began to decline in 1969 (McMahan, 1986), although exports to other countries continued to escalate at least through 1970 (Myers, 1973). The number of jaguar skins in trade declined in the 1980s except for a shipment from Paraguay to Italy of 587 skins in 1980 (Broad, 1987). Prices paid for raw jaguar skins reached a high of US \$130–180 in the early 1970s (Doughty and Myers, 1971; Smith, 1976).

This study began in April 1986, and the report was completed in December 1987. Countries were visited by the investigators and interviews were held with government officials, biologists at universities and other institutions, with ranchers, professional hunters, and members of the general public who were knowledgeable and interested in the welfare of the jaguar. Responses were received from every country within the range of the jaguar except Nicaragua, Guyana, and French Guiana; hence, it was necessary to

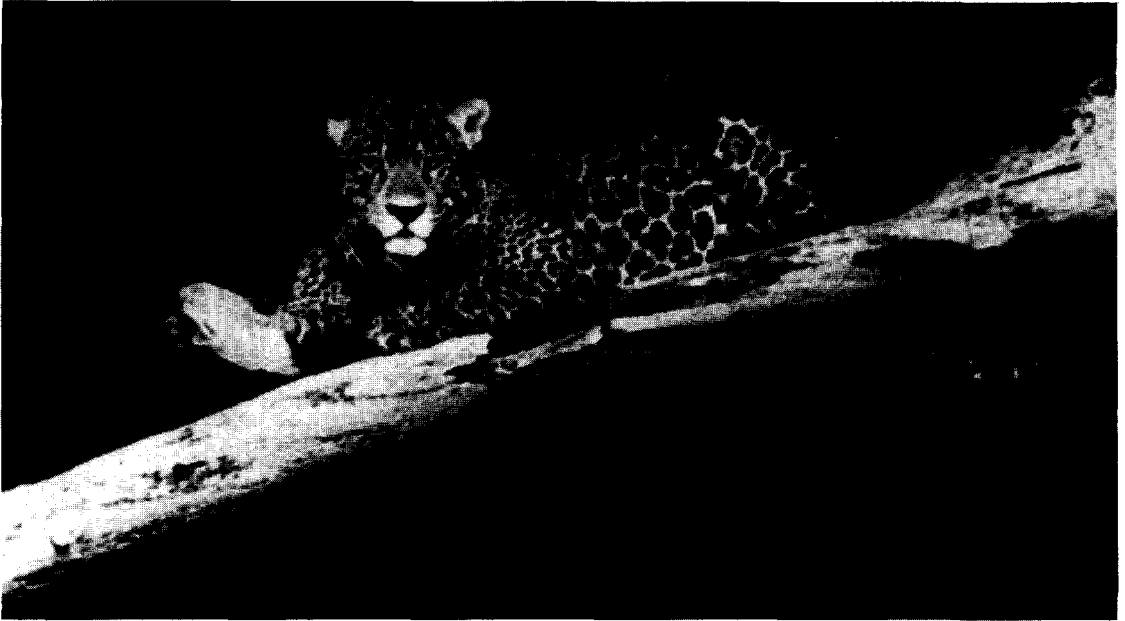
evaluate the status of the species in those countries by indirect information from persons located in adjacent countries, reports of development within the countries, and other data available to us.

Maps with the status of the jaguar for each country were prepared from information obtained directly from the interviews and from other sources (Figures 1 and 2). They depict the historical range occupied by the jaguar, areas within the range where it no longer has established populations, areas in which the population has greatly declined (particularly since the early 1960s), areas in which the population has declined, and areas in which the population has stabilized or increased since 1980.

Historical and present range

The historical range of the jaguar extended north to the states bordering Mexico in the United States and south to the Rio Negro at about 45°S in Argentina (Hall, 1981). The jaguar prefers a warm tropical climate, hence, it did not occur in the high plateau country of Mexico, and in areas above 3000 m in the mountains of South America. It is usually associated with water and was found only sparingly in extensive arid areas.

The jaguar now occurs in a broad belt from central Mexico through Central America and into



One of the few photographs of a wild jaguar. The photographer was floating down a Venezuelan river in a dugout canoe when he saw a jaguar sunning itself. He let the current take him towards the animal, which eventually snarled and moved off (*Karl Weidmann*).

South America as far south as the northern portion of Argentina (Swank and Teer, 1987). Although its original range has decreased, it still occurs in large blocks of the Amazon Basin and in disjunct populations of varying numbers in Central and South America. Established populations are now believed to be gone from the United States and it faces extinction in several Latin American countries, including Argentina, Costa Rica and Panama. It is judged to be extinct in El Salvador, Uruguay and Chile. It occurs in varying numbers in every other sovereign country from Mexico to its southernmost range.

Ecology

The ecology of the jaguar has a tremendous influence on its present status and future security. The area over which it wanders depends on the type of available habitat and the abundance of prey species. In the tropical forests of Belize four radio-collared males ranged over areas from 11 to 16 sq km and a male's home range overlapped that of two or more females (Rabinowitz, 1986). A study in the Pantanal of Brazil showed the range of two females to be at least 25–38 sq km, and the range of males was twice that (Schaller *Status of the jaguar—1987*

and Crawshaw, 1980). In another area of the Pantanal five radio-collared jaguars (one male and four females) had a mean home range of 142 sq km, with a 42 per cent overlap of the ranges of the females (Quigley, 1987). Jaguar home-range sizes decrease with an increase in the abundance of prey species (Almeida, 1986; Quigley, 1987). In Belize the daily hunting area of male jaguars was about 3 sq km, which they used for about a week. They then travelled to a new area in a single night, probably because the prey species became more wary and difficult to capture (Rabinowitz, 1986).

The jaguar is an opportunistic feeder, and subsists on a great variety of animals. In the lower Llanos of Venezuela its major prey species were capybara *Hydrochaerus hydrochaeris*, spectacled caiman *Caiman crocodylus*, two species of freshwater turtles, *Podocnemys unifilis* and *P. vogli*, and the collared peccary *Dicotyles tajacu* (Mondolfi and Hoogesteijn, 1986). In forested areas they live on agouti *Dasyprocta* sp., paca *Agouti paca*, white-lipped peccary *Tayassu pecari*, tapir *Tapirus terrestris*, brocket deer *Mazama* sp., sloths *Bradypus* sp., and giant armadillos *Priodontes maximus*. In the Pantanal

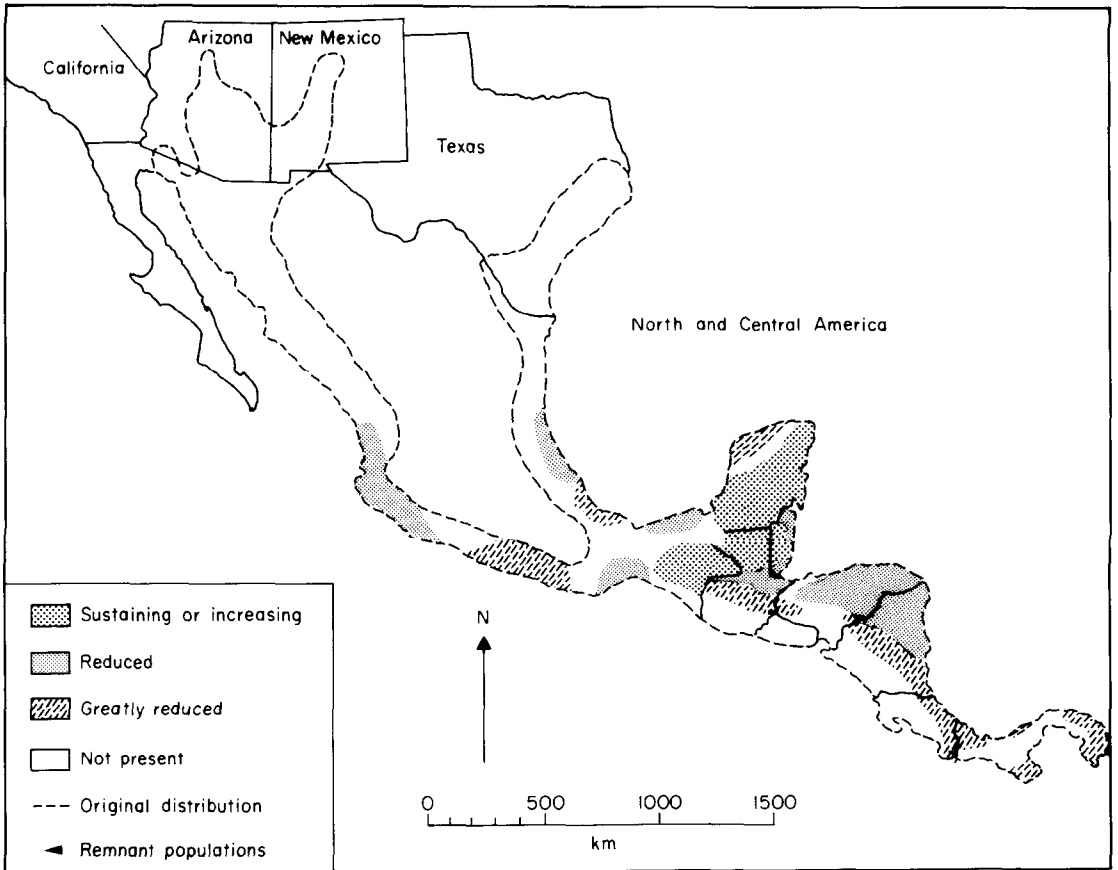


Figure 1. Status of the jaguar in North and Central America in 1987, based on population trends from 1980 to 1987.

of Brazil, where cattle made up the single greatest contribution to vertebrate biomass, Quigley (1987) found that almost half the kills of jaguars were of cattle.

Range and status

Breeding populations of the jaguar probably disappeared from the United States early in the 1960s; however, one was taken in Arizona in 1971 (Brown, 1983), and one in December 1986 (D. E. Brown, pers. comm.). The present (1987) most northerly established populations reported by Mexican officials are in southern Sinaloa and southern Tamaulipas, thus the range has receded southward about 1000 km.

Within Mexico and Central America the jaguar now occupies an area of approximately 483,000 sq km, or 33 per cent of its original range (Figure 1).

Within the range that it occupies it is greatly reduced over 28 per cent, and reduced over 47 per cent. On a more optimistic note, the population seems to be holding its own or perhaps even increasing over the remaining 25 per cent. The Peten in Guatemala and the areas surrounding it in southern Mexico and western Belize have high densities of jaguars, that is, high for the species in relatively undisturbed habitat.

In South America the jaguar still occurs over 62 per cent of its original range (Figure 2). Within the area where it occurs it is greatly reduced throughout 16 per cent and reduced throughout 20 per cent. The population can be considered sustaining or perhaps increasing over the remaining 64 per cent. The Amazon Basin in Brazil, and the areas influenced by the Amazon in southern Venezuela, in French Guiana, Surinam and Guyana, eastern Colombia, Peru, and Bolivia

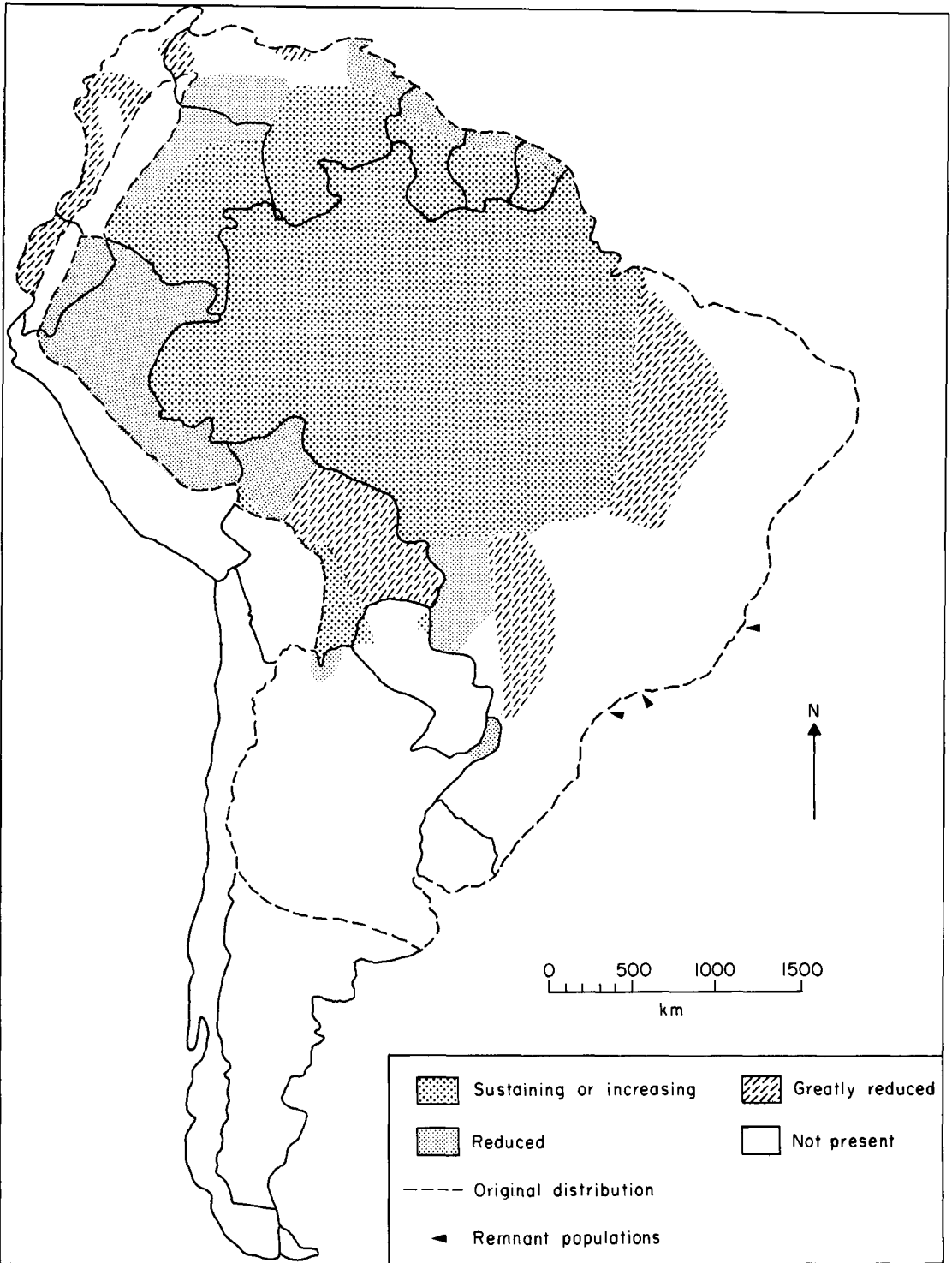


Figure 2. Status of the jaguar in South America in 1987, based on population trends from 1980 to 1987.

have resisted human development, in turn providing some sanctuary for the jaguar in that vast region.

Densities and numbers

Only recently have estimates been made of densities and numbers of jaguars based on valid field studies. Schaller and Crawshaw (1980), working with two radio-collared animals and tracks of others, found one jaguar per 25 sq km on one ranch and one jaguar per 22.5 sq km on another in the Pantanal of Brazil. Almeida (1986), using tracks and drawing on the work of Schaller and Crawshaw, estimated that there were 3500 jaguars in the Pantanal and its peripheral area, and an additional 1400 jaguars to the north of the Pantanal in the basin of the Guapore River. P. Crawshaw and H. B. Quigley, on the basis of the considerably larger home ranges found in their study, conclude that Almeida's estimate was too high, and that a more reasonable figure would be 1000–1500 jaguars for the Pantanal (pers. comm.). Almeida (1986) considered that the rain-forest habitat carried a lower density of jaguars than the Pantanal due to the lower prey base. He concluded that a male and female jaguar in the forest, though living separately, would occupy an area together of 150 sq km. Rabinowitz (1986), working with radio-collared animals in the rain forest of Belize, estimated a density of one jaguar per 6.5 sq km. In a similar habitat in the Laconden Forest of Chiapas, Mexico, Aranda (in press), using distinctive tracks of animals, estimated a density of one jaguar per 20–30 sq km, and a population of 250 jaguars in an area of 6000 sq km.

Causes of population decline

Loss of forest habitat is now of major concern as a cause for the decline of the jaguar. Estimates of annual deforestation rates in Latin America vary considerably (Holdgate, 1987), but it is generally held that they are currently among the highest in the world and are expected to increase (UNFAO, 1982). Forests are being cut for timber, agricultural development and settlement, and for conversion of the land to grass for cattle production. In Latin America it is customary for loggers to live by killing wild game, and in many in-

stances logging companies employ professional hunters who are in direct competition with the jaguar for prey species (Tello, 1986; Swank and Teer, 1987). Logging is usually followed by settlement, and, traditionally, subsistence agriculturalists use wild species to supply a great part of their protein requirements. The end result is that wild game soon disappears in those areas surrounding human settlement (Ojasti, 1986). There is considerable overlap of those species used by the jaguar (Mondolfi and Hoogesteijn, 1986) and those most frequently used by rural people (Ojasti, 1984).

Wholesale conversion of the tropical forests to the production of cattle may not be progressing at the rate once expected. A grass species with sufficient vigour to prevent the re-establishment of the forest has not been found. To maintain an area in grass requires constant maintenance by shredding the woody growth, application of herbicides, hand chopping and/or burning. This constant outlay of resources accompanied by lower cattle prices has, at least temporarily, caused some potential ranchers to lose interest in the cattle business in Latin America.

The killing of jaguars for various reasons continues everywhere within the species's range. In ranching country trapping and hunting of jaguars is a common practice (Almeida, 1986; Tello, 1986), and was probably the major reason for the elimination of the cat from the south-western United States (Brown, 1983; IUCN, 1982). Commercial hunting and trapping of jaguars for their pelts has declined dramatically since the 1970s. Organized poaching rings, in which fur buyers travelled through the country supplying traps and buying pelts from local people, are things of the past. Prices paid for good jaguar pelts have declined from as high as US \$180 to as low as \$10, if a buyer can be found to take them at all. The combined processes of putting CITES regulations into effect in Latin America, increased enforcement of national laws, and primarily the decreased popularity of garments made from spotted cat skins have reduced markets for skins and are largely responsible for rises in jaguar numbers where they are reported to be increasing (Caldwell, 1984; Tello, 1986; Wildlife Trade Monitoring Unit, 1985; Swank and Teer, 1987).

Opportunistic killing is now probably the greatest threat to the jaguar, following loss of habitat. Guns are traditionally carried by local people in many countries in Latin America, and jaguars are shot or shot at whenever encountered. The traditional fear of the animal, its practice of feeding on domestic stock, including dogs, and the competition it presents for wild game animals that are used for food by local people, all combine to make a local hero of a person who kills a jaguar.

Sport trophy hunting has declined, and is in fact illegal in most countries that have jaguars. Mexico had a season with limited permits up to 1987, and Belize and Costa Rica have issued permits to take specific animals that have taken cattle. Annually, this has accounted for about 10 animals in Belize and 12 animals in Costa Rica in the past few years. Sport hunting for pleasure with dogs has been traditional in ranching communities, and is still common, usually under the guise of depredation control. Hunting for recreation and depredation control are so intertwined in ranching communities that it often appears impossible for those who participate to separate the two.

Laws for conservation of the jaguar

All countries within the range of the jaguar have laws that forbid the killing of the animal. Enforcement of those laws varies from country to country, but generally it is non-existent or is very lax. Almost universally, laws permit the killing of animals for the protection of domestic stock, and this is used as the reason for persecuting the jaguar.

In some countries laws require permission of the authorities prior to killing of the animal, but this is usually not adhered to and rarely is an investigation in the field made prior to issuance of a permit. Lack of personnel and resources to enforce the laws in remote areas where jaguars occur are problems for all wildlife conservation agencies in Latin America. Enforcement is usually confined to inspecting staging areas where pelts are collected for commercial shipment and at airports for contraband items intended for export out of the country.

Getting a conviction in the courts for killing a jaguar is virtually impossible. Biologists have

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This, and the photograph on page 20, is a four-year-old male jaguar, which was live captured as a cub and cared for by a rancher, Badar Hassan, in Belize. He is also a professional jaguar hunter who removes problem jaguars for the government and has spent years studying the animal's habits
(Wendell G. Swank).

reported the killing of radio-collared animals to authorities, with adequate evidence, yet no action was taken to prosecute the person, because the support in local communities is with the person who has killed the jaguar (Swank and Teer, 1987).

All countries in the range of the jaguar, except Mexico, are members of CITES. Enforcement of CITES regulations at an international level and an increase in the enforcement of local laws have been effective in controlling commercialization of the trade in jaguar skins.

Protection of the habitat

For the jaguar to remain a part of the ecosystem large tracts of land will have to be set aside where wildlife and natural ecosystems have first priority. There are some encouraging developments. Every country in Latin America has established national parks or reserves where wildlife is offered protection to some degree. In Central America 46 conservation units totalling 4.3 per



cent of the land area have been established (Hartshorn, 1983). A conservation area designated specifically to protect the jaguar was established in Belize in 1986. The Rio Platano Biosphere Reserve, covering 350,000 ha, was dedicated by Honduras in 1980, and the Darien World Heritage Site of 597,000 ha was dedicated by Panama in 1981. Proposals are under consideration for establishing large natural areas under various degrees of protection in the centre of the best existing jaguar habitat in the State of Campeche in Mexico, and in the Peten District of Guatemala (Swank and Teer, 1987).

Environments that are inherently inhospitable to man have been instrumental in protecting the jaguar up to the present. This applies to the eastern coasts of Honduras and Nicaragua, to the Peten in Guatemala and western Belize in Central America and to the Amazon Basin, and that vast area influenced by it in Brazil and the coun-

tries surrounding it. To dedicate large tracts of land for the protection of wildlife in these remaining undeveloped areas will take great resolution on the part of any government. The human population in Central and South America is currently increasing annually at about 3 per cent, which means that it will double in less than 25 years. The demand by local people for resources to sustain that growing population is great, and will increase with time.

Economics as an incentive to management

Eventually, as human population grows, land will be evaluated in terms of its contribution to the welfare of people. This could be aesthetic as well as economic, but aesthetic evaluation is a luxury that generally comes only after people have attained an economic level that provides for most of their basic needs. Rural people in much of Latin America have not yet attained this level; hence, to have successful plans for the management of the jaguar, economic returns to the local people must be a consideration. National parks and similar reserves will depend on the development of tourism to provide this economic return. Unfortunately, the jaguar is not the type of animal that promotes mass tourism. Its habitat does not have the same attraction as the open plains of Africa, nor are jaguars, or the animals on which they prey, readily observable.

A controlled system of hunting the jaguar may provide a solution to some of the problems for management of the species. At present, jaguars that are killing cattle are being taken, sometimes under a permit issued by government officials but more often not. This practice is going to continue. Officially legalizing the system, and establishing a programme for charging a reasonable fee for taking the depredating animal by sport hunting, could bring revenue to governments and to the local people and partially alleviate the complaints against the jaguar by persons adversely affected by the animals' depredations.

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