



IS THE ARK AFLOAT? – Captivity and *Ex Situ* Conservation in UK Zoos

An analysis by the Born Free Foundation, May 2007

Abstract

*All species of mammal, bird and amphibian kept by 13 large zoos registered as UK charities were assessed in relation to their internationally-recognised conservation status in the wild, in an attempt to quantifiably indicate the zoos' commitment to ex situ conservation. Less than one quarter of species kept were classified as threatened in the wild, while 53% of individual animals and 62% of species kept were classified by the IUCN Red List as **Least Concern** (lowest possible category). Less than 12% of individual mammals and 20% of mammal species in the zoos featured in the list of 522 evolutionarily distinct and globally endangered (EDGE) species of mammals. Furthermore, just 24% of the individuals and 31% of all taxa in the 13 zoos were representatives of species in European breeding programmes – however, not all of these animals appeared to be actively involved in captive breeding (for example, a proportion of populations of higher-priority mammal and bird species comprise single-sex groups or single individuals). There were differences between taxonomic groups, with an apparently greater focus on mammal species in need of conservation than on birds and amphibians. Amphibians appeared to be especially under-represented in these zoos, despite the global population crisis facing amphibian species and the recommendations for their captive breeding. Based on the evidence, the claim that zoos keep species in need of active conservation measures is at best equivocal, and there is a considerable difference between the proportion of threatened species actually kept by zoos and what the general public believe they hold.*

Conservation in Zoos

Article 9 of the Convention on Biological Diversity (CBD), adopted in 1992, outlines the requirements of Contracting Parties to adopt measures for *ex situ* conservation (conservation outside a species' habitat). The EC Directive on zoos (Council Directive 1999/22/EC) entered into force in April 1999, requiring Member States to ensure that zoos are licensed and inspected, and to implement a framework for their participation in education and conservation. It was given force of law by the countries in the UK in 2003.

This legal framework underpins a shift in the latter part of the 20th century in the stated aims of zoos towards refocusing their aims to include conservation. The ways in which

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

zoos can participate in species conservation are outlined in numerous guidelines and “aspirational” documents including the Secretary of State’s Standards of Modern Zoo Practice (DEFRA 2004), Zoos Forum Handbook (Zoos Forum undated), the World Zoo and Aquarium Conservation Strategy (WAZA 2005) and others. Zoos may undertake conservation both *in situ* (in species’ habitat) and *ex situ* (outside species’ habitat). This paper will focus on zoos’ participation in, and commitment to, *ex situ* conservation.

Although many zoos now claim to have adopted a broader approach to conservation (Regan 2005), keeping and breeding animals remains a defining feature of zoos, a concept they believe will be attractive to visitors and, in some ways, a legal requirement. While it could be argued that *ex situ* conservation may include zoo-based training, research and gene-banking, it is clear that the main focus – indeed, the “*major contribution to ex situ conservation*” - by zoos is through Species Management Programmes, which generally involve co-ordinated keeping and breeding of species through designated studbook keepers (Zoos Forum undated).

Such breeding programmes in zoos are not necessarily undertaken to preserve a (small) population of threatened species for future reintroduction to the wild – an additional purpose might simply be to ensure a “sustainable” supply of animals for display in zoos thereby reducing the need for supplementation from the wild. It must be pointed out that might some regard the reinforcement of captive populations using wild-caught animals as being highly suspect in conservation terms. In addition, this approach appears to be failing in some cases, such as elephants, when the then-chairman of the European Association of Zoos and Aquaria (EAZA) has stated that: “*both elephant programmes [African and Asian elephant] also conclude that – in order to reach the ultimate goals of population size and sustainability – additional imports from the wild are still needed*” (de Boer 2004, p. 2).

Nonetheless, the “Ark” paradigm (Wiese and Hutchins 1994) - the keeping and breeding of threatened species in captivity until such time as suitable conditions exist for reintroduction to the wild - remains a conceptually powerful and persistent stated aim of zoos. It has sparked considerable discussion - both in favour and against (e.g. Soulé *et al.* 1986; Balmford *et al.* 1995), but its effectiveness rests on the ability and commitment of zoos to subscribe to, and implement, the keeping and breeding of threatened species in practice. The space and resources available in zoos for keeping and breeding animals are finite (Balmford *et al.* 1996), and consequently it stands to reason that conservation should be the priority when strategic decisions are made

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

regarding collection planning and the species kept. However, most zoos and regional affiliations now prefer to broaden their scope towards a more “*holistic*” approach to conservation (Regan 2005), and quantitative assessment of participation in *ex situ* conservation under the Ark paradigm appears to have been relatively neglected recently.

Consortium of Charitable Zoos

9 British zoological societies, approximately representing the UK’s largest zoos in financial terms, commissioned a document entitled “The Manifesto for Zoos” (Regan 2005), which attempted “*to establish the overall value and true “public good”, actual and potential, available to British Society through the progressive UK zoos*” (Regan 2005, p. 5). This group of societies represent a total of 13 zoos, and has adopted the name of the Consortium of Charitable Zoos (see Appendix A).

It would appear that these Consortium Zoos promote the keeping and breeding of animals to zoo visitors and the wider public as a significant conservation undertaking. For example, the following quotes appear on the websites of 3 Consortium Zoos:

- The zoo “*takes part in many captive breeding programmes for endangered animals (about three quarters of the animals housed at [the zoo] are officially classed as endangered species)*” [emphasis added].
- “*Through our work with ex situ populations, we directly manage populations of endangered species through cooperative captive breeding programmes, provide technical support to build wider capacity for this work and undertake research to inform population management.*”.
- “*Many of the species at our zoos are part of European endangered species programmes (ESBs and EEPs)*”.

Many people may think that a significant proportion of the animals they see during a visit to the zoo are threatened in the wild, or perhaps destined one day for reintroduction to the wild. This view is supported by the results of a recent opinion poll which indicate that the general public (not necessarily zoo visitors) think that, on

* European Studbooks and European Endangered Species Breeding Programmes

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

average, 41% of the animal species kept in zoos are threatened in the wild (ICM Research / Born Free Foundation 2007 – see Appendix B).

In order to determine whether public perception of the extent of zoo conservation is accurate, commitment to *ex situ* conservation in the 13 Consortium zoos was assessed by examining numbers of animals, species and populations in relation to: their conservation status in the wild as determined by IUCN (the World Conservation Union); their EDGE status (an assessment of whether mammals are evolutionarily distinct and globally endangered); and their current potential for breeding.

Methods

Section 9.5 of the Secretary of State's Standards of Modern Zoo Practice requires that an annual stocklist of all animals in each zoo must be kept, including information on common and scientific names of all species; number of arrivals into the collection; number of births or hatchings; number of those births or hatchings that died within 30 days; number of all other deaths; number of departures from the collection; total in the collection at 31 December; and the sex of each animal (DEFRA 2004).

Copies of the Consortium Zoos' most recently submitted annual stocklists (2005) were requested from the relevant licensing authorities under the Freedom of Information Act. The received information was supplemented with data from the British and Irish Association of Zoos and Aquariums annual inventories (BIAZA 2005b, 2005c, 2005d). The information was compiled to provide data on end-of-year totals by sex for all non-fish vertebrates in the 13 Consortium Zoos. The end-of-year totals were used in the analysis as "current" holdings. Obviously, this represents an isolated observation of a potentially changeable situation, but based on experience, the authors have assumed that in general zoo populations and species holdings are relatively stable.

Data for fish and invertebrates generally appeared to be less accurate in comparison to other taxa (estimates or counts of colonies may be used) and consequently were not included in this study.

While many zoos keep some domesticated species (cf. DEFRA 2003 – Annex E), information on these animals was excluded from the analysis. This might potentially under-represent the space and resources diverted from conservation by the housing of these animals, but the dataset used should give a more accurate representation of the *ex situ* keeping of wild animal taxa. (It should be noted that some species with high-

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

priority IUCN Red List category, such as Bactrian camels *Camelus bactrianus*, were included in the analysis, although the individuals kept are likely to represent domesticated forms of the species).

Conservation status

The conservation status at a global level for each species recorded on the zoos' stocklists was obtained from the IUCN Red List of Threatened Species, which assesses species on biological factors related to extinction risk (IUCN 2007). Species are assigned categories of Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Conservation Dependent, Least Concern, Data Deficient, and Not Evaluated, dependent on their status in the wild.

Species in the categories of Vulnerable, Endangered, and Critically Endangered are considered to be threatened with extinction (see Table 1). However, when examining species held in zoos, it may be useful to additionally include those species classed as Conservation Dependent, Near Threatened and Extinct in the Wild, since maintaining and breeding these species might be considered to be a contribution to *ex situ* conservation. Therefore, in this report, all species in the categories of Conservation Dependent, Near Threatened, Vulnerable, Endangered, Critically Endangered and Extinct in the Wild are described as being of “conservation concern” (see Table 1).

IUCN Red List categories	“Conservation concern”	Threatened
Least Concern (LC)		
Conservation Dependent (CD)	Y	
Near Threatened (NT)	Y	
Vulnerable (VU)	Y	Y
Endangered (EN)	Y	Y
Critically Endangered (CR)	Y	Y
Extinct in the Wild (EW)	Y	

Table 1: Explanation of the terms “conservation concern” and “threatened”, with respect to IUCN Red List categories.

The list of species in Consortium Zoos was compared against the IUCN Red List to assign a conservation status to the animals kept. Subspecies were included only when details were provided by the zoos and assessed on the Red List – in all other instances, conservation status at species level was used.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

The IUCN Red List is incomplete for reptile species (664 species evaluated of 8246 species described (IUCN 2006)). Therefore, data for reptiles was included only in totals and not analysed by Red List category (however, see Marešová & Frynta, in press). The term animal in this report therefore refers to mammals, birds and amphibians, unless otherwise stated.

(It should be noted that a threatened Red List category does not necessarily indicate suitability nor a recommendation for breeding a species in captivity. Captive breeding and / or reintroduction of threatened species may be compromised as a conservation tool by numerous behavioural, nutritional or environmental factors, for example). It might be expected that conservation measures for species unsuitable for breeding in captivity would focus on *in situ* activities which zoos could contribute to.

Breeding programmes

The Consortium Zoos comprise 13 of the 43 European Association of Zoos and Aquaria (EAZA) member zoos in the UK (excludes Jersey and Isle of Man) (EAZA 2007). EAZA manages 2 types of breeding programme: the intensive European Endangered species breeding Programmes (EEPs), and the less intensive European StudBooks (ESBs).

There are 5624 vertebrate species (including 4451 species of mammal, bird, amphibian and reptile) listed as threatened on the IUCN Red List (IUCN 2006). Globally, about 810 species and subspecies are managed under co-operative breeding programmes by regional zoo associations such as EAZA, the European Association of Zoos and Aquaria (WAZA 2007). At the regional level, the EAZA website lists a total of 163 non-fish vertebrate EEPs (7 reptile, 37 bird and 119 mammal programmes) and 160 ESBs (2 amphibian, 16 reptile, 64 bird and 78 mammal programmes) (EAZA 2007, data from October 2006). This represents co-operative breeding programmes for a very small proportion ($\leq 14\%$) of threatened species.

Obviously, captive breeding can only be attempted with species actually held in zoos. As a result, zoo breeding programmes may be biased to those species already kept in zoos, and may not necessarily reflect species at most risk in the wild. It might therefore be expected that large EAZA member zoos (such as the Consortium zoos) would have a significant proportion of species in EEPs and ESBs.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

The list of EEPs and ESBs was compared against the Consortium Zoos' stocklists to identify those species and individuals potentially involved in European breeding programmes.

EDGE Species

An index of Evolutionarily Distinct and Globally Endangered (EDGE) species that assesses the level of conservation priority for mammals based on threat in the wild and phylogenetic diversity has been devised by researchers from the Zoological Society of London (Isaac et al. 2007).

Despite the highest-ranking EDGE species representing a large proportion of global mammal diversity, they include many species that are not recognised as conservation priorities and Isaac et al. indicate that many of these EDGE species “*do not benefit from existing conservation projects or protected areas*” (2007). This may have serious implications for future directions of *in situ* conservation. However, the extent of *ex situ* conservation of EDGE species in the UK has not yet been assessed.

The list of 522 EDGE species (EDGE 2007) was compared against the Consortium Zoos' stocklists to identify those species and individuals of EDGE species kept by the zoos. (It should be noted that many EDGE species may not have been recommended, or may be unsuitable, for captive breeding).

Breeding situation

In many instances, zoos keep species in groups of one sex or as single individuals, and consequently these animals do not have immediate reproductive opportunities. This may be unintentional or reflect deliberate attempts to prevent breeding by these animals. Records show that many animals of threatened species or species of conservation concern are also housed in “non-breeding” situations. Without access to individual breeding and studbook records, it is not possible to determine why this is the case but it is possible to obtain an estimate of the zoos' population of threatened / conservation concern species that are currently housed in “breeding” or “non-breeding” situations. This may go some way to indicating the animals actually involved in captive breeding. This approach is, of course limited, since it provides an arbitrary “snapshot” in time of zoo populations and excludes the possibility that animals (or gametes) are moved between zoos for breeding purposes. Such transactions do occur, and indeed breeding programmes may require them. However, only a proportion of animals housed in “breeding” groupings may actually be capable of breeding, due to factors

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

such as age, infertility, behavioural problems or reproductive suppression, for example. Consequently, the respective proportions of “breeding” and “non-breeding” animals should be taken to represent an estimate at the time of reporting.

Data on populations was obtained from the zoos’ stocklists, and examined to indicate those populations where the zoo keeps the species in a situation where breeding is unlikely. Populations are classed as a single zoo’s holding of an individual species or subspecies.

Results

See Table 2 for the summary of results.

All taxa

The IUCN Red List includes a total of 20,477 extant species of mammal, bird and amphibian in any category (including Least Concern and Data Deficient). Consortium zoos keep representatives of 708 non-fish vertebrate species (mammals, birds, reptiles and amphibians) that could be identified on the IUCN Red List (=3.5% of the total on the IUCN Red List). Consortium zoos keep 13599 individual non-fish vertebrates, of which 11908 individual mammals, birds and amphibians could be identified on the IUCN Red List .

The results show that:

- 62.0% of the animal species in Consortium zoos are in the Least Concern category on the IUCN Red List.
- 52.7% of the individual animals in Consortium zoos are in the Least Concern category on the IUCN Red List.

- 37.4% of the animal species in Consortium zoos can be considered to be of “conservation concern”.
- 46.9% of the individuals in Consortium zoos of species that can be considered to be of “conservation concern”.

- 24.7% of the species in Consortium zoos are threatened in the wild.
- 29.0% of the individuals in Consortium zoos are of species threatened in the wild.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

24.3% of the individuals and 30.8% of the taxa (species and subspecies) represent taxa with European breeding programmes. However, not all animals are involved in these breeding programmes, and furthermore 14.6% (n=425) of the individuals, and 23.4% (n=51) of the taxa, within European breeding programmes are classed as Least Concern by the IUCN Red List.

Breeding situation:

	Populations “non-breeding” (% of total)	
	Conservation concern	Threatened
Mammal	23.9	24.1
Bird	22.0	20.0

Table 3: Populations of mammals and birds in Consortium Zoos kept as single-sex or single individuals, with respect to conservation status

It is estimated that between 20-24% of populations of threatened / “conservation concern” species of mammal and birds are not kept in a breeding situation.

Mammals

More than 90% of threatened mammal species, and more than 90% of EDGE species are not represented in Consortium zoos. Consortium zoos keep representatives of 8.9% of all threatened species, 8.3% of all species of conservation concern, and 4.3% of all species classed as Least Concern. Consortium zoos keep representatives of 10% of the top 522 EDGE species, comprising 20% of mammalian species and 12% of mammalian individuals kept.

37% of Consortium zoos’ mammal species are classed as threatened by the IUCN Red List. Nearly half (43.8%) are classed as Least Concern.

Birds

Less than one fifth (16.5%) of Consortium zoos’ bird species are classed as threatened by the IUCN Red List. Nearly three quarters are classed as Least Concern. Consortium zoos keep representatives of 5.6% of all threatened species, 5.3% of all species of conservation concern, and 3.8% of all species classed as Least Concern.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

Amphibians

Consortium zoos keep less than 1000 individual amphibians, and only 11 threatened species. Consortium zoos keep representatives of 0.6% of all threatened species, 0.6% of all species of conservation concern, and 1.2% of all species classed as Least Concern. Threatened species represent just over one quarter of Consortium zoos' amphibians, with nearly 66% being classed as Least Concern.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

		Total	A. Least Concern (%)	B. “Conservation Concern” (%)	C. Threatened (%)	D. EDGE (%)	E. Breeding Programme (%)
Mammals	Individuals	6301	48.3	51.4	26.8	11.8	29.2
	Species	262	43.8	55.3	37.0	19.8	54.9
	Populations	661	35.8	63.4	44.0	24.2	55.4
Birds	Individuals	4618	62.6	36.2	24.1	-	21.6
	Species	405	73.3	26.4	16.5	-	17.8
	Populations	881	67.2	32.5	22.1	-	20.1
Amphibians	Individuals	989	31.4	68.0	66.4	-	5.7
	Species	41	65.9	31.7	26.8	-	4.9
	Populations	78	61.5	37.2	32.1	-	7.7
Sub total	Individuals	11908	52.7 (n=6275)	46.9 (n=5587)	29.0 (n=3459)	-	24.3 (n=2895)
	Species	708	62.0 (n=439)	37.4 (n=265)	24.7 (n=175)	-	30.8 (n=218)
	Populations	1620	54.3 (n=879)	45.3 (n=734)	31.5 (n=511)	-	33.9 (n=549)
Reptiles	Individuals	1578	-	-	-	-	-
	Species	172	-	-	-	-	-
	Populations	347	-	-	-	-	-
<i>Total</i>	<i>Individuals</i>	<i>13486</i>					
	<i>Species</i>	<i>880</i>					
	<i>Populations</i>	<i>1967</i>					

Table 2: Summary results by taxa for animals in Consortium Zoos where Red List status could be confirmed, for conservation status in the wild (A-C), inclusion on the list of EDGE species (D), and potential participation in European breeding programmes (E).

Notes:

Least Concern (A) + Conservation concern (B) + Data Deficient = 100%.

Threatened (C) is a subset of Conservation concern (B)

Conclusions

In zoos, it is claimed that “resources are always at a premium. Especially space for keeping species and people who are able to professionally manage populations are limited. Therefore, EAZA member institutions make very careful choices about which species to keep and which ones not to keep” (EAZA 2007). Regan (2005) states that: “The Consortium zoos do not claim that through captive breeding they can maintain anything more than a minority of endangered species: the holding spaces available are just too limited”, and further qualifies this with the statement that “Ex situ programmes necessarily tend to focus on single species and often large charismatic mammals”. The results presented in this study show that at least half or more of these “limited spaces” are being given over to species and individual animals that are considered by IUCN as least in need of global conservation. While this study only examined mammals, birds and amphibians, Marešová & Frynta (in press) provide evidence that the likelihood of zoos worldwide keeping reptile species does not reflect increased threat in the wild, but aesthetic attractiveness to humans and body size. The zoos’ apparent high-profile promotion of keeping and breeding threatened species is therefore not necessarily supported by the “very careful choices” made by these zoos, as evidenced by the animals kept. An opinion poll indicates that, on average, the public believe that nearly 41% of the species kept in zoos are threatened in the wild (ICM Research / Born Free Foundation 2007 – see Appendix B). The results indicate a substantial difference between public expectations (possibly arising in part from zoos’ own claims) and reality.

Taxonomic bias

There is evidence that taxa are prioritised differently by the Consortium Zoos. For example, the proportion of conservation priority species of mammal kept is considerably more than either birds or amphibians. This seems to confirm Regan’s statement that *ex situ* programmes focus on charismatic mammals (2005). However, we would dispute the implication that larger charismatic mammals must necessarily be the focus. For example, the situation regarding amphibians in these zoos is particularly striking. The World Association of Zoos and Aquariums has stated that: “Addressing the amphibian extinction crisis represents one of the greatest species conservation challenges in the history of humanity. It is clearly understood that if the global zoo and aquarium community does not respond immediately and on an unprecedented scale, much of an entire vertebrate class will be lost.” (WAZA 2007).

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

Of the taxonomic groups examined, amphibians have the highest proportion of threatened species, with 31% of described species threatened in the wild (IUCN 2006). Despite this, it appears that amphibians are the least represented group in Consortium Zoos compared to birds and mammals. Balmford et al. (1996) found that annual per capita costs for keeping species in captivity increase significantly with body mass (although this may be somewhat offset by generation length), indicating that smaller-bodied taxa are less costly to maintain in long-term breeding programmes. Amphibians are small-bodied taxa that reproduce in large numbers. The data indicate that Consortium Zoos are not substantially benefiting *ex situ* conservation of amphibians, despite the fact that doing so would almost certainly represent a much more efficient use of resources for conservation than breeding larger bodied taxa.

Captive breeding

While not explicit in zoo legislation, the handbook issued by the Government-appointed advisory body on zoo issues, the Zoos Forum, indicates that the conservation commitment of a zoo should be in proportion to its size, and suggests that for zoos of equivalent size and scope to Consortium Zoos:

“Active participation in captive-breeding and species management programmes for threatened species must be required, where relevant species are held. Support for, or active participation in, field conservation projects should be expected. Such support may be financial support and/or through providing husbandry and management skills, staff and equipment for habitat and species conservation and/or essential material for local education and awareness programmes overseas” (Zoos Forum, undated)

As both charities and larger zoos, it might be expected that the contribution of the Consortium Zoos to *ex situ* conservation should be significant. However, not only do the results show that Consortium Zoos hold less threatened and conservation concern species than might be expected, but a proportion of the populations of threatened species may not be kept in breeding groups. In addition, it might be expected that EAZA member zoos, such as the Consortium zoos, would have a significant representation of EEPs and ESBs. However, participation in European breeding programmes is limited, with less than one third of species kept playing a role (as a maximum). This does not appear to represent a strong commitment to *ex situ* conservation at a regional level.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

Furthermore, around one quarter of the species of mammals, birds and amphibians in European breeding programmes kept by Consortium Zoos are actually in the Least Concern category. Consequently, a substantial proportion of the *ex situ* conservation activity and resources of these zoos may be devoted to species that are not at risk in the wild. As mentioned previously, zoos do not claim to only keep threatened species. For example, WAZA (2005) lists several priorities for selecting species for breeding programmes, including:

- degree of threat to the wild populations, i.e. IUCN categories of threat;
- taxonomic uniqueness;
- species native to a region;
- species with established husbandry protocols;
- species with already established and healthy populations;
- flagship species;
- educational and research value.

It might be argued, therefore, that zoos maintain or even breed populations of non-threatened species: as “flagship” species to bring attention to or raise funds for conservation work benefiting threatened species (WAZA 2005); as surrogate species for training and research into husbandry and breeding of related threatened species (e.g. Miller & Anderson 1990); as a sustainable population to reduce offtake from the wild for zoos or the pet trade; or perhaps even as an extension to the “Ark” concept by keeping representatives of as many species as possible in captivity to ensure survival in perpetuity. However, the limited spaces and resources in zoos call these potential justifications, especially the latter two, into question. Captive breeding of any species, especially species not at risk in the wild, potentially diverts funds, expertise and resources away from *in situ* conservation:

“Captive breeding must not on any level result in the misallocation of available resources or, more importantly, become an excuse to avoid dealing with preservation of habitats” (Rahbek 1993, p.434)

Effectiveness of zoo conservation

It is important to note that the legal framework for zoo conservation calls for zoos to undertake conservation, but does not require that the results or effectiveness of zoos in this role be measurable. At the moment, zoo visitors and the wider public have no alternative but to take the claimed conservation role of zoos on trust. It seems vital that

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

benchmarks are devised and employed that allow measurement and scrutiny of zoo conservation activities, to ensure that they are deliverable and measurably effective, and whether they measure up to the zoos' stated claims regarding their conservation efforts. However, Regan (2005) states that "*Zoos look on the conservation problem holistically and endeavour to pursue all possible solutions in an integrated fashion*" (p.23). Such a position may disguise inefficiency and actually undermine attempts to measure conservation success. This study attempts to measure participation in *ex situ* conservation, and the results indicate that it may be neither a priority nor necessarily effective. This benchmark analysis allows members of the public to determine which, if any, zoos are engaged in substantiated *bona fide, ex situ* conservation activities.

Since the Consortium Zoos are large and have charitable status, the results of this study leave open the possibility that other UK zoos are committing even less to *ex situ* conservation. Indeed, this is confirmed by results for zoos in the British and Irish Association of Zoos and Aquariums (BIAZA) (n=85 approx.), where "*members are putting less than a quarter of their space over to threatened taxa*" (BIAZA 2005). It might be expected that zoos that are not BIAZA members may be investing still less in threatened taxa.

While it remains unclear whether the requirements for *ex situ* conservation measures under the Convention on Biological Diversity and in other agreements, legislation and guidelines are being sufficiently met, the fact remains that the minority of species in the "*progressive*" zoos in the Consortium of Charitable Zoos (Regan 2005) are threatened, and few more are of conservation concern. Most species are in the Least Concern category of the IUCN Red List, and public claims such as "*three quarters of the animals housed at [the zoo] are officially classed as endangered species*" must be examined seriously in the light of the evidence presented.

Over 10 years ago, it was commented that "*Currently and historically, zoos have not held disproportionate numbers of threatened species in their collections*" (Balmford et al. 1996, p. 720). Despite an increasing need for the conservation of threatened species, it would appear that little has changed in the intervening years.

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

References

- Balmford A, Leader-Williams N & Green MJB (1995). Parks or arks: where to conserve threatened mammals? *Biodiversity and Conservation* 4: 595-607
- Balmford A, Mace GM & Leader-Williams N (1996). Designing the Ark: Setting priorities for captive breeding. *Conservation Biology* 10(3): 719-727
- BIAZA (2005a). British and Irish Association of Zoos and Aquariums Annual Report 2005. BIAZA
- BIAZA (2005b). British and Irish Association of Zoos and Aquariums Inventory – Aves 2005. BIAZA
- BIAZA (2005c). British and Irish Association of Zoos and Aquariums Inventory – Mammalia 2005. BIAZA
- BIAZA (2005d). British and Irish Association of Zoos and Aquariums Inventory – Reptilia and Amphibia 2005. BIAZA
- de Boer L (2004). From the Chairman's desk. *EAZA News* 47: 02
- DEFRA (2003). Circular 02/2003 – Zoo Licensing Act 1981. Department for Environment, Food and Rural Affairs.
- DEFRA (2004). Secretary of State's Standards of Modern Zoo Practice. Department for Environment, Food and Rural Affairs.
- EAZA (2007). European Association of Zoos and Aquaria website, www.eaza.net. Accessed 04/05/2007
- EDGE (2007). EDGE species list, www.edgeofexistence.org/downloads/edge_species.xls. Accessed 25/05/2007
- ICM Research / Born Free Foundation (2007). ICM Research Omnibus survey, commissioned by the Born Free Foundation. May 2007
- Isaac NJB, Turvey ST, Collen B, Waterman C & Baillie JEM (2007). Mammals on the EDGE: Conservation priorities based on threat and phylogeny. *PLoS ONE* 2(3): e296. doi:10.1371/journal.pone.0000296
- IUCN (2006). 2006 IUCN Red List of Threatened Species, www.redlist.org. Accessed 04/05/2007
- Mareš J & Frynta D (In press). Noah's Ark is full of common species attractive to humans: The case of boid snakes in zoos. *Ecological Economics*, doi:10.1016/j.ecolecon.2007.03.012
- Miller BJ & Anderson SH (1990). Comparison of black-footed ferret (*Mustela nigripes*) and domestic ferret (*M. putorius furo*) courtship activity. *Zoo Biology* 9(3): 201-210
- Rahbek C (1993). Captive breeding – a useful tool in the preservation of biodiversity? *Biodiversity and Conservation* 2: 426-437
- Regan J (2005). *The Manifesto for Zoos*. John Regan Associates Ltd.
- Soulé M, Gilpin M, Conway W & Foote T (1986). The millennium ark: how long a voyage, how many staterooms, how many passengers? *Zoo Biology* 5(2): 101-113
- WAZA (2005). *Building a Future for Wildlife – The World Zoo and Aquarium Conservation Strategy*. World Association of Zoos and Aquariums
- WAZA (2007). World Association of Zoos and Aquariums website, www.waza.org. Accessed 17/05/2007
- Wiese RJ & Hutchins M (1994) *Species Survival Plans: Strategies for wildlife conservation*. American Zoo Association
- Zoos Forum (undated). *Zoos Forum Handbook*. Available online via DEFRA website, www.defra.gov.uk/wildlife-countryside/gwd/zoosforum/handbook/index.htm

* ICM Research interviewed a random sample of 1004 adults aged 18+ by telephone between 22-23 May 2007. Interviews were conducted across the country and the results have been weighted to the profile of all adults. ICM is a member of the British Polling Council and abides by its rules. Further information at www.icmresearch.co.uk

Is the Ark Afloat? – Captivity and *Ex Situ* Conservation in UK Zoos

Appendix A

Consortium of Charitable Zoos - Zoological Societies and their zoos:

- The Zoological Society of London (Regent’s Park Zoo & Whipsnade Wild Animal Park)
- The North of England Zoological Society (Chester Zoo)
- The Royal Zoological Society of Scotland (Edinburgh Zoo & Highland Wildlife Park)
- The Bristol and Clifton Zoological Society (Bristol Zoo)
- The Whitley Wildlife Conservation Trust (Paignton & Newquay Zoos and Living Coasts)
- Marwell Preservation Trust (Marwell Zoo)
- Twycross Zoo East Midlands Zoological Society
- Dudley Zoological Society
- Zoological Society of Wales (Welsh Mountain Zoo).

Appendix B

ICM Research interviewed a random sample of 1004 adults aged 18+ by telephone between 22-23 May 2007. Interviews were conducted across the country and the results have been weighted to the profile of all adults. ICM is a member of the British Polling Council and abides by its rules. Further information at www.icmresearch.co.uk

Respondents were asked the following question:

“What percentage of animal species in UK zoos do you think are threatened in the wild? By threatened we mean the animal is classed as Vulnerable, Endangered or Critically Endangered”

Results:

0% / None	1-20%	21-40%	41-60%	61-80%	81-100%	Don't know
19	246	235	216	124	94	69
2%	25%	23%	22%	12%	9%	7%

Mean: 40.82
Standard deviation: 25.99
Standard error: 0.85