

# The State of Wild Animals in the Minds and Households of a Neotropical Society: The Costa Rican Case Study

# 13

CHAPTER

*Carlos Drexler*

## Introduction

**O**ur daily choices and behaviors determine to a large extent the impact of our lives on the environment and on our fellow creatures. The sharing of our living quarters with native wildlife is one dimension of such choices and conduct. Currently, there are two obvious manifestations of living with wildlife: the highly questionable acquisition and keeping of wild animals as pets (for example, parrots) and the colonization of our living quarters by animals (for example, bats). The ways in which each person manages these situations are the result of tradition, education, and the scheme of values that governs one's beliefs, perceptions, and actions. Opposition to keeping wild animals as pets based on ethical considerations and tolerance of the presence of bats in the attic are manifestations of an amicable, compassionate, and respectful attitude toward wild animals. As a working hypothesis, an analysis of the relationship between how people think

about wild animals—whether they keep them and how they care for them in their homes—may serve as a lens through which to better observe the relationship between attitudes and behavior in the field of animal protection.

The study of attitudes in a society provides insight into variables that may be pertinent to people's everyday decisions and practices involving animals. This essay addresses the relationship between attitudes, knowledge, and behavior in the context of the protection of wild animals in the Neotropics and ventures to draw some conclusions about the state of wild animals from this perspective. The Neotropics, a biogeographical region that extends from the Yucatan peninsula to the southern tip of South America, includes some of the most biodiverse countries of the world. Its nations share a common history of Iberian colonization but are nonetheless comparatively heterogeneous in their cultures and social

arrangements. Contrary to the number of sources available with information about social attitudes toward animals in the United States (see Herzog, Rowan, and Kossow 2001), surveys based on extensive samples are scant for the Neotropics.

Nassar-Montoya and Crane (2000) reviewed some of the information about attitudes toward animals in Latin America in a series of essays written by experts expressing their perceptions of such attitudes. An additional source of information for this analysis is the national survey about the relationship between Costa Ricans and wild animals carried out in 1999. The survey includes a formal analysis of attitudes, perceptions, knowledge, and practices involving wildlife, with an emphasis on pet keeping. A professional surveying organization administered personal interviews to 1,024 adults and 177 minors, aged nine to seventeen, from a representative, nationwide sample of 1,024 households (for methodological details see

Drews 2001, 2002a).<sup>1</sup> The instrument for the study of attitudes, a battery of questions subject to factorial analyses, was based on Stephen Kellert's conceptual and methodological framework (e.g., Kellert and Berry 1980; Kellert 1996). In an attempt to provide a robust picture of the relationship between Costa Rican society and wildlife protection, attitudes toward hunting are included in the analysis. Consequently, the analysis sets Costa Rica as a case study and discusses the possible implications of the findings for the rest of the region. Data for Costa Rica shown below come from that survey, unless otherwise indicated. In 2000 a similar, nation-wide survey was carried out in 1,012 Nicaraguan households. Some preliminary results of that study are also included in this chapter (Zegarra and Drews 2002).

## Animals Involved in Wildlife Trade

An estimated 30,000 primates, 2–5 million birds, 2–3 million reptiles, and 500–600 million ornamental fishes are traded globally each year to satisfy the demand for live animals for the pet trade, zoos, and laboratories (Nilsson 1977; Hemley 1994). Most of these animals are native to tropical countries and wild caught (that is, taken from wild populations rather than produced in captivity) (e.g., Clapp and Banks 1973; Clapp 1975). These estimates do not include the great proportion of animals who die prior to entering international trade, which, in the case of birds, could result in some 100 million individuals being extracted yearly from the wild (e.g., Inskipp 1975). The Neotropics supplies a great volume of wild animals, both legally and illegally, to North America, Europe, and Asia (e.g., Poter 1991; Cedeño and Drews 2000). Green iguanas (3.4 million animals) from South and Central America, for example, ranked first among the non-native reptile species

imported into the United States between 1989 and 1997 (Franke and Telecky 2001).

In Latin America there is a constant, and by-and-large illegal, demand for wildlife, especially for psittacids and other birds to keep as pets (e.g., Bolivia: Martínez 2000; Colombia: Nassar-Montoya 2000; Chile: Muñóz-López and Ortiz-Latorre 2000; Ecuador: Touzet and Yépez 2000; Mexico: Benítez-García and Durán-Fernández 2000; Panama: Rodríguez 2000; Salvador: Ramos and Ricord de Mendoza 2000; Venezuela: De Alió 2000). Such demand has been inferred mainly from the detection of a large volume of illegal trade, confiscations, and donations of unwanted pets to rescue centers and zoos (contributions in Nassar-Montoya and Crane 2000).

End consumers are rarely aware of the animal welfare and species conservation implications of such trade in live animals. Injury and death during capture, transport, and quarantine are common. The number of animals lost in the process greatly exceeds the numbers that reach the end consumers (Redford 1992). The survival of wild populations can be compromised from overexploitation. These same concerns apply to the trade of animals for the pet market within tropical countries, but the lack of data has obscured thus far the magnitude of the phenomenon. Beissinger (1994), for example, pointed out the lack of information on—and the urgent need to quantify the demand for—parrots in Latin America as one of the challenges facing those working for their conservation. Local use, consumption, and trade of wild animals (Carrillo and Vaughan 1994), including felids and parrots for pets, have been recognized as having a stronger impact on wild populations in Central America than international trade (Barborak et al. 1983).

Recently, however, a colossal effort by the Brazilian organization Rede Nacional De Combate Ao Trafico De Animais Silvestres has generated a wealth of information about wildlife trade in the largest Neotropical coun-

try (Rede Nacional De Combate Ao Trafico De Animais Silvestres 2001).<sup>2</sup> An estimated 38 million animals in Brazil are taken yearly from the wild for the wildlife trade. Of that number a considerable proportion escape injured, die during capture, or are discarded because of their poor condition, and about 4 million individuals are illegally traded in the country. Birds make up the great majority of these animals, accounting for 82 percent of confiscations between 1999 and 2000. The Internet emerges as a new and powerful medium for a clandestine wildlife market. In 1999 Rede Nacional De Combate Ao Trafico De Animais Silvestres found 4,892 advertisements involving Brazilian fauna in illegal transactions. By virtue of the sheer numbers of animals involved in the chain of extraction, trade, and captivity, this issue stands out as probably the most important determinant of the state of the wild animals in the Neotropics.

## Reasons for Concern

Pets have been commonly and affectionately kept in Middle America since pre-Columbian times (e.g., Mexico: Benítez-García and Durán-Fernández 2000). Animals at home are part of Costa Rican culture and routine: 71 percent of households keep at least one animal (Drews 2001). Overall 68 percent of Costa Rican adults report keeping a pet (domestic, wild, or both). These values are high by international standards, exceeding the incidence of pets in Germany, Netherlands, the United States, Australia, and Japan (Drews 2001, Kellert 1993a). The proportion of households in Costa Rica keeping dogs (53 percent) is 3.6 higher than the proportion of households keeping cats (15 percent). Cats are much less popular than dogs as companion animals in Costa Rica than they are in the United States or Australia.<sup>3</sup> In Nicaragua the proportion of households keeping dogs and cats, 56 percent and 17 percent respectively, is

similar to Costa Rica.

The proportion of households that keep livestock is higher in Costa Rica than in the United States or Germany. While 6.4 percent of U.S. respondents and 10 percent of German respondents raised livestock in the preceding two years (Kellert 1980; Schulz 1985, respectively), in Costa Rica 25 percent of households kept livestock at the time of the survey. The proportion of households that keep horses in Costa Rica (4.5 percent) and Nicaragua (4.4 percent) is three times higher than the 1.5 percent recorded in the United States (American Veterinary Medical Association 1997).

There are few studies of the incidence of wild animals kept as pets in tropical households. Wild, native species are found in 24 percent of Costa Rican households (Drews 2001). This incidence is similar in Nicaragua (22 percent) (Zegarra and Drews 2002) and higher than the incidence in a sample suburb in Panama (14 percent, Medina and Montero 2001). Although parrots are the majority of the wild animals kept as pets, there are at least 45 animal species commonly kept in Costa Rica, including other birds, reptiles, mammals, amphibians, fishes, and invertebrates. These are typically taken from their natural habitat to satisfy the pet market. The extraction from the wild and the keeping of such animals is by-and-large illegal and often involves endangered species. Over half of the respondents have kept a parrot at some point in their lives. A conservative estimate suggests that about 151,288 parrots are kept currently as illegal pets in Costa Rica (Drews 2001). The preference for parrots as pet birds in Costa Rica and Nicaragua is in line with such preference in other societies.<sup>4</sup> In the United States, for example, parrots correspond to 65 percent of species of pet birds kept (Kellert 1980).

The initiative to obtain a wild animal comes mainly from adults. The presence of minors in the household, however, increases the likelihood that an animal will be kept as a pet. In a

quarter of all cases, the idea to acquire a wild animal came from a minor. The widespread belief among Costa Rican (Drews 1999a, 2000a) and Nicaraguan adults that keeping a wild animal fosters love and respect for nature in children probably also helps trigger the purchase.

Conditions in captivity suggest that the welfare of wild animals in people's households is severely compromised (Drews 2000a). The pet is kept in an enclosure smaller than a large television set in 77 percent of the cases, and without the company of any conspecifics in 75 percent of cases. Diets are by-and-large inadequate, and only 16 percent of keepers of wild animals have ever given veterinary care to their animals. An average survivorship of four years for captive parrots (Drews 2000b), animals with a lifespan of several decades, testifies to the inadequacy of the typical husbandry situation. In spite of this, however, a great majority of pet keepers in Costa Rica and Nicaragua state that their animals fare well. There is an evident need to disseminate information about what determines the well being of an animal.

The majority of wild animal purchases were spontaneous: 82 percent in the case of parrots, 61 percent in the case of turtles, and 63 percent of the fish (Drews 1999a). Eight percent of adults who kept a wild animal at home at some point reported cases of venomous stings or bites that caused bleeding; half of these cases involved minors. This fact, in addition to the burden of work associated with the care of the animal (which typically falls onto a female member of the family), probably led 39 percent of the pet keepers to express reservations about keeping wild animals as pets (Drews 2000a). Some 23 percent asserted that they would rather not keep the animal they already had. Only half of the captive animals were replaced after they died or escaped.

All parrot species, primates, and felids documented as pets in Costa Rica are endangered or vulnerable under IUCN (formerly International Union for the Conservation of

Nature, now the World Conservation Union) criteria and/or national legislation (Solís et al. 1999). With the exception of white-faced capuchin monkeys, these species are all listed under the Convention on International Trade in Endangered Species of Wild Fauna And Flora (CITES), indicating global concern about the potential harm to their wild populations from international trade. Local trade of these species to satisfy the illegal pet market poses an additional burden on the viability of their wild populations, in addition to other pressures such as habitat destruction. In Costa Rica the yearly extraction rate of parrots from the wild to satisfy the national demand for pets is in the range of 25,000–40,000 chicks (Drews 2000b). This figure does not take into account mortality during capture and transport, which would at least double the estimate (Pérez and Zúñiga 1998). This Costa Rican figure alone exceeds the volumes exported from Central America for the international pet market (Drews in preparation), just as Beissinger (1994) had anticipated. The yearly, mostly illegal, extraction of parrots in Venezuela for international trade is on the order of some 5,000–75,000 individuals (Boher-Bentti and Smith 1994; Desenne and Strahl 1991, 1994). If the thus far unknown incidence of parrots in Venezuelan households is similar to those in Costa Rican households, it is quite likely that the national demand there also exceeds the volumes exported.<sup>5</sup> These calculations show that the internal pet market is a stronger threat to wild populations and compromises the well being of more individuals, than does international trade. The importance of studying and quantifying pet-keeping practices and the associated market in Neotropical countries is evident, therefore, both in the context of species conservation strategies (also Beissinger 1994; Morales and Desenne 1994) and in the context of animal protection considerations associated with the capture, handling, care, and captive fate of these numerous individuals.

## Attitudes toward Animals in Costa Rica

A nationwide survey in Costa Rica, based on Stephen Kellert's conceptual framework for the study of attitudes, revealed in 1999 a society with an "animal friendly profile," based on five attitude dimensions toward animals (Drews 2002a). Overall Costa Rican adults have a strong *sentimental* attitude, that is, an expression of feelings of affection, toward animals. In contrast, the *materialistic* attitude, which regards animals as resources (Kellert's utilitarian attitude) and praises acts of control over them (Kellert's dominionistic attitude), is weak. This reflects a prevailing opposition to the act of hunting per se: because of harm inflicted on individual animals rather than because of its potentially detrimental effect on natural populations. There is a strong *inquisitive* attitude, corresponding to a widespread interest in learning about the biology of animals and their habitats. High scores on the ethical attitude indicate concern for the ethical treatment of animals and nature. The *schematic* attitude emphasizes the role of aesthetic appearance in the preferences for certain animals and acknowledges feelings of aversion, dislike, or fear of some animals. Scores for this attitude were weakly positive. That said, the attitude profile of Costa Ricans is probably incomplete, given the relatively small battery of questions used in this study.

Kellert (1993a) compared the attitudes toward wildlife in the United States, Germany, and Japan using a standardized methodology. Direct comparisons of attitude score levels between these countries and Costa Rica are not possible due to differences in the composition of question clusters for each attitude and in the scoring method. The relative importance of certain attitudes, however, is amenable to comparisons with Costa Rica. Feelings of affection toward animals scored high among other atti-

tudes in these four countries.<sup>6</sup> The relatively high importance of moralistic traits was similar in the United States (from Kellert 1993a) and in Costa Rica. Germany stands out in the dimension of concern for the ethical treatment of animals, however, by virtue of a score much higher than on any other attitude. In fact, most Europeans are more negative toward the use of animals in research and testing, as well as toward factory farming practices, and are more supportive of organic farming than are Americans (Herzog, Rowan, and Kossow 2001). In contrast, the moralistic attitude garnered one of the lowest attitude scores in Japan. The utilitarian and dominionistic attitude scores were particularly low in relation to other attitudes in Germany and Costa Rica (low materialistic attitude), and relatively high in Japan. The schematic attitude, which includes aesthetic and negativistic elements, was of intermediate importance in Costa Rica. The negativistic attitude was relatively strong in Japan and in the United States, whereas in Germany it scored relatively low.

The profile of Costa Rican attitudes toward animals contrasts greatly with that of another tropical country, Botswana, where the prevailing attitude of the public was utilitarian (Mordi 1991). The next most pronounced attitude in Botswana was the *theistic*, an attitude introduced by Mordi in his study design, in which the population dynamics of wildlife was believed to be controlled by the supernatural. Other attitudes with high scores in Botswana were the *scientistic*, the *neutralistic*, and the *negativistic*. *Humanistic* feelings toward animals were rare in Botswana, probably because wild animals cannot be friends of the public and meat at the same time (Mordi 1991).

Costa Ricans feel protective toward animals, as reflected in their attitudes and law. They relate to wildlife through strong affection, aesthetic appreciation, ethical concern, and a strong desire to learn. Overall, the general public condemns expressions of mastery over wildlife and the hunt-

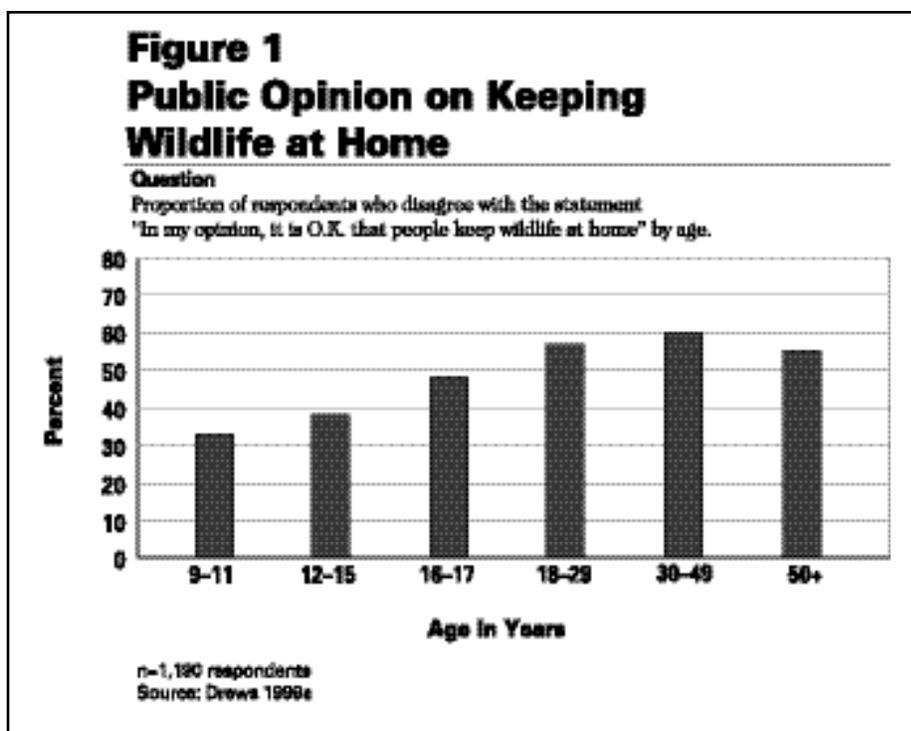
ing of animals for recreation or even sustainable use (see below). Such a relatively consistent trait is probably the product of the cultural homogeneity of Costa Rican society. In 1924 a series of legal measures were taken to safeguard the well being of animals, including, among several regulations for the husbandry and care of livestock, a ban on bullfighting involving physical injury and death of the bull, cockfighting, dogfighting, cat fighting, and the use of slingshots against birds. A common theme of these protective attitudes and measures is that the suffering and cause of death of the animals involved are visible: bleeding injuries result from fights, bad handling, or the use of a weapon. In contrast, the suffering of caged animals, for example, is subtle and not easily visible to an uninformed person. A cognitively more demanding process is required to appreciate the animal's suffering, one that combines common sense with additional information. The use of wild animals in circuses and other public performances was banned in Costa Rica in July 2002. The average audience for such performances is not directly confronted with a visible suffering of the animals involved. This ban and a recent series of publicity campaigns against the keeping of wild animals as pets in Costa Rica by government agencies and non-governmental organizations (compiled by Trama and Ramírez 2002) are signs of an increasing awareness of animal protection issues in this society.

## Attitudes toward Animals in the Neotropics

Current attitudes toward animals in Latin America are shaped by a multicultural heritage. Attitudes toward wildlife in the Caribbean coast of Costa Rica, for example, can be related to the history of colonization by various ethnic groups, e.g., African,

Caribbean, Hispanic, and their resulting blends in modern culture. Therefore, marine turtles, for example, may have a different significance in different cultures: as deity, merchandise, food, medicine, aphrodisiac, subject of scientific research, protected animal, managed animal, tourist attraction, or art (Vargas-Mena 2000). These categories are not necessarily mutually exclusive for any given person. With the addition of two categories—the animal as subject of superstition and as pet—they inspired an analysis of attitudes toward wildlife in Colombia that illustrated the influence of indigenous and colonizing cultural traits (Nassar-Montoya 2000). Ramos and Ricord de Mendoza (2000) offer a description of current views on wildlife in El Salvador citing these attitudes: utilitarian or consumptive, cruel or contemptuous, dominionistic, compassionate, and naturalistic or scientific. Elements of Kellert's typology can be associated with most of the above-mentioned cultural meanings and views on animals.

In general, a utilitarian attitude, devoid of awareness about the threats to wildlife and the importance of its protection, seems common among Latin Americans (contributions in Nassar-Montoya and Crane 2000). Not just commercial exploitation but also subsistence hunting for food can lead to population declines of various Neotropical wild animals (Bedoya-Gaitán 2000). Ignorance about the finiteness of wildlife as a resource can be high among societies that commonly utilize animals (e.g., Botswana: Mordi 1991). Previous studies in Colombia and El Salvador and on the Caribbean coast of Costa Rica suggested that the utilitarian, materialistic view of wild animals as food and as a source of income is possibly the most prevalent in the region. However, according to the recent national survey, in Costa Rican society, the prevailing attitudes toward animals are the sentimental and inquisitive, whereas utilitarian views on wildlife are not popular (see also public opinion about hunting, below). Direct



comparisons of attitudes among Latin American societies are hampered by the different methodologies used to characterize them. Nevertheless, the results of this Costa Rican study suggest that the Neotropical region may be more heterogeneous in its attitudes toward animals than previously thought. The Costa Rican profile is probably not representative of Latin America. For instance, while 59 percent of Costa Rican adults disapprove of keeping wild animals as pets (Figure 1), in Nicaragua only 39 percent of adults share that disapproval.

## Hunting

The proportion of the population that participates in hunting is smaller in Costa Rica than in the United States. Only 2.4 percent of Costa Rican respondents said to have hunted or captured a wild animal, excluding fish, during the year previous to the survey.<sup>7</sup> Kellert (1993a) reported that 14 percent of Americans, 4 percent of Germans, and 1 percent of Japanese hunted during the two years previous to the corresponding studies. Every fifth Costa Rican adult fished in a river and every tenth adult fished in the sea during the year previous to the study.<sup>8</sup>

Although overall participation in hunting was small in Costa Rica, 13 percent of the adults ate meat of a wild animal during that year. This result is surprisingly high given that, with few exceptions, there is no legal access to wild animal meat in public establishments in that country.

Social attitudes and public opinion toward hunting have been studied mostly in developed nations (e.g., the United States: references in Herzog, Rowan, and Kossow 2001; Germany: Schulz 1985; Japan: Kellert 1993a). Although figures from such surveys need to be interpreted and compared with caution, in the light of differences in the phrasing of questions and their impact on the outcome of the study (Herzog, Rowan, and Kossow 2001), there are some recognizable trends. The general public in these nations disapproves of recreational hunting per se, with some allowances for subsistence hunting and meat consumption.<sup>9</sup> This pattern is found in Costa Rica, too.

Neither hunting nor hunters enjoy a generalized acceptance in Costa Rica. The majority (89 percent) of respondents consider recreational hunting an act of cruelty (Table 1). This is a well-established stance in

**Table 1**  
**Adults' Acceptance of Hunting in Costa Rica**

Question	Definitely Yes (percent)	In General Yes (percent)	In General No (percent)	Definitely No (percent)	Sample Size
Do you agree with the use of venison as long as deer are not endangered?	18.5	26.2	19.2	36.1	1,006
Do you admire the skill and courage of a person who hunts successfully in the wild?	11.9	15.3	19.3	53.5	1,017
If there are enough crocodiles in Costa Rica, do you approve of the hunting of some to sell their hides?	7.4	9.6	21.2	61.8	1,016
Do you consider any kind of hunting for entertainment or sport an act of cruelty to the animals?	71.3	17.5	4.5	6.8	1,020
Do you think that the main reason to protect deer is to safeguard the supply of venison?	28.5	24.8	15.5	31.2	1,010

Note: These questions were part of a large battery of items in a nationwide survey carried out in 1999 about the relationship between society and wildlife. They did not appear clustered in the questionnaire. The difference between the total sample of 1,021 adults interviewed and the sample size reported for each question correspond to missing or "I don't know" answers.

Costa Rican society, with no significant differences related to gender, urban or rural setting, socioeconomic level, or education. The proportion of respondents sharing strongly this opinion increases significantly with

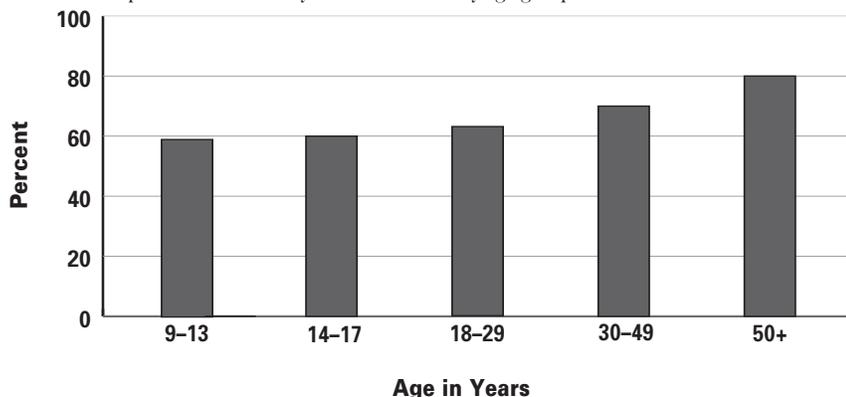
age (Figure 2).<sup>10</sup> Two thirds of the adults interviewed do not admire the skill and courage of hunters (Table 1). This Costa Rican stance is similar to that of Japanese and German respondents, who expressed consider-

able opposition to hunting per se (Kellert 1993a). In the United States, 56 percent of respondents felt that hunting was morally wrong (Princeton Survey Research Associates 1991, cited in Herzog, Rowan, and Kossow 2001). A majority of Americans objected to the activity if it was justified only on the basis of its sporting or trophy values (Kellert 1989, 1993a; Rutberg 1997). In contrast, a majority of Americans supported hunting if the meat was utilized. In Costa Rica there is less disapproval of hunting for deer meat (55 percent) than of hunting for crocodile hides (83 percent). Female respondents disapprove of hunting for the use of venison and hides significantly more strongly than do males.<sup>11</sup> The more likely acceptance of hunting for meat than for hides or for recreational purposes in general mirrors a similar trend in the United States and Japan (Kellert 1993a). The opposition to hunting for venison and hides in Costa Rica is probably a matter of ethical principle, irrespective of species conservation considerations (see phrasing of questions in Table 1).

**Figure 2**  
**Public Opinion on Hunting for Entertainment**

**Question**

Proportion of Costa Rican respondents answering "Definitely Yes" to the question "Do you consider any kind of hunting for entertainment or sport an act of cruelty to the animals?" by age group.



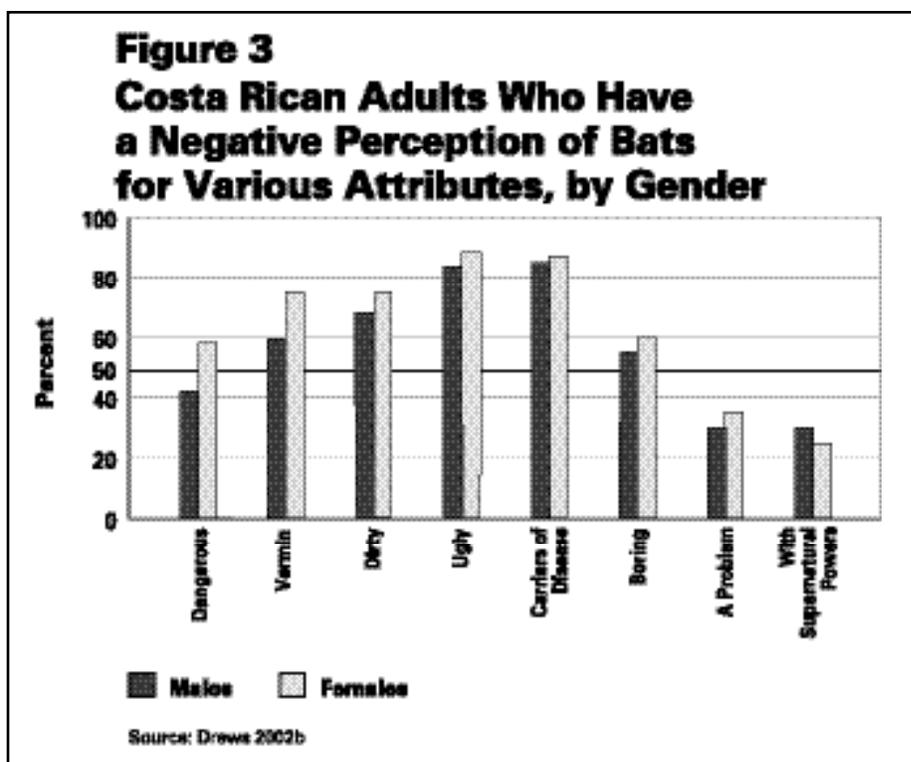
n=1,190 respondents

A slight majority of respondents justified protection measures for deer on the grounds of safeguarding the supply of venison, a utilitarian reason (Table 1). Most of the opponents of this utilitarian motive were well-educated, urban adults of high socioeconomic status. A higher education level was associated with a stronger rejection of hunting for venison or hides, less admiration of the skill and courage of hunters, and a stronger disapproval of utilitarian reasons for the protection of wildlife.

The overall disapproval of hunting by the Costa Rican public shown above reduces the viability of projects such as commercial utilization of animals taken from the wild for their meat or hides, the establishment of hunting grounds, and the conceivable promotion of Costa Rica as an international destination for trophy and sport hunters. This country maintains a “green” profile in the eyes of the international community and benefits from this image through the income generated from ecotourism. Currently, therefore, Costa Rica values its live animals more highly than it does carcasses or products thereof. There are no legal exports of wild animals for the international pet market from Costa Rica (Gómez and Drews 2000). In the context of a non-consumptive use policy, the use of native wildlife for pets within the country is contradictory. Taking live parrot chicks from nests may not be generally regarded as hunting and keeping them alive in captivity may not be seen as consumptive.

## Living with Bats

In the tropics people commonly share their homes with bats, albeit often unknowingly. Modifications of the landscape through logging and through urban and agricultural development have reduced the number of natural roosts for these nocturnal mammals. Several species, however, find adequate shelter in buildings. In Costa Rica at least every tenth adult is aware of the presence of bats in his or her home (Drews 2002b). The incidence of



bats in people’s homes is three times higher in rural than in urban areas. At least 87,020 household countrywide share their shelter with bats, a very conservative estimate given that their presence is often unnoticed.<sup>12</sup> A fifth of interviewees knew of bats inhabiting a nearby school and one quarter reported their presence in a nearby church. The species of bats living in buildings feed on insects, nectar of flowers, or fruit. They are harmless and free of diseases that could be transmitted to humans. The vampire bat is not commonly found in people’s quarters. Perceptions of bats worldwide are loaded with prejudices and superstition, which have turned these animals into victims of dislike and unjustified eradication, and Costa Rica is no exception.

Changing attitudes toward bats is a challenging goal. Understanding the nature of the relationship between the society concerned and these animals is a prerequisite for such an endeavor. Costa Rican adults were asked to select one of four choices along a semantic gradient for various attributes.<sup>13</sup> The percentage of answers inclined toward a negative perception of the bats is shown in Figure

3. Most respondents perceive the bats as vermin, dirty, ugly, carriers of disease, and boring. About half consider them dangerous. A fifth of the interviewees attribute supernatural powers to these animals. Female adults have a more negative perception of the bats than do males.

Although in some cases a colony of bats under the roof may cause bad odors and stains on the ceiling, the majority of respondents did not perceive the presence of these animals as problematic (Figure 4). Interviewees who reportedly had bats in their homes, however, considered these a problem in 44 percent of the cases, in contrast to only 28 percent of those who did not notice bats at home.<sup>14</sup> There were no significant differences between these two groups with regard to any of the remaining attributes shown in Figure 3.

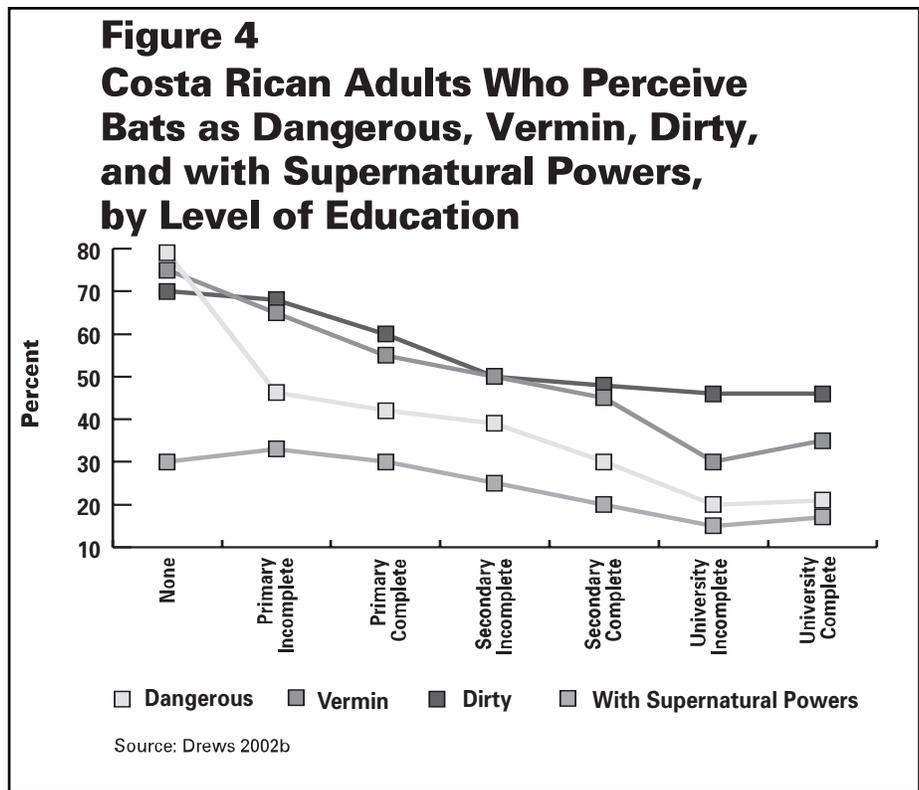
Perceptions of bats are closely linked to the level of education (Figure 4). Extremes on the negative side of the attributes studied are found mainly among the less educated. Superstition and fears seem to fade along with increased education. The tolerance of bats at home reflects knowledge about their biology,

responsibility in attending to the needs of other species, and success in challenging the negative myths about bats that still prevail in Costa Rica. This exercise suggests that environmental education efforts are a promising avenue toward a more animal friendly society. It is illustrative of similar processes that govern the perception that the bush is hostile, the urge for biological sterility in urban settings, and the simplistic dichotomy between good and bad organisms. The readiness to share the living space with live members of the national biodiversity without resorting to their control in captivity is a firm step toward a harmonious co-existence with nature.

## Linking Attitudes and Knowledge to Practices

The decision to obtain a wild animal to keep at home is conceivably the product of highly heterogeneous influences, including cultural upbringing and surrounding, attitudes, social condition, education, knowledge of natural history, tradition, gender, and family composition, as well as logistical and legal considerations (Drews 1999b). Aesthetic appeal of the animals, compassion, affection, and a desire to please and stimulate children are important motives for the acquisition of wild animals as pets in Costa Rica. The sentimental attitude was stronger in those who decided to keep a wild animal at home than in those adults who did not initiate the acquisition. Thus, keepers provide wild pets inadequate care despite their strong affection for animals. The result supports the hypothesis that a marked sympathy for and false empathy for the pets perpetuates this practice in Costa Rica (Drews 1999b).

There are further contradictions between attitudes and people's behavior, showing that the relationship



between thought and action is not usually straightforward and can be quite complex. Biophilia, the innately emotional affiliation of human beings to other living organisms (Wilson 1984), can be conceptually linked to values and attitudes toward animals (Kellert 1993b). Biophilia probably contributes to the positive feelings of Costa Ricans toward wild animals, then backfires as it encourages the keeping of wild animals, condemning them to an alien environment and permanent captivity. The contradiction between attitudes and practices is further illustrated by the fact that, despite a stronger affinity with animal protection among households of high socioeconomic status, the percentage of households with wildlife did not differ among the socioeconomic strata (Drews 2000a).<sup>15</sup> At the root of such contradictions may be the invisibility of the animal's suffering. Rather than changing the attitudes of Costa Ricans toward animals, the challenge is to increase the awareness about the animals' needs and thereby trigger the ethical concern for their well being.

The underlying assumptions of any such environmental education efforts

are that individual attitudes toward wild animals influence people's behavior, and that attitudes are influenced by culture, and as such are amenable to changes over time. These assumptions, if true, should enable the fostering of respect and compassion through example, guided experiences, and relevant information, conveyed emotionally and intellectually, about the role of the living environment in people's lives. (Values education constitutes a synthesis of cognitive and affective learning, pertinent in this context [c.f. Kellert 1996]). The teaching of values needs to accompany any education effort oriented toward encouraging animal protection and biodiversity conservation.

Understanding the link between attitudes and practices poses an acute challenge to the design of awareness campaigns. Herzog, Rowan, and Kossow (2001) analyzed social attitudes in the United States toward the use of animals in research, the wearing of fur, hunting, farm animal issues, diet choice, and public support of animal protection philosophy. The study illustrates the existence of contradictory results, both

from methodological constraints and flaws and from a “real” lack of correspondence between attitudes and action. For example, in general, public opinion in the United States has become more supportive of animal protection issues in the past fifty years. However, although the majority of Americans have favorable views of the animal rights movement (Roper Center for Public Opinion 1994), their daily behaviors, including meat-eating, are not necessarily compatible with such perception. Positive feelings toward animals do not necessarily lead to kind treatment, respect, and consideration of the animal’s needs (e.g., Herzog, Rowan, and Kossow 2001). The strength of an attitude, and its associated beliefs and emotions, may be decisive to its likelihood of being translated into corresponding behaviors (Herzog, Rowan, and Kossow 2001). Some individuals may have attitudes toward animals that are peripheral or superficial. Such a collection of preferences and isolated opinions has been referred to as “non-attitudes” or “vacuous attitudes” (Eagly and Chaiken 1993). These may have little real salience in a person’s life but can affect responses on opinion polls. The treatment of animals is not an issue of high priority to most people.

Adults who keep wildlife have better biological knowledge than those who never kept wildlife as pets (Drews 2002a). Costa Ricans ranked highest in the percentage of correct answers to five questions about animals, in comparison to U.S. and Japanese citizens (calculated from Kellert 1993a, Figure 5).<sup>16</sup> Such knowledge of natural history per se, however, does not translate into more animal friendly practices, as seen by the widespread keeping of wildlife as pets under conditions of concern. Specific key aspects seem to be dimly represented in biological curricula, such as the social needs of wild animals, their drive for dispersal, exploration, and coverage of wide areas in search of resources and mates, the effects of stress generated by constrained freedom of movement, among others.

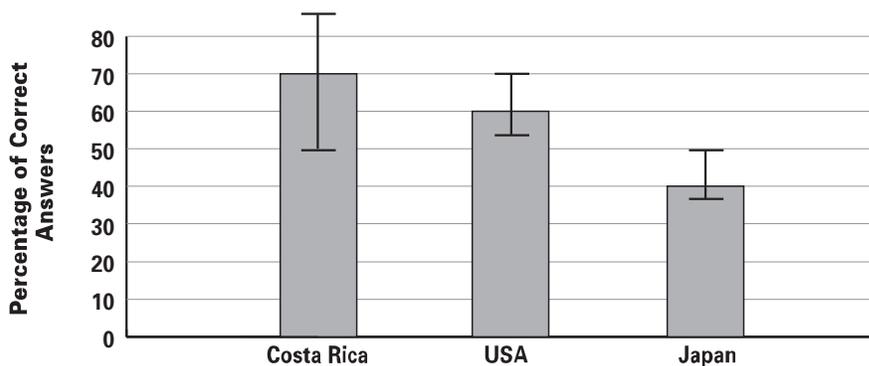
Previous research suggested that most Costa Ricans have a fairly superficial understanding and awareness of environmental problems (Holl, Daily, and Ehrlich 1995).

A slight majority of Costa Rican adults do not consider acceptable the keeping of wild animals as pets. This tendency, however, is not mirrored among minors aged nine to seventeen (Figure 1). Nature-related values seem to develop later in children than other moral values. Young children typically view nature in highly instrumental, egocentric, and exploitative ways (Kellert 1996). In the course of further development, however, these values change in emphasis toward less utilitarian, negativistic, and dominionistic ones. American children between thirteen and seventeen years of age begin to comprehend relationships among creatures and habitats, as well as people’s ethical responsibilities for exercising stewardship toward the natural world. This is reflected in a sharp increase in moralistic, ecologicistic, and naturalistic values of nature (Kellert 1996). Costa Rican children seem to follow this pattern, with regard to their increasing disagreement with people keeping wildlife at home with age (Figure

1). The proportion of respondents who disagree with that practice among nine to eleven year olds, the youngest of the sample, is nearly half that of the adults. This proportion increases steadily with age towards adulthood, reaching 59.5 percent of the Costa Rican adults interviewed (Drews 1999a, 2000a). This suggests a progressively increasing awareness about ethical arguments against the keeping of wildlife at home.<sup>17</sup> Given the central role that children can play in the family initiative to obtain a wild animal, this age group becomes a key target for awareness education—in the hopes of speeding up their acquisition of moralistic values of nature, which may prevent or hinder the acquisition of a wild animal.

The belief that a wild animal kept as a pet stimulates in children love and respect for nature is probably erroneous. Being able to observe a wild animal at close range is a thrilling and stimulating experience. If that animal is in a cage, however, detached from its habitat and natural behavior and deprived of the freedom to come and go as it pleases, the experience is much less rewarding and perpetuates the idea that people can control and subdue nature at will. It is plausible

**Figure 5**  
**Means and Standard Deviations**  
**of Level of Biological Knowledge**  
**Based on Five Statements\***



\*See text  
 Kruskal Wallis test,  $p < 0.02$   
 Source: Drews in press, calculated from Kellert 1993a

that outdoor activities—a guided confrontation with the habitat of these species, their ecological role, and their individual needs—stimulates the interest in and reverence for nature more strongly than does the caged animal in the backyard. Such has been the approach taken by the biological education program of the Guanacaste Conservation Area in Costa Rica, which hopes to produce better citizens by increasing their biological literacy (Valverde 2000).<sup>18</sup>

## Lessons from and for the Neotropics

Any progress toward reducing the levels of trade and the incidence of wild animals kept as pets will have a significant and strong positive impact on the state of wild animals in the Neotropics. Progress in such a reduction of numbers seems distant. Nonetheless the information platform about trade, pet keeping habits, and attitudes toward animals has improved considerably in the past five years. Similarly awareness campaigns and more efficient networking between similarly minded organizations in the region are contributing to progress in this direction. The human resources and organizational apparatus dedicated to wildlife protection, both at a government and private level, are growing toward their consolidation. There are indications of an increasing public awareness and concern about wildlife protection in Costa Rica and other countries of the Neotropics: the use of wild animals in circuses has been banned in Costa Rica, the state of Rio de Janeiro (Brazil), and some municipalities of Colombia since 2001.

Confiscated animals from the illegal trade are the tip of an iceberg. Their proper attention in rescue centers is one of the many tasks that a society needs to accommodate in its animal protection agenda. There has been slow progress in the field of wildlife rescue in the Neotropics

(Drews 1999c). At the turn of the century, however, various countries have well-established rescue centers, and information about the peculiarities of rescue techniques for Neotropical animals is becoming available.

Academics from the fields of biology, ethology, and veterinary medicine have a key challenge ahead: the production of material that visualizes the suffering of wild, Neotropical animals kept as pets, in relation to their social and ecological needs in the wild. An efficient integration of such material in a society with an affectionate and inquisitive attitude toward animals should trigger ethical concern about the habit of keeping wild animals as pets. A look at perceptions of bats has shown that education is a promising avenue for the improvement of social attitudes toward wild animals. Ultimately, animal-friendly attitudes should translate into animal-friendly actions. The absence of parrots in Neotropical households and the tolerance of bats in the attics will show the success in the endeavor to move toward a more compassionate, biologically literate society, respectful of wild animals.

## Acknowledgements

I am grateful to Humane Society International (HSUS/HSI, Washington, D.C.) for funding the Costa Rican and Nicaraguan surveys and the preparation of this manuscript. Stephen Kellert provided advice and documents during the early stages of the survey. The Regional Wildlife Management Program of the National University of Costa Rica and personnel from Unimer Research International (San José, Costa Rica) provided logistical support. My sincere thanks to the people of Costa Rica who were interviewed and shared their practices, attitudes, and knowledge about wildlife in a most forthcoming manner.

## Notes

<sup>1</sup>With four million inhabitants and 51,100 km<sup>2</sup>, Costa Rica is a small country.

<sup>2</sup>Rede Nacional de Combate ao Tráfico de Animais Silvestres (National Network for the Fight against Illegal Wild Animal Trade, [www.renecas.org.br](http://www.renecas.org.br)).

<sup>3</sup>Dogs are kept 1.2 to 1.3 times more often than cats in U.S. households (AVMA 1997 and American Pet Products Manufacturers Association 2000, respectively), and 1.5 times more often than cats in Australian households ([www.petnet.com.au/statistics.html](http://www.petnet.com.au/statistics.html), accessed March 17, 2000).

<sup>4</sup>Some species of parrot is kept in 91 percent of households that keep wildlife in Nicaragua.

<sup>5</sup>Venezuela has a population of about 23 million inhabitants, nearly six times more than Costa Rica. If extraction rates for the national pet market are similar in these countries, Venezuela would need about 150,000–240,000 parrot chicks to satisfy this demand.

<sup>6</sup>The humanistic attitude, which is similar to the sentimental dimension identified in Costa Rica, was the most common perspective of animals in a U.S. sample of adult citizens (Kellert 1989).

<sup>7</sup>Males represented 80 percent of the 24 people who reportedly hunted the previous year. Among these 24 people, 46 percent reported having hunted more than once in that year.

<sup>8</sup>30 percent of male and 13 percent of female adults fished in a river, 16 percent of male and 4 percent of female adults fished in the sea.

<sup>9</sup>The percentage of people participating in hunting has decreased in the United States in the past thirty years (Herzog, Rowan, and Kossow 2001).

<sup>10</sup>Spearman's correlation coefficient  $r=1.0$ ,  $n=5$ ,  $p<0.05$ .

<sup>11</sup>Chi-square=18.7,  $df=3$ ,  $p<0.001$ , chi-square=14.9,  $df=3$ ,  $p<0.01$ , respectively.

<sup>12</sup>According to the national census of 2000, there are 937,210 homes in Costa Rica.

<sup>13</sup>E.g., rated from dangerous to harmless, with four other options between them. Frequencies of the two options showing an inclination toward a negative perception were pooled to calculate percentages shown in Figure 4. Significant differences between males and females are indicated in Figure 3 by asterisks (chi-square tests, NS= not significant, \* =  $p<0.05$ , \*\*\* =  $p<0.001$ ).

<sup>14</sup>Chi-square=10.7,  $df=3$ ,  $p<0.02$ .

<sup>15</sup>In Nicaragua the incidence of wildlife kept as pets was significantly higher among middle and high strata households than among households of low socioeconomic level.

<sup>16</sup>Respondents were asked in Costa Rica, the United States, and Japan to state for each of the following five statements whether it was true or false: (1) spiders have ten legs, (2) most insects have backbones, (3) a seahorse is a kind of fish, (4) snakes have a layer of slime to move more easily, and (4) all adult birds have feathers.

<sup>17</sup>In line with this view, both ethical principles and logistical considerations account, in about equal proportions, for 74 percent of reasons put forward for not having ever had a wild animal at home. A further 5 percent indicated dislike for wild animals, and only 4 percent noted that keeping wild animals as pets is illegal.

<sup>18</sup>[www.acguamacaste.ac.cr](http://www.acguamacaste.ac.cr).

# Literature Cited

- American Pet Products Manufacturers Association (APPMA). 2000. *National pet owners survey 1999–2000*. Greenwich, Conn.: APPMA.
- American Veterinary Medical Association (AVMA). 1997. *U.S. pet ownership and demographics sourcebook*. Schaumburg, Ill.: Center for Information Management, AVMA.
- Barborak, J., R. Morales, C. MacFarland, and B. Swift. 1983. *Status and trends in international trade and local utilization of wildlife in Central America*. Turrialba, Costa Rica: Wildlands and watershed program, CATIE.
- Bedoya-Gaitán, M. 2000. Cacería y conservación de fauna en la comunidad indígena Ticuna de Buenos Aires. In: *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 177–188. Washington D.C.: Humane Society Press.
- Beissinger, S.R. 1994. La conservación de los psitácidos del neotrópico: Retos para los biólogos, gerentes, y gobierno. In: *Biología y conservación de los psitácidos de Venezuela*, ed. G. Morales, I. Novo, D. Bigio, A. Luy, and F. Rojas-Suárez, 141–147. ISBN 980-07-1717-X, Caracas: privately published.
- Benítez-García, M.A., and L. Durán-Fernández. 2000. Aspectos socio-culturales y políticos en las actuales actitudes hacia la fauna silvestre en México. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 98–117. Washington D.C.: Humane Society Press.
- Boher-Bentti, S., and R. Smith 1994. Comercio ilegal de guacamayas y loros. In: *Biología y conservación de los psitácidos de Venezuela*, ed. G. Morales, I. Novo, D. Bigio, A. Luy, and F. Rojas-Suárez, 277. ISBN 980-07-1717-X. Caracas: privately published.
- Carrillo, E., and C. Vaughan, eds. 1994. *La vida silvestre de mesoamérica: Diagnóstico actual y estrategia para su conservación*. Heredia, Costa Rica: Editorial de la Universidad Nacional EUNA.
- Cedeño, Y., and C. Drews. 2000. Comercio internacional de fauna silvestre en Centroamérica entre 1992 y 1996. Technical report. Programa Regional en Manejo de Vida Silvestre, Universidad Nacional, Heredia, Costa Rica.
- Clapp, R.B. 1975. *Birds imported into the United States in 1972*. Washington, D.C.: U.S. Department of Interior, Fish and Wildlife Service, Special Scientific Report—Wildlife No. 193.
- Clapp, R.B., and R.C. Banks. 1973. *Birds imported into the United States in 1971*. Washington, D.C.: U.S. Department of Interior, Bureau of Sport Fisheries and Wildlife, Special Scientific Report—Wildlife No. 170.
- De Alió, L.W. 2000. El uso de la fauna silvestre como mascota en Venezuela. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 129–136. Washington, D.C.: Humane Society Press.
- Desenne, P., and S. Strahl. 1991. Trade and the conservation status of the family Psittacidae in Venezuela. *Bird Conservation International* 1: 153–169.
- . 1994. Situación poblacional y jerarquización de especies para la conservación de la familia Psittacidae en Venezuela. In: *Biología y conservación de los psitácidos de Venezuela*, ed. G. Morales, I. Novo, D. Bigio, A. Luy, and F. Rojas-Suárez, 231–272. ISBN 980-07-1717-X. Caracas: privately published.
- Drews, C. 1999a. Wildlife in Costa Rican households—A nationwide survey. Technical report, Washington, D.C.: Humane Society International.
- . 1999b. Simpatía y empatía hacia la fauna: Las raíces de tenencia de mascotas silvestres. In *Rescate de fauna en el neotrópico*, ed. C. Drews, 31–52. Heredia, Costa Rica: Editorial Universidad Nacional.
- . 1999c. Rescate de fauna en el Neotrópico: cerrando el milenio. In *Rescate de fauna en el neotrópico*, ed. C. Drews, 495–520. Heredia, Costa Rica: Editorial Universidad Nacional.
- . 2000a. Caracterización general de la tenencia de animales silvestres como mascotas en Costa Rica. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 45–55. Washington, D.C.: Humane Society Press.
- . 2000b. Aspectos del mercado en torno a la tenencia de animales silvestres como mascotas en Costa Rica. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 147–160. Washington D.C.: Humane Society Press.
- . 2001. Wild animals and other pets kept in Costa Rican households: Incidence, species, and numbers. *Society and Animals* 9(2): 107–126.
- . 2002a. Attitudes, knowledge and wild animals as pets in Costa Rica. *Anthrozoös* 15(2): 119–138.
- . 2002b. Convivencia con murciélagos en Costa Rica. *Ambientico* 103: 12–13. <http://www.ambientico.una.ac.cr/drewsmurc.htm>.
- Eagly A.H., and S. Chaiken. 1993. *The psychology of attitudes*. Orlando, Fla.: Harcourt Brace Jovanovich College Publishers.
- Franke, J., and T.M. Telecky. 2001. *Reptiles as pets*. Washington, D.C.: The Humane Society of the United States.
- Gómez, J.R., and C. Drews. 2000. Movimientos internacionales de flora y fauna de los apéndices CITES en Costa Rica entre 1992 y 1998. Technical report. Heredia, Costa Rica: Programa Regional en Manejo de Vida Silvestre, Universidad Nacional.
- Hemley, G., ed. 1994. *International wildlife trade: A CITES sourcebook*. Island Press, Washington, D.C.
- Herzog, H., A. Rowan, and D. Kossow. 2001. Social attitudes and animals. In: *The state of the animals: 2001*, ed. D. Salem and A. Rowan, 55–69. Washington, D.C.: Humane Society Press.

- Holl, K.D., G.C. Daily, and P.R. Ehrlich. 1995. Knowledge and perceptions in Costa Rica regarding environment, population, and biodiversity issues. *Conservation Biology* 9: 1548–1558.
- Inskipp, T.P. 1975. *All heaven in a rage: A study of the importation of birds into the United Kingdom*. London: Royal Society for the Protection of Birds, published in cooperation with the Royal Society for the Prevention of Cruelty to Animals.
- Kellert, S.R. 1980. Phase II: Activities of the American public relating to animals. Technical report, Washington, D.C.: U.S. Fish and Wildlife Service.
- . 1989. Human-animal interactions: A review of American attitudes to wild and domestic animals in the twentieth century. In *Animals and people sharing the world*, ed. A.N. Rowan, 137–175. Hanover and London: University Press of New England.
- . 1993a. Attitudes, knowledge, and behavior toward wildlife among the industrial superpowers: United States, Japan, and Germany. *Journal of Social Issues* 49: 53–69.
- . 1993b. The biological basis for human values of nature. In *The biophilia hypothesis*, ed. S.R. Kellert and E.O. Wilson, 42–69. Washington, D.C.: Island Press.
- . 1996. The value of life. Washington, D.C.: Island Press.
- Kellert, S.R., and J.K. Berry. 1980. *Phase III: Knowledge, affection and basic attitudes toward animals in American society*. Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service.
- Martínez, N. 2000. Situación actual del manejo de la fauna silvestre en Bolivia. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 3–11. Washington D.C.: Humane Society Press.
- Medina, C., and A. Montero. 2001. Censo de la fauna silvestre en cautiverio en la comunidad de Nueve de Enero, Corregimiento de Amelia D. de Icaza, Distrito de San Miguelito, Panamá. Honors diss., Panama City, Panama: Escuela de Biología, Universidad de Panamá.
- Morales, G., and P. Desenne. 1994. Plan de acción y conservación de los psitácidos venezolanos. In *Biología y conservación de los psitácidos de Venezuela*, ed. G. Morales, I. Novo, D. Bigio, A. Luy, and F. Rojas-Suárez, 299–307. ISBN 980-07-1717-X. Caracas: privately published.
- Mordi, A.R. 1991. *Attitudes toward wildlife in Botswana*. New York: Garland Publishing Inc.
- Muñoz-López, E., and A. Ortíz-Latorre. 2000. Rehabilitación y actitudes hacia la fauna silvestre en Chile. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 71–84. Washington, D.C.: Humane Society Press.
- Nassar-Montoya, F. 2000. Actitud y pensamiento sobre la fauna silvestre en Colombia. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 27–43. Washington, D.C.: Humane Society Press.
- Nassar-Montoya, F., and R. Crane, eds. 2000. *Actitudes hacia la fauna en Latinoamérica*. Washington, D.C.: Humane Society Press.
- Nilsson, G. 1977. *The bird business: A study of the importation of birds into the United States*. Washington, D.C.: Animal Welfare Institute.
- Pérez, R., and T. Zúñiga. 1998. *Análisis del comercio de psitácidos en Nicaragua*. Managua, Nicaragua: WCS/WWF.
- Poten, C.J. 1991. A shameful harvest: America's illegal wildlife trade. *National Geographic* 180 (9): 106–132.
- Princeton Survey Research Associates. 1991. Great American TV Poll #2—USPSRA. 91TV02.R30. Sponsored by Troika Productions and Lifetime Television.
- Ramos, L.A., and Z. Ricord de Mendoza. 2000. Tenencia de fauna silvestre en El Salvador. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 85–95. Washington, D.C.: Humane Society Press.
- Redford, K.H. 1992. The empty forest. *BioScience* 42(6): 412–422.
- Rede Nacional de Combate ao Tráfico de Animais Silvestres. 2001. *1º relatório nacional sobre o tráfico de fauna silvestre*. Brasília: Rede Nacional De Combate ao Tráfico De Animais Silvestres.
- Rodríguez, J. 2000. Situación de la vida silvestre en Panamá. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 119–128. Washington, D.C.: Humane Society Press.
- Roper Center for Public Opinion. 1994. Question US-PSRA. 092194, R24S. Times Mirror. July 12.
- Rutberg, A.T. 1997. The science of deer management: An animal welfare perspective. In *The science of overabundance: Deer ecology and population management*, ed. W. J. McShea, H.B. Underwood, and J.H. Rappole. Washington, D.C.: Smithsonian Institution Press.
- Schulz, W. 1985. Einstellung zur natur. Ph.D. diss., Ludwig-Maximilians-Universität.
- Solís, V., A. Jiménez, O. Brenes, and L.V. Strusberg. 1999. *Listas de fauna de importancia para la conservación en Centroamérica y México*. San José, Costa Rica: IUCN-ORMA, WWF-Centroamérica.
- Touzet, J.M., and I. Yépez. 2000. Problemática del tráfico de la fauna silvestre en el Ecuador. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 57–69. Washington, D.C.: Humane Society Press.
- Trama, F., and O. Ramírez. 2002. Decomisos de fauna silvestre en carreteras: Un indicador del éxito de campañas de concientización? Technical report. Heredia, Costa Rica: Programa Regional en Manejo de Vida Silvestre, Universidad Nacional.
- Valverde, J.F. 2000. Programa de educación biológica en el área de Guanacaste, Costa Rica. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 214–219. Washington, D.C.: Humane Society Press.
- Vargas-Mena, E. 2000. Significados

- culturales de la tortuga verde (*Chelonia mydas*) en el Caribe costarricense. In *Actitudes hacia la fauna en Latinoamérica*, ed. F. Nassar-Montoya and R. Crane, 161–176. Washington, D.C.: Humane Society Press.
- Wilson, E.O. 1984. *Biophilia*. Cambridge: Harvard University Press.