

*Full Length Research Paper*

# Regional zoos in Brazil and their specific role for environmental education

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**This paper evaluates the specific role that regional zoos might play in promoting general biodiversity education. The perceptions of visitors of four zoos in Santa Catarina State, Brazil were obtained through the application of 400 questionnaires at each zoo. Almost half the visitors sought 'leisure in nature' with their families, while in one zoo, the majority of visitors aimed to learn about the fauna through the educational project at this institution. In response to this research, we propose that the primary role of regional zoos should be focused on the promotion of educational programs for environmental conservation of biodiversity.**

**Keywords:** Environmental education, role of zoos, visitor perceptions, native fauna, biodiversity conservation

## INTRODUCTION

The following extensive review of the literature is provided in order to adequately introduce the theme of the article. Zoos are one of the more popular social institutions, receiving thousands of visitors yearly, giving a global total of more than 700 million participants (Gusset and Dick, 2011). The number of visitors to zoos often exceeds the population of their host cities (Auricchio, 1999), suggesting multiple visiting and that zoos are also popular with visitors. Despite these statistics, the zoo world still under-utilizes its potential for the conservation of endangered species (Azevedo et al., 2012), for the conservation of biodiversity (Hoban and Vernesi, 2012), for the development of scientific knowledge about native animals (Conway, 2011; Pritchard et al., 2012), and for educational programs aimed at public awareness of environmental issues (Wheater, 1995; Marandino and Rocha, 2011; Meadows, 2011).

### Reasons for visiting zoos

Little information is available on the attitudes of visitors to zoos, especially regarding captive animals. The general public outside of the zoo environment has a number of

negative perceptions about confined animals, such as their being bored and sad. Actual visitors have a more positive perception of zoo animals and a greater awareness of the way in which such animals enrich the environment (Reade and Waran, 1996).

In relation to these perceptions, visitor attitudes and preferences were assessed in the Jersey zoo (Trinity, England) through demographic data and to evaluate the effectiveness of informal educational media such as the guidebook, signs and keeper talks. Visitors were asked for their perceptions of the work of the zoo, their personal experience of a visit and their evaluation of the educational facilities offered. Public attitudes to wildlife conservation and the influence of the zoo were also assessed. A positive influence on visitor attitudes towards conservation was found (Broad, 1996; Moss and Esson, 2010).

In another study at Kent, England, visitors were found to be willing to spend much more time looking for and watching monkeys in trees than in cages (E. C. Price et al., 1994). Kreger and Mench (1995) found that visitors' interest in less familiar animals may be sufficiently strong that they are willing to pay extra fees to participate in additional programs involving direct human-animal interaction, such as theme-centered exhibitions, animal

rides, and public feedings. Such programmed activities can be used to enhance and focus much more clearly on the education and conservation mission of zoos.

These results suggest that developing more naturalistic zoo exhibits may have considerable benefits not only for the animals involved, but also for the public education on conservation issues.

### **Animal extinctions and biodiversity conservation**

One of the key roles of zoos is to preserve biodiversity, especially in relation to endangered species (Miller et al., 2004; Rees, 2005; Gusset and Dick, 2011; Azevedo et al., 2011). In some cases, the breeding of endangered animals in zoos has staved off extinction. Gorayeb (1994) suggests that the treatment given to animals depends on the importance attributed to them by humans. Much of humanity holds the view that the world was created for the good of humans and that other species should be subordinated to human wishes and necessities (Thomas, 1988). (Prada, 1997) suggests that this anthropocentric paradigm is leading to the destruction of our planet at an alarming rate. Many people overlook the evidence that animals and plants can live very well without them. However, the opposite is not true. In fact, humans cannot survive without a healthy and diverse biosphere.

Advances in ecology and the conservationist ideals are factors that are beginning to change this outlook. It is hoped that humans will appreciate that species are the result of evolution, and play a vital role in maintaining the equilibrium of the entire biosphere. The severity of environmental problems will not decrease unless action is taken to develop and encourage greater environmentally responsible behavior (E. A. Price et al., 2009).

While species extinctions are a natural evolutionary phenomenon, over recent time, 99% of the extinctions are attributable to human activities (Primack and Rodrigues, 2001). When people become aware of the causes of extinctions, a higher level of involvement with environmental themes becomes possible. Extinction is considered the biggest threat for biodiversity and conservation and is correlated with the increase in human populations (Morris, 1990; Primack and Rodrigues, 2001). The public must realize how extinction is the result of the destructive action of the human species.

This is not always a straightforward matter, however. For example, hunting has been important for human survival. Notwithstanding, survival hunting has in many situations been transformed into sport hunting, which has the capacity to generate high casualties and of extinguishing populations (Morris, 1990). Hunting also selects negatively, privileging the weaker animals, because these tend to be ignored by hunters.

Knowledge of how pollution acts in nature is important for environmental education. Citizens often do not

perceive the damage caused by routine actions on the environment and the impact these actions sometimes have on human health. There is a need to understand the human capacity to pollute the environment and how this can be avoided.

Public consciousness about biodiversity appears to be high if the findings of research in the Philippines (Bagarinao, 1998) and in Switzerland (Lindemann-Matthies and Bose, 2008) are general indicators. But biodiversity conservation, along with other issues such as global warming, poverty, and wealth, represents an urgent environmental issue globally. Even two decades after the usage of the term biodiversity (Wilson and Peter, 1988), now used to define biological variation at the genetic, species, and ecosystem levels (Hooper et al., 2005), and more than a decade after the Convention on Biodiversity came into force, public knowledge regarding biodiversity remains limited.

It does not seem possible to significantly reduce the current rate of biodiversity loss without an active participation of society. First, society at large has to be convinced of the importance of biodiversity before meaningful measures can be implemented (Hanski, 2005). Efforts are therefore required to educate the public accordingly. Following from this proposal, an important future direction in zoo management might well be to focus on the enhancement of public awareness of biodiversity and community species interactions.

### **Knowledge of native animals**

Wildlife programs and documentaries on television help to produce special concerns and sensibilities and many zoo visitors have been influenced by this medium (Morris, 1990). It is interesting, however, that historically, zoos largely exhibited non-indigenous species. This was unfortunate, because zoos may represent the only contact of many people living in cities with animals (Weisberg, 2000). Thus, the opportunity to become familiar with the local fauna was lost. Both children and adults are usually more interested in large, intelligent animals (charismatic mega fauna). Zoo visitors are usually far more interested in mammals than in other species of possible value for conservation (Moss and Esson, 2010).

People often avoid small invertebrates like insects and spiders because they are so unlike humans (Kellert, 1993) yet these species are vital to healthy ecosystems. Biodiversity education needs to raise emotional concern and sympathy for a broad range of species (Kellert, 1996), not just the charismatic ones. Zoos which concentrate efforts on local faunas can attract visitors, and this can have the impact of reducing human impact on reserves. There is no evidence that addressing conservation goals by shifting emphasis to smaller

animals would necessarily conflict with the need for zoos to operate profitably (Balmford et al., 1996; Balmford, 2000). On the other hand, the connection of tourists in both wildlife reserves and zoos for charismatic wildlife has been shown to positively influence pro-conservation behaviors for both individual species and general biodiversity (Skibbins et al., 2013). Each vertebrate flagship species may be recognized as a collection of miniature ecosystems supporting unique communities of symbiotic arthropods and other parasites, thus representing an ideal arena for the conservation and breeding of threatened invertebrates (Adler et al., 2011).

The preference for exotic wild animals may, however, also be due to the influence of animal documentaries in the media. Most documentaries in Brazil, for example, deal with the African megafauna. Another factor contributing to the reference for exotic animals is the content of school books and children's literature, particularly before the nineties. In this material, the local Brazilian fauna is largely absent, and children often learnt more about lions than jaguars (Auricchio, 1999).

Appreciation of the native fauna may establish an identity with the country when animals exhibited in Brazilian zoos are largely native (82%), which helps to foster awareness of the local fauna (Auricchio, 1999). The more regional this fauna becomes, the closer the association with the community. The value and beauty of free animals living in surrounding areas may then be appreciated.

### Role of the ideal zoo

Modern zoos place priority on protecting species and on maintaining the well-being of their animals. Historically (before the emergence of television), zoos have exhibited 'exotic' animals from distant places that normal folk would never otherwise see. But with the growth of ever larger cities people have become isolated from even local wildlife (Morris, 1990). At the same time, the media show how animals really live, and programs often emphasize the importance of the environment on which these animals depend. This has brought new pressure for zoos. Gradually, small cages with cement floors and excessive cleaning are being substituted by enclosures that stimulate the natural environment of the animals. Most of the public, now alerted by documentaries and films about the importance of natural habitats, do not want to see bored animals pacing small enclosures.

Zoos should no longer confine animals, having an important role in the preservation of animal diversity of our planet. The best strategy is to protect communities in their natural environments – *in situ* preservation (Primack and Rodrigues, 2001). Zoos have an important role in the future as animal sanctuaries (Weisberg, 2000). The next step for zoos is to successfully implement *ex-situ*

conservation programs, that is, zoos should function as stock providers for nature reintroductions of successfully bred wild animals (Rees, 2005; Gippoliti, 2012; Pritchard et al., 2012).

### Environmental education

Modern zoos increasingly participate in programs of animal conservation (Cooper et al., 1998; Muurmans, 2001; Smith et al., 2007; Price et al., 2009; Conde et al., 2011; Fabregas et al., 2012; Goodman et al., 2013), environmental education (Meyer, 1988; Esson and Cowan, 1998; Yoco et al., 2011; Chang et al., 2011; Esson and Moss, 2013), basic research (Doolittle and Grand, 1995; DiVita, 2001), and entertainment for the paying public (Turley, 2001). Because communities become involved with these institutions, they may have a fundamental role for the informal education of its public, with animals generating themes in environmental preservation.

The activities of organized institutions are essential, because only they can legislate, coerce, fine and repress actions that degrade the environment. Individual action represents a first step, but initiatives only occur when the citizen learns, comprehends and grasps the magnitude of his acts. Formal teaching must lay the foundation that will provide new generations with concepts and examples. Thus the errors of the past, reflecting the late awakening of society to environmental issues, will not be repeated.

Zoos today represent the only contact of many citizens with nature. Zoo visitors need to be able to form a personal connection to the issues surrounding conservation (Swanagan, 2000). Children represent a significant proportion of zoo visitors (Turley, 2001). Educational programs directed towards children are accordingly most effective in changing sensitivities towards nature (Turley, 2001). The traditional role of the zoo in public entertainment must be maintained, in addition to the modern roles in conservation, education and research (Reade and Waran, 1996). Zoos deal with wildlife in humanity's closest, most constant, and most interdependent relationship with wild animals (Conway, 1995). Conservation education remains the single most important function of the modern zoo (IUDZG/CBSG, 1993; Balmford et al., 1995; Moss and Esson, 2010, 2013; Meadows, 2012; Fabregas et al., 2012).

A very successful partnership may be established between school educators and the zoo staff. When the zoo visit takes advantage of its educational space, it can become an instrument for interactive and stimulating learning. This may mark the life of a student in a significant and instructive way. The interaction between zoos and universities can promote graduate programs in conservation biology. The university may provide students and formal course work, public network

resources, and other teaching facilities, while the zoo can provide office space, animals, and outdoor learning environments (Marcellini and Murphy, 1998; Chang et al., 2011).

Conservation and education of conservation is becoming the main role of the zoo today (Mallinson, 1984; Robinson, 1989; Miller et al., 2004; Meadows, 2012; Esson and Moss, 2013). The history of conservation generated by zoos is documented since Sheppard (1983). Programs of conservation education have been evaluated for parks in Central America (Jacobson, 1991), and the future of biodiversity has been linked to the future of zoos (Robinson, 1992). Zoological parks become evolving institutions with respect to conservation of biological diversity. Education becomes the primary function for the conservation of biodiversity (Rabb, 1994). A key objective in zoo evolution is to focus upon species and its habitat as the unit of evolution (Conway, 1995).

Whitehead (1995) considered the role of zoological gardens as vehicles for teaching about diversity and conservation, concluding that zoos represent a grossly under-utilized force for the conservation of endangered species, for the development of scientific knowledge, and for the increase of public awareness through environmental education programs. Strategic planning for species conservation has been devised at the Jersey zoo (Durrell, 1998), and this exposition now includes a module on Conservation Education (Esson, 2001). Present exhibitions now invest massively in technology as an aim for attaining environmental education and fulfilling the educational role of zoos (Chang et al., 2011; Marandino and Rocha, 2011).

This paper aims to evaluate the perceptions of zoo visitors in Santa Catarina, Brazil, and to suggest future directions for regional zoo management regarding the specific role they might play in promoting education about biodiversity.

## METHODS

From September 2000 to May, 2001, 2126 questionnaires (Appendix) were applied on weekends and holidays to the visitors of the following zoos in Santa Catarina: Cyro Gevaerd (Balneário Camboriú), Fundação Hermann Weege (Pomerode), Parque Ecológico e Zoobotânico (Brusque) and Parque Beto Carrero World (Penha). Participants were chosen by chance, among those with ages of 12 years or above. A sample of 400 questionnaires was established as a minimum for each zoo, certifying a level of confidence of 95% for the results (Labes, 1998).

The questions were arranged into five main topics: 1) Reasons for visiting zoos: a) leisure; entertainment with family; c) to observe animals; d) to establish close

contact with animals; e) other. 2) Causes and effects of extinctions: a) habitat destruction; b) environmental pollution; c) hunting; d) illegal commerce; e) do animal extinctions affect humans directly or indirectly?; f) other. 3) Knowledge of native animals: a) animals you most liked in zoo; b) animals you would have liked to have seen in zoo; c) cite animals threatened by extinction; d) cite three native animals you recollect at the moment. 4) Role of the ideal zoo: a) to house adapted animals; b) to exhibit animals that can be seen from close up; c) to contain many animals from other countries; d) to protect many Brazilian animals threatened by extinction; e) to provide educational programs; f) other. 5) Environmental education: a) indicate the ideal medium for environmental programs: newspapers/magazines; TV; internet; schools and universities; zoos; other; b) should zoos develop programs of environmental education that complement those of schools and universities? (yes or no).

To guarantee the validity and confidence in our research instrument, we preliminarily conducted a pilot sampling of questions with 30 visitors for each zoo. These questions served to produce the final questionnaire with both closed and open inquiries. We aimed to evaluate the reasons of the public for visiting zoos, and their awareness of biodiversity issues, including the causes and effects of extinctions, their knowledge of native animals, and the roles they attribute to an ideal zoo.

In the analysis of the answers, the visitor's remarks were grouped (or regrouped, in the case of responses to open questions) into the pre-established categories listed above, and received a qualitative/quantitative treatment.

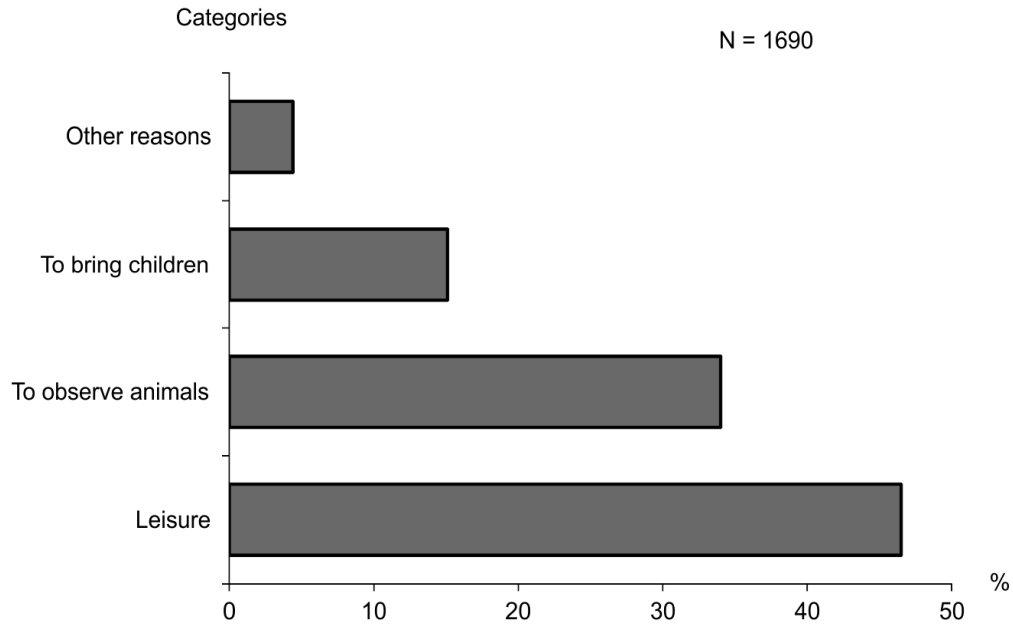
## RESULTS

Of the 2,126 applied questionnaires, only 1690 had results properly filled in: 452 were from the Beto Carrero (BC) park, 423 from the Cyro Gevaerd (CG) zoo, 409 from the zoo in Pomerode (PO) and 406 from the zoo and botanical park in Brusque (BR).

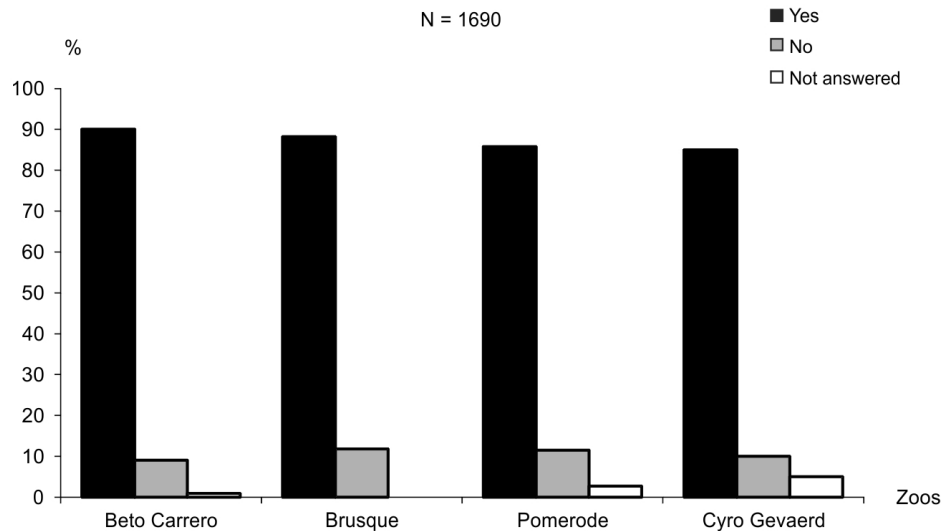
These data were collected several years ago, but certainly remain true today. The regional zoos under inquiry have not changed their management perspectives since. Visitors have not been significantly exposed to the changing roles of modern zoos in a world of accelerating man-inflicted biodiversity loss.

Regarding the reasons for visiting zoos (Figure 1), 45% of the interviewed visitors to the four zoos sought an agreeable place in nature for leisure and entertainment. Interest in knowing animals rated second (36%). This was followed by 14% that come to these institutions to bring their children, while 4.7% have special motives, such as attending jobs in restaurants and shops inside the zoos, or accompanying excursions.

Notwithstanding (Appendix, from answers to question



**Figure 1.** Reasons listed by visitors for seeking zoos in Santa Catarina, Brazil (data combined for all four zoos)



**Figure 2.** Answers of visitors to zoos in Santa Catarina, Brazil, to the question: "Can the extinction of an animal affect the human being?"

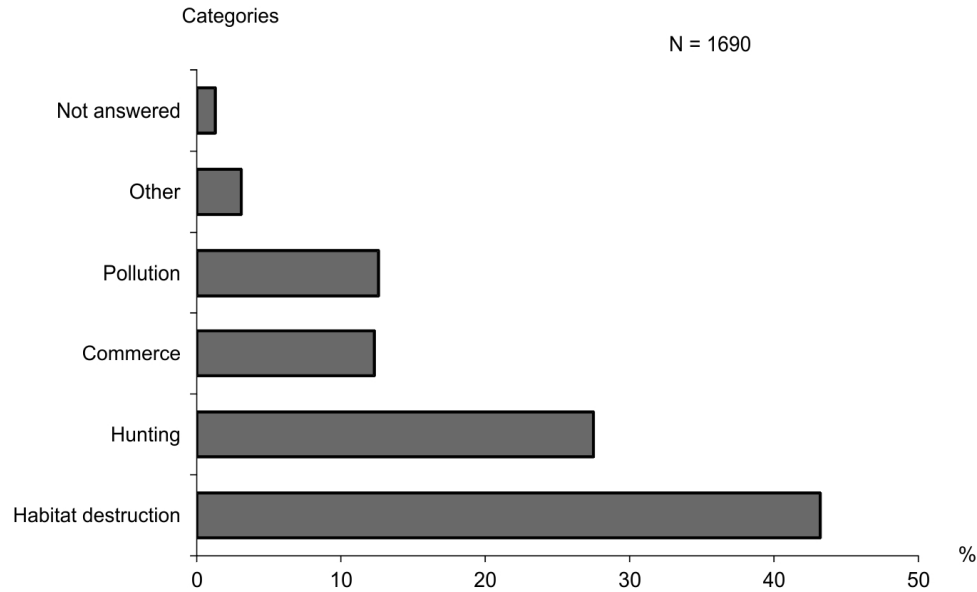
17), many visitors (60%) to one park (CG) sought the place to learn more about the animals. Only 23.2% of these visitors were interested specifically in environmental education.

In this study, over 85% of visitors understood that species extinction may influence their lives directly or indirectly (Figure 2).

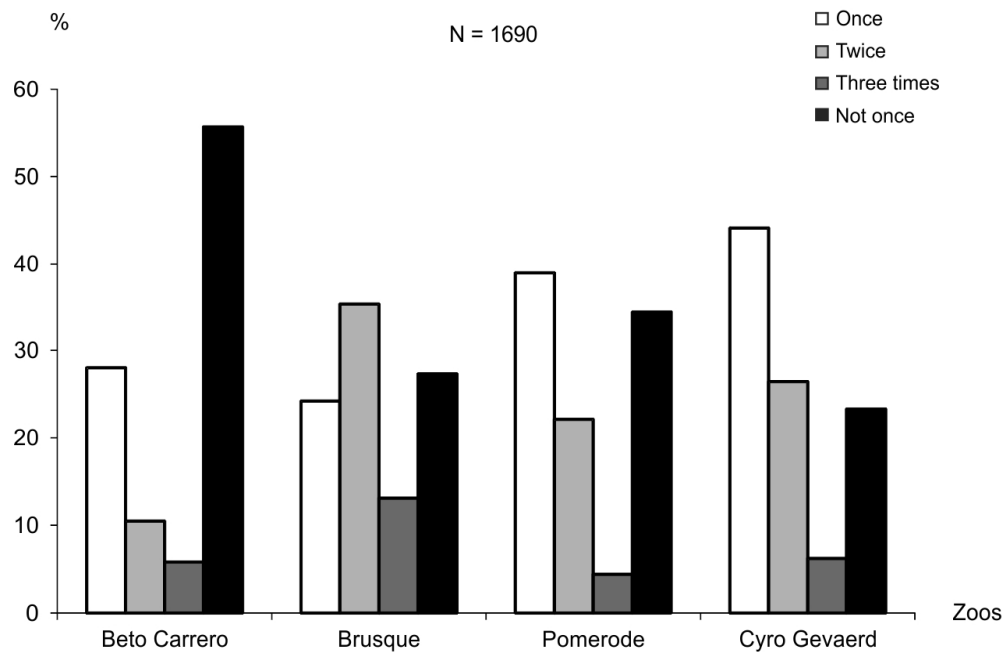
A good number of visitors in the four zoos (Figure 3) attributed extinctions to the destruction of habitats (43%). Hunting was cited by 29% of visitors and was considered

responsible for an unfair treatment of animals. Pollution, cited by 13% of visitors, was directly related to habitat destructions, but operated in a more subtle manner.

Knowledge of native fauna has only been correlated with species endangered by extinction. When solicited to indicate the name of three native animals, inevitably the great majority only recollected exotic species. Figure 4 shows how rarely Brazilian animals were cited. In zoo BC, 54.6% did not cite native animals, which may be related to the reduced number of native species in the



**Figure 3.** Causes of animal extinctions according to zoo visitors in Santa Catarina, Brazil (data combined for all four zoos; Other = introductions of exotic species, genetic improvement).



**Figure 4.** Frequency with which native animals were cited by zoo visitors in Santa Catarina, Brazil.

stocks of this institution and its emphasis on exotic wild animals. In the remaining institutions, the percentage was less than 26.3% in BR, 33.9% in PO and 25.5% in CG. The largest occurrence of native Brazilian animals was registered in Brusque, with 13.3%. This bias towards exotic species persisted when visitors indicated the animal which they most liked in the different zoos. (figure 4)

Despite zoos being seen as places for leisure and relaxing (15%), the public expected institutions to aim at conserving animals endangered by extinction (44.1%) and to develop environmental education programs (26.6%) (Figure 5).

The most desired ideal for a zoo (Figure 6), among options presented to visitors in the questionnaires, was to have animals housed that were well adapted to their

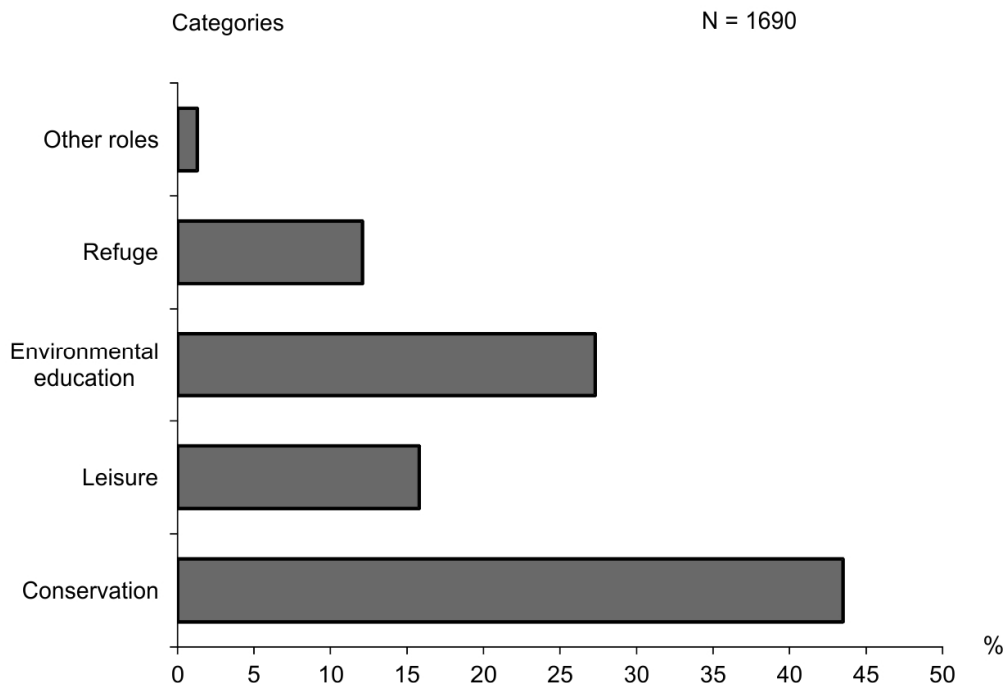


Figure 5. Roles of zoos according to visitors in Santa Catarina, Brazil (data combined for all four zoos).

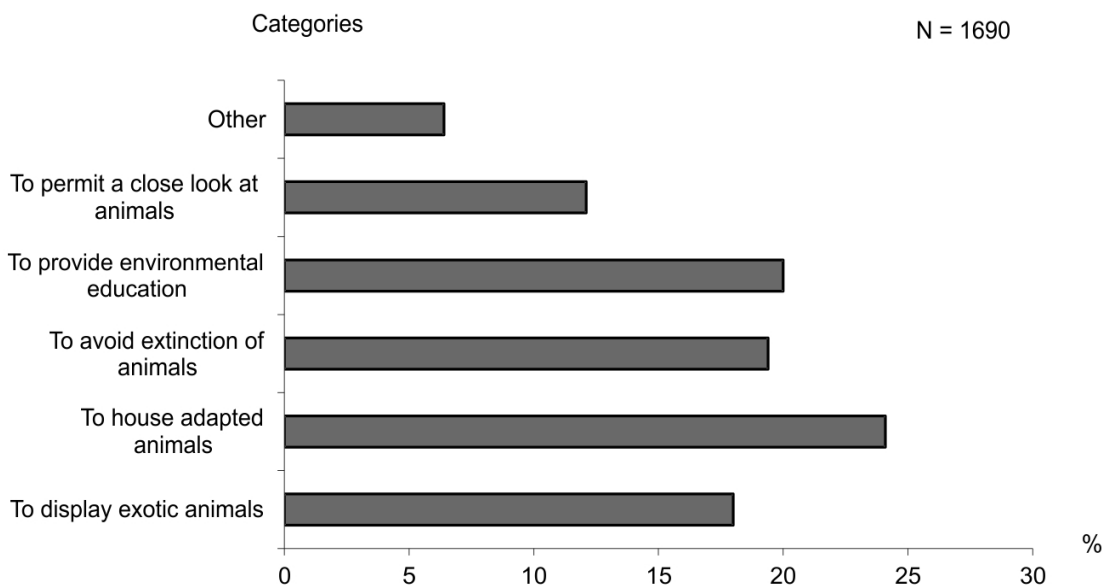


Figure 6. The role of the ideal zoo in Santa Catarina according to visitors (data combined for all four zoos).

environments, which was selected by approximately one-quarter (24,4%) of respondents. Only a slightly smaller number of visitors indicated a preference for education programs (20%) or for maintaining species endangered by extinction (19%).

Reinforcing the idea of using the institutional space for educational programs, 94.0% of visitors agreed that zoos were appropriate places for environmental education, and

only 6.0% responded negatively to this question (Appendix, responses to question 18).

**DISCUSSION**

Based on the environmental perceptions of zoo visitors, we infer that a positive vision for the role of zoos exists.

This follows a world tendency to make them appropriate not only for family leisure in contact with nature, but for establishing the well being of animals as their priority. According to the participants in the inquiry, zoos must exist for the conservation of species and, at a lower level of perception, for the development of educational programs that complement formal teaching, substituting the image of places of animal imprisonment for the delight of spectators. Visitors desired mostly to find animals well adapted to their environment (Figure 4).

Only one of the studied zoos (CG) has regular educational programs. At this study site, 60% of the visitors sought to learn more about the animals. This permits the user to integrate leisure with learning, reinforcing the hypothesis that this represents the best potential for modern zoos. Almost half of the visitors in our study seek zoos for entertainment and leisure in nature. It would be desirable, however, if significantly more of our visitors became interested specifically in environmental education (Figure 5).

One of the main points of maintaining animals in captivity is to involve the local human community in efforts for their preservation. The reintroduction of a species into an area requires involvement and change of local habits, so that the community understands the importance of the preservation of the species and its habitat. Visitor perceptions of the dangers of extinction and of the need for conservation are more frequent than perceptions that the zoo must provide environmental education programs for visitors (Figure 5). Thus, environmental education must represent a more focused activity in regional zoos.

When solicited to name three native animals, the great majority of visitors only recollected exotic species. Figure 4 indicates how rarely native Brazilian species were cited.

Visitors recognized the main causes and consequences of extinction. The native animals recollected most often were those vulnerable to extinction that have most appeal in the media, such as the golden lion tamarin (*Leontopithecus rosalia*) and the hyacinth macaw (*Anodorhynchus hyacinthinus*). There is a clear deficiency in the broadcasting of the Neotropical fauna, as indicated by the great interest of visitors in exotic animals.

Most visitors are aware that extinctions may affect their lives directly or indirectly. Hunting is cited by more than one-fourth of visitors as responsible for an unfair treatment of animals (Figure 1). On the other hand, pollution was considered by 13% of visitors to be related to habitat destructions, although the majority attributed animal extinctions directly to the destructions of habitats (Figure 1).

This paper indicates a general, but clearly insufficient, predisposition of the public to get involved in environmental causes. We recommend that zoos dedicate more attention to the systematic development of

environmental education projects which involve schools and family groups that visit these institutions. If zoos are going to make breakthrough contributions to biodiversity perception and environmental conservation, we believe the present focus on single species will have to change to whole functioning communities. Biodiversity preservation needs more than breeding of single species.

Under this perspective, regional zoos and, by implication, also public aquaria, botanical gardens, and city parks, still have a key role to play. We suggest that regional zoos in particular should select as their main focus a habitat from the surrounding environment and organize both their main expositions of animals and environmental education programs around the interactions of species living therein. The links among myriads of invertebrates from diverse trophic levels and distinct habitats need to be understood for a growing public perception of biodiversity, its effects throughout the community, and the consequences of species subtractions and area reductions to the overall equilibrium of these ecosystems.

## CONCLUDING COMMENTS

Zoos have high educational potential. Representative animals can be used to generate themes on environmental education. Zoos may fulfill an important role in informal learning for visitors.

We evaluate the environmental perceptions of visitors of four zoos in Santa Catarina State, Brazil. The most obvious limitations in conservation perceptions relates to the low awareness of, and little interaction with, the native fauna. Preferred animals were exotic species, but concern for endangered native species does occur, mostly regarding the golden lion tamarin. Participants understand that extinctions influence quality of life and recognized habitat destruction as the main cause of extinctions.

Zoo visitors in Brazil are only partially aware that zoos are ideal places for environmental education. Although almost half of visitors seek leisure in nature with the family, at least in one zoo the majority aimed to learn about the fauna, in response to the educational project of this institution. Almost half of the visiting public was aware of the conservation role of zoos for endangered species, with fully one-fourth recognizing zoos as the ideal place for environmental education.

Animal welfare should be promoted, and efforts towards preventing the extinction of the endangered fauna from the immediate surroundings represent a priority. Zoos have a privileged role for environmental education at all levels from the lay public to tertiary education, and for research of wildlife and their interactions with human communities.

The most promising management plan for regional



zoos will be to select interacting communities from the surrounding environments and to concentrate research and environmental education programs on themes relating to the interrelationships of species in these habitats. These may then be selected furthermore as themes for public awareness programs, zoological research of native populations, breeding experiments, *in situ* introductions of animals back into protected areas, and any forms of promoting a possible coexistence of human and animal life in nature. Zoos have an increasing role as small conservation units for diversity preservation within cities and as environmental labs in a growingly species-poor world.

Conservation implies active management of human-nature interactions, being as much about people as about species and ecosystems (Kaplan et al., 1998; Mascia et al., 2003). Reconnecting people and nature is a major challenge for future conservation biology (Balmford and Cowling, 2006). Environmental literacy is a culturally specific body of knowledge that fosters particular ways of thinking and acting in the world. This makes biodiversity an excellent topic to approach through multidisciplinary frameworks and from different cultural viewpoints (Lindemann-Matthies and Bose, 2008).

The success of these suggested management programs of environmental education and research should result in (1) exchange of educational programs between schools and universities with zoos; (2) internationally supported research at all levels, integrating the native fauna and the surrounding habitats; and (3) a better public awareness to promote the best management programs for the preservation of endangered native species.

The development of zoos and related city parks are tied to the future of biodiversity. These small-scale, city-bound, conservation units represent the environmental labs of the world and should become the main conservation centers in the not-so-distant future. Every zoo must realize that its mission is to conserve wildlife and natural habitats though changing the attitudes of its visitors (Norton et al., 1995). Modern zoos have changed their mission from the curiosity cabinets of the previous century (Poliseli and Christoffersen, 2012) (in particular as show-rooms for exotic animals) to progressive leaders in conservation biology and endangered species management (Adler et al., 2011).

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**Appendix.** Questionnaire used for visitors to zoological parks in Santa Catarina, Brazil

1) City: \_\_\_\_\_ State: \_\_\_\_\_ 2) Age: \_\_\_\_\_ 3) Sex: \_\_\_\_\_  
 4) Profession: \_\_\_\_\_ 5) Civil state: \_\_\_\_\_  
 6) Number of children: ( ) up to 6 years old ( ) up to 18 years old ( ) more than 18 years old

7) Educational degree  
 ( ) fundamental ( ) medium ( ) third grade ( ) incomplete ( ) complete course: \_\_\_\_\_

8) Mean monthly income:  
 ( ) up to R\$1000 (US \$500) ( ) R\$1000 to R\$3000 ( ) R\$3000 to R\$6000 ( ) more than R\$6000

9) How did you arrive at the park (zoo)?  
 ( ) your car ( ) bus ( ) on foot ( ) tourist package ( ) other \_\_\_\_\_  
 10) Are you accompanied by:  
 ( ) family ( ) friends ( ) school ( ) alone ( ) others \_\_\_\_\_  
 11) Which is the frequency of your visits?  
 ( ) first time ( ) weekly ( ) monthly ( ) annual ( ) \_\_\_\_\_

12) During your school life (or university life) was environmental education a part of your curriculum?  
 ( ) yes ( ) no

13) What motivated your visit to the park (zoo)? **Mark only one alternative**  
 ( ) for leisure ( ) to pass the day in contact with nature ( ) observe animals ( ) bring children others \_\_\_\_\_  
 14) Write the name of three native animals that you recollect at the moment:  
 a) \_\_\_\_\_ b) \_\_\_\_\_ c) \_\_\_\_\_  
 15) Which animal would you like to see in this zoo? \_\_\_\_\_  
 16) Which animal did you most like in this zoo? \_\_\_\_\_

17) In your opinion, how should an ideal zoo be? **Select only one alternative**  
 ( ) with many animals from other countries  
 ( ) with well adapted animals  
 ( ) with many Brazilian animals threatened by extinction  
 ( ) with educational programs  
 ( ) where the public can see animals easily and from close up  
 ( ) others \_\_\_\_\_  
 18) Should zoos develop environmental programmes complementing those in schools and universities?  
 ( ) yes ( ) no  
 19) Do you know the name of some animal threatened by extinction?  
 ( ) I don't recollect ( ) yes → which? \_\_\_\_\_  
 20) Can the extinction of a species affect the human being directly or indirectly?  
 ( ) no ( ) yes ( ) others \_\_\_\_\_

21) Which of the reasons below is the most important for the extinction of an animal?  
 ( ) destruction of the place in which the animal lives  
 ( ) predatory hunting  
 ( ) illegal commerce  
 ( ) environmental pollution  
 ( ) others: \_\_\_\_\_

22) Which medium best informs on subjects related to environmental education? **Indicate only one alternative**  
 ( ) TV ( ) TV by signature ( ) internet ( ) magazines/newspapers ( ) formal education ( ) zoos  
 others: \_\_\_\_\_