

# The changing face of zoos: centres for conservation or a panacea in an age of extinction?

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## Abstract

*Zoos and wildlife parks are generally perceived as centres for conservation, a vital component in the fight against species extinction, but how, and how effectively, do such institutions achieve this aim? A review of several of the world's most prominent zoos (San Diego, Bronx, Great Plains, London, and Melbourne Zoos) reveals a common set of conservation oriented goals such as increasing public awareness of conservation issues, developing wildlife research programs and preserving and breeding endangered animals. Education programs offer participants an opportunity to learn about animals and plants at risk from extirpation or extinction plus their natural ecosystems and the pressures they face. Zoo research scientists champion the benefits of studying wildlife under controlled conditions but critics argue that such research merely aims for improved maintenance of zoo specimens rather than supporting the conservation of animals in the wild. Captive breeding programs in particular come under fire; opponents highlight the poor history of successful reintroductions to the wild plus the unviable economics of such ex situ programs compared with in situ fieldwork. Concentrating less on large mammals might increase conservation outputs but the paying public is perceived to favour high-profile species' exhibits. The real conservation value of zoos and parks would seem to lie more in the championing of in situ programs via educational activities and encouraging a flow of scientific knowledge rather than in elaborate captive breeding programs and an apocryphal biological ark concept.*

*"The word conservation has become common and cheap. The act of conservation, alas, is rare and brutally expensive" (Goodzoos 2004).*

From the beginning of civilization, people have marvelled at the diversity of plants and animals around them and attempted to collect, classify and exhibit them (Cooper 2000). Zoos have been a permanent fixture of urban society for at least four thousand years, and the number of zoos is greater now than ever before (Reichenbach 2002). Zoos have evolved from menageries organized on taxonomical grounds, to ecological museums of animal habitats and biodiversity, through to the range of sanctuaries, wildlife parks and zoos found today (Rabb 1994). Large prestigious zoos such as San Diego Zoo, London Zoo and Melbourne Zoo sit at the pinnacle of this 'evolution' moving towards biogeographical exhibits with mixed species groups kept in carefully landscaped enclosures (Jones 2004). Over 7,200 animal species around the globe are currently threatened with extinction, the primary causes being habitat destruction, commercial exploitation, invasive species and pollution. Of these, direct habitat destruction threatens the greatest number of species as humans increasingly occupy and alter natural areas (Miller, B. et al. 2003). The World Bank has estimated that the human population will level off at around ten to twelve billion towards the end of the next century with most of the expected increases occurring in poorer countries which are often rich in wildlife (Good Zoos Guide 'Conservation' 2004). Collection-based institutions such

as zoos, aquariums and botanical gardens should play a significant role in conserving the world's biodiversity (Miller, B. et al. 2003): indeed 51% of British people surveyed stated that their visits to zoos were contingent on such conservation efforts (Gatland 1996). So how are zoos meeting these conservation expectations?

The World Zoo Conservation Strategy, published in 1995, aimed to focus zoos' efforts in conservation by stressing the importance of education and in situ conservation, integrating conservation strategies of zoos with those of government and conservation bodies and, crucially, preserving natural habitats and ecosystems (Jones 2004). The American Zoo and Aquarium Association's Species Survival Plan (Jones 2004) outlines the common conservation goals of its members as: increasing public awareness of wildlife conservation issues, promoting relevant scientific research, establishing breeding programs for selected wildlife, reintroducing captive-bred wildlife into restored or secure habitat and cooperating with other institutions and agencies to ensure integrated conservation strategies.

All of the zoos surveyed in this review have strong education programs, mostly aimed at giving children a holistic view of nature and emphasizing the importance of biodiversity and natural ecosystems. Awareness does not necessarily translate into individual action and it is almost impossible to quantify the link between the two, but a well-informed public now more than ever has the opportunity to donate money to conservation organizations or exert pressure on government and other bodies to protect their own and other nations' environments. Educational activities within zoos vary widely: for example the Great Plains Zoo, South Dakota, runs summer and Christmas camps and a mobile education unit targeting primary school children ('The Great Plains Zoo' 2004). Assessing whether such programs are successful would be relatively easy; surveying participants before and after an activity would help the zoo to tailor its program so that its stated aim of raising conservation awareness was met. A study in Colombia showed that where teachers were closely involved in wildlife park and zoo educational programs, the knowledge and attitude scores of the children to the animals increased significantly (Gutierrez de White & Jacobsen 1994). Even smaller wildlife parks, such as Tasmania's Bonorong Wildlife Park, usually have some sort of educational program. Such ventures do not have the financial muscle to conduct expensive research but can be valuable, if run well, in raising awareness about the plight of many species, particularly in a local setting.

Zoos offer wildlife biologists research opportunities difficult to achieve with free ranging animals as samples of captive animals' urine, faeces and blood can be easily collected for analysis. Reservations arise that such research is geared more towards better maintaining animals in captivity than conserving those in the wild (Miller, G. 2002). Many zoos do have impressive research programs benefiting wild populations, however, such as Melbourne Zoo's successful projects helping to re-establish wild populations of endangered helmeted honeyeaters, eastern barred bandicoots and striped legless lizards ('Zoos Victoria' 2004). The zoo has important collaborations with scientific bodies such as Yale and Chicago Universities, many Australian universities, the National Trust and Birds Australia. Associations with overseas organizations have been developed to assist in situ conservation efforts such as the National Recovery Plan for the Philippine Crocodile, the world's most endangered crocodile. San Diego Zoo hosts CRES, Centre for Reproduction of Endangered Species and promotes in situ conservation via field programs in "hotspots" in China, the Pacific Region, the Caribbean Islands, South America and Africa ('San Diego Zoo' 2004). Perth Zoo has had great success with the release of captive bred chuditch, dibbler and numbats into habitat under predator control ('Perth Zoo' 2004) and New York's Bronx Zoo participates in 326 in situ conservation programs around the world, helping governments to set up parks and train local people as keepers or custodians (Miller, G. 2002).

Publicity seems to least correspond with reality in the promotion of captive breeding programs



and the touting of zoos as biological arks. Captive breeding efforts have undoubtedly meant the difference between survival and extinction for high-profile species such as the Californian condor, black footed ferret and golden lion tamarin (Miller, G. 2002; Snyder et al. 1996) and can increase public awareness of conservation problems of little known taxa such as the Mauritius Island pink pigeon (Gipoliti & Carpaneto 1997). There are, however, concerns that captive breeding is promoted as a recovery technique for species that may not benefit from it (Snyder et al. 1996). A 1994 review found that only 11% of reintroductions successfully established wild populations (Beck 1994 in Snyder et al. 1996) and most programs seem geared towards keeping zoos stocked rather than rescuing endangered species (Miller, G. 2002). Genetic and phenotypic changes affect the chances of successful reintroductions to the wild (Snyder et al. 1996). Captive raised tigers returned to the wild lack crucial hunting skills leaving them susceptible to death by starvation, attacks by wild tigers and conflict with humans as they are attracted to softer prey such as domestic livestock (Gatland 1996). Wild turkeys are completely unable to form wild populations after only a few generations in captivity, research has shown that the size of their adrenal glands rapidly decreases making them less able to cope with the rigors of the wild (Knoder, 1959 in Snyder et al. 1996). The cost effectiveness of *ex situ* breeding programs has also been compared unfavourably with *in situ* programs: for example, the estimated annual operating costs for the Garamba National Park, Zaire, which houses 31 white rhino, 4,000 elephants, 30,000 buffalo and the entire giraffe population of Zaire is US\$269,500 compared with US\$16,000 per annum for a single captive rhino (Alibhai & Jewell 1993).

Zoos could increase their conservation output by concentrating on smaller-bodied species as larger animals are more expensive to maintain and often more difficult to breed in captivity (Ward et al. 1998). Some species such as Asian elephants will never form self-sustaining captive populations due to poor reproduction and lack of space (Snyder et al. 1996). However, the vast majority of zoos depend on paying visitors to fund all of their running costs including conservation efforts (Good Zoos Guide 'Conservation' 2004) and the rationale has been that the public will only pay to see "big" exhibits. Balmford et al (1996) compared the taxonomic spread of threatened species targeted by zoo programs and found "a greatly disproportionate emphasis on large mammals, with little attention paid to invertebrates or smaller vertebrates". Studies have given conflicting results about the public's response to large or small sized animal exhibits. Ward et al (1998) did find a positive response to increasing body size in both adults and children but Balmford et al (1996) found no tendency for large animal exhibits to be more popular, the aquarium and reptile house were among the top three most popular exhibits. It might be more productive to use existing large high-profile animals as ambassadors to raise money exclusively for *in situ* conservation such as with Melbourne Zoo's Elephant Village. The exhibit aims to show how elephants live in the wild and the important relationships between elephants and other animals, plants and humans ('Zoos Victoria' 2004). Demonstrating that the public can also respond positively to the less cuddly side of life, if marketed well, is the case of the Lord Howe Island Stick Insect. Exterminated in their natural home by rats and believed extinct for 80 years, the discovery of a tiny remnant population by curators from Melbourne Zoo's Invertebrate Department led to a well publicized and publicly supported rescue and recovery effort ('Zoos Victoria' 2004). London zoo has a number of popular invertebrate conservation and breeding programs focusing on animals such as the critically endangered Seychelles Fregate beetle and members of the highly endangered snail genus *Partula* ('London Zoo' 2004).

Conservation programs can also raise more subtle ethical dilemmas for the modern zoo. Many animals that are naturally cryptic, shy or solitary in the wild are exhibited in a contrived environment to meet public expectations (Robinson 1998) or kept in socially inappropriate groups preventing expression of natural breeding behaviours (Gatland 1996). Some species reproduce in captivity at a higher rate than can be absorbed in the normal functioning of the zoo and may be considered "surplus" (Nolen 2002). Excess male offspring can pose problems in terms of

aggressive interactions and housing difficulty and zoos face dilemmas about what to do with such animals (Nolen 2002). Solutions such as culling, aborting male foetuses, or passing on animals to medical research institutions carry their own ethical challenges and the probability of censure by the general public.

Zoos and wildlife parks are commonly perceived as centres for the preservation of endangered wildlife but their precise role in conservation is not as easy to define as promotional material would have us believe. It is clear that zoos play a significant role in the management of threatened species though the maintenance of captive gene pools and the flow of information from zoo researchers to field scientists linking in situ and ex situ conservation efforts (Ryder & Feistner 1995). Genuine efforts are also made to educate the public, particularly children, about the devastating impact of habitat destruction and the value of conserving and preserving diversity even though it is difficult to quantify how such endeavours translate into conservation action. Promoting captive breeding programs as the saviour of endangered species and zoos as biological arks diverts attention away from the real crises of habitat degradation and destruction threatening global biodiversity. In order to effectively contribute to conservation, zoos need to target their conservation based breeding efforts on those threatened species for which reintroduction to the wild is a realistic option or be sincere about the limitations of programs and make overt use of the educational value of the captive population.

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