

Zoo Counterpart Initiative

A Report to Fauna and Flora International and the Rufford Foundation

Sourced and written by Simon Hicks with contributions from fifteen British zoos.
10th July 2006

1. Executive summary:

The Conservation Officers of fifteen British zoos were asked to describe conservation projects carried out by their institutions. A wide variety of examples were offered, some of the smallest zoos having profound influence for conservation in diverse parts of the world.

The majority of project components described were conducted within the natural and historical range of the species concerned with a perceived success rate of 56% to 68%. Although unable yet to show a statistically significant result, it is suggested that this rate could improve with time and practice and that, from the examples presented, zoos appear to acknowledge the advantages of expending conservation effort 'in-range'.

Certain anomalies are raised by the study:

- There was an apparent reluctance by some zoos to volunteer their zoo-specific, core skill of captive breeding and management, or their many and diverse practical abilities, aspiring rather to roles shared with other conservation sectors
- There were very few examples of UK zoos building the capacity of local zoos as a means of effectively implementing their conservation mandate and thereby promoting the role of zoos in conservation globally
- Research in some zoos is not always as pragmatic or high priority as might be expected from a sector with a mission requiring high levels of quality information.

The case is put that the specialist skills and resources of UK zoos should be expended 'in-range', working with other conservation sectors, building the capacity of local animal holding facilities, and promoting the role of zoos in ecosystem conservation, thereby endorsing several important recommendations of the World Zoo and Aquarium Conservation Strategy, 2005.



Confiscated, orphan Western Lowland gorillas at a Wildlife Aid Fund sanctuary in Cameroon, supported by Bristol Zoo.

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2. Aim

The aim is to consider the conservation potential of closer working relationships between zoos and International Conservation Non Government Organisations (ICNGOs), such as Fauna and Flora International (FFI).

3. Hypothesis

The hypothesis under consideration is that where zoos conduct conservation within range of the species concerned, the likelihood of success is increased. This hypothesis is based on results from earlier, less structured, inquiries, which suggested that the location of conservation effort was a major influence on effective conservation outcome. If shown to be valid, this hypothesis could be of interest to the aim above, because it would move the focus of zoo conservation effort out of zoo-exclusive territory into the territories of other conservation sectors, such as that of the ICNGO.

4. Objectives

As a first step it was decided to ask the Conservation Officers of a sample of zoos, how and where they are already contributing to conservation. It was speculated that this could

- Locate the most effective conservation output to be within range of the species

Furthermore it could

- Provide an ICNGO (FFI) with some idea of the conservation value and potential of zoos
- Encourage the ICNGO to consider its needs and where these could be met by a zoo
- Identify where and how UK zoos might bring resources of conservation value to ICNGOs
- Provide some data on which to base discussions around the combined conservation value of UK zoos and ICNGOs working together rather than separately
- Contribute other pointers, criteria and stories that provide clues for the better utilisation of the zoo sector in conservation.

This survey is not intended as an evaluation of success in the field of zoo conservation. The question "was it successful?" is intended to solicit UK zoo *opinion* of where funds and resources have, *in their view*, been most effectively utilised for conservation. The qualitative nature of this line of inquiry may get a mixed reception in a community, largely raised in the scientific, rather than sociological, discipline. It is suggested, however, that perceptions of success, when supplied by those most qualified to have them, are fair indicators of real success, when hard data are in short supply.

5. Method

Fifteen Zoos were approached and, in interview, asked to describe conservation projects with which they were most pleased or which had taught them most about conservation.

The projects were assigned to nine categories, 1 to 9 below. They are based on the five Conservation Measures listed in the Zoo Licensing Act:

Education
Research
Training
Information exchange
Breeding
Reintroduction

or adapted, e.g., Breeding *for Release*
or added when no other category sufficed (e.g., 4,6,7,8,9, below)

1. Breeding for Release
2. Education
3. Research
4. Welfare
5. Training
6. Sustainability
7. Campaigning
8. Population Management
9. Habitat Management

10. Information Exchange

'Information Exchange' did not arise as a stand-alone category because it requires the availability of records from one of the other nine primary activities. It has been included here because of its origin as a Conservation Measure of the European Commission Directive and Zoo Act, because it should not be neglected, and because it may gain a higher profile if zoos are to communicate the value of their experience to ICNGOs.

'Funding' was also not assigned a stand-alone conservation category. In four cases, contributions to conservation were identified as funds raised in response to centralised campaigns by EAZA (European Association of Zoos and Aquaria) or others. They were, therefore, neither project nor category specific and have not been included in the analysis.

Where the conservation category was known, 'funding', or 'fund-raising', still did not work as a category in its own right because of the blurring of 'cash' and 'in-kind' contributions in a complexity of combinations. Cash and in-kind donations have therefore been taken under their intended target categories, 1-9 above. It may be assumed, therefore, that the projects described below include financial grants, or the equivalent in saved financial expenditure.

The allocation of funds to the nine primary conservation tasks required zoos to know how their funds were – or were to be – spent. This is desirable for a number of reasons, not least being the value of engaging zoos' awareness and understanding of actual conservation needs.

Each interviewee was asked *what* projects they would like to describe; *where* they had taken place; with *whom* they had worked; and *how* they began. Finally they were asked whether or not, in their opinion, the project had been successful.

As the question "*where*" was thought to be critical to the survey Objectives, the following four descriptions were used:

- In-situ / in-range – meaning in the wild, in the natural range of the species
- In-situ / ex-range – meaning in the wild, not in the natural range of the species
- Ex-situ / in-range – meaning in captivity, in the natural range of the species
- Ex-situ / ex-range – meaning in captivity, not in the natural range of the species

'In-range' is sometimes taken to mean in the country – or countries – of origin, and is usually made explicit. This definition is run as a footnote on each page.

The survey is qualified by a number of constraints or variables:

- it reviews the experience of a sample of English, Channel Island and Welsh zoos only;
- it is limited to 15 zoos;
- the zoos were encouraged to name their *preferred* examples of conservation activity;
- the author has selected examples for comment to illustrate specific points.

The core data are freely available to any interested party.

6. Results and Comment

121 conservation project components were volunteered. Another four were contributions to general conservation appeals without identified targets under the nine categories and were therefore excluded.

30 (25%) project components were given as carried out ex-range, of which 18 (60%) were considered successful, 5 (17%) were considered unsuccessful and 7 (23%) didn't know.

91 (75%) project components were given as in-range, of which 51 (56%) were considered successful, 7 (8%) were considered unsuccessful and 33 (36%) didn't know.

While there is little room for doubt that zoos wish to make a case for effective conservation being conducted in-range, the ratio of perceived success is not yet as high as the survey might have wished to show.

Category	In-situ/in-range + success rate%	In-situ/ex-range + success rate%	ex-situ/in-range + success rate%	ex-situ/ex-range + success rate%
Breeding	4/44 – 50%	0/44 – 0%	24/44 – 54%	16/44 – 56%
Education	9/13 – 44%	0/13 – 0%	2/13 – 0%	2/13 – 50%
Research	18/34 – 44%	0/34 – 0%	11/34 – 64%	5/34 – 40%
Welfare	0/9 – 0%	0/9 – 0%	8/9 – 75%	1/9 – 100%
Training	0/7 – 0%	0/7 – 0%	5/7 – 80%	2/7 – 100%
Sustainability	0/1 – 0%	0/1 – 0%	1/1 – 0%	0/1 – 0%
Campaigning	1/4 – 100%	0/4 – 0%	1/4 – 100%	2/4 – 50%
Population Man	3/4 – 67%	0/4 – 0%	1/4 – 0%	0/4 – 0%
Habitat Man	3/5 – 100%	2/5 – 100%	0/5 – 0%	0/5 – 0%

6.1 Breeding for Release

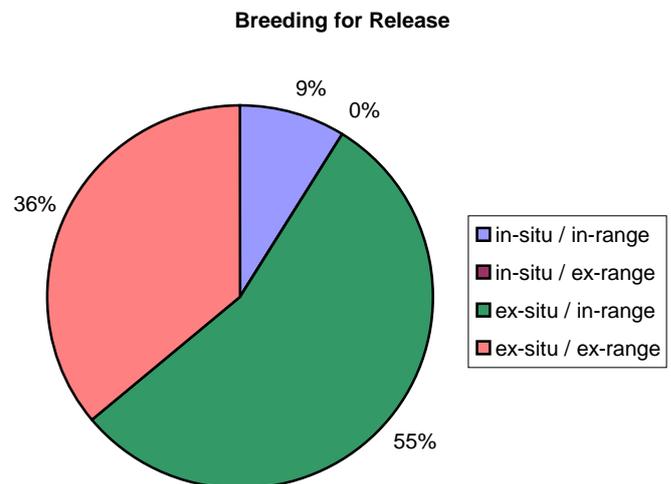
15 zoos described 44 Breeding for Release project components.

Comment:

Of special note is the Proportion of 'Breeding for release' projects volunteered by zoos as being carried out ex-situ but in-range, rather than ex-situ and ex-range. This apparent preference for quoting conservation breeding programmes within the ecosystem, or at least the country, of species' origin may be a modern departure from the familiar 'foreign zoo' focus.

A dilemma exists over the analysis of these data. When considering 'success' of 'Breeding for Release', does it refer to the breeding or the release? If releasing captive bred stock proves to be unnecessary because other factors have been put right, should it be described as 'unsuccessful'? If a project achieves - or comes within sight of achieving - a viable population for release to the wild is it 'unsuccessful' if the need to release stock bred in captivity did not, in the end, arise?

These questions contribute to a larger one, i.e. when is breeding in captivity not for release? Newquay Zoo identified the EAZA coordinated EEPs (European Endangered Species Programmes) it had joined as



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'Breeding for Release'. All other zoos referred only to those programmes that they perceived as realistically anticipating stock needed for release in the foreseeable future.

In some cases, the perception of 'unsuccessful' was used when lessons learned more than compensated for negative results. For example the Welsh Mountain Zoo gave as 'unsuccessful' the breeding and release of red squirrels, *Sciurus vulgaris*, while contributing to science vital clues for the species' demise.

Neither Paradise Park, which wanted to augment a population of wild choughs, *Pyrrhocorax pyrrhocorax*, nor Bristol, which hoped to help breed the Negros bleeding heart doves, *Galicolumba keayi*, in the Philippines but was unable to start due to a lack of founders, were able to begin their projects so an 'unsuccessful' rating was returned when, in fact, there was no project data to base this on. "The lesson is to be sure of the availability of founders before spending money on building cages," says Bristol. "Fortunately the cages and our technical advice are useful for other species so it is not money wasted."

Important lessons can be learned from both situations, indeed with further inquiry, this is equally true for most perceived 'unsuccessful' projects.

6.1.1 Breeding for Release: In-situ / In-range *

4 zoos described 4 breeding components conducted in-situ/in range. The outcomes of 2 were considered successful, 2 unknown.

- a.) Three of the examples given are of UK conservation programmes, the harvest mouse, *Micromys minutus*, stag beetle, *Lucanus cervus*, and lesser horseshoe bat, *Rhinolophus hipposideros*, at Chester, Colchester (presently on hold pending further land purchase), and the Monkey Sanctuary near Looe, respectively. They all breed (or are intended to) within zoo grounds and are free to migrate.
- b.) The John Aspinall Foundation provided an example that began, in the mid eighties, as an ex-situ / in range programme to hold confiscated Western Lowland Gorillas, *Gorilla gorilla gorilla*, in the Republic of Congo. Rehabilitation was hampered by disease at the original Brazzaville orphanage, with 70% losses, until 1998 when the orphanage was translocated to a release site that was pathogen free and where the wild environment reduced stress levels.

There are 15 reintroduced orphans out of a total 23 individuals now in project care. The first wild birth was recorded in 2004. A sister project in the neighbouring state of Gabon has reintroduced, to date, 17 gorilla orphans and 6 others born in the United Kingdom.

Comment:

These two projects of the John Aspinall Foundation pose the question, is an in-situ/in-range breeding programme a reintroduction?

Howletts and sister zoo, Port Lympne have forged a path somewhat independently from the rest of the zoo community. The programme director admitted that they "might never have started (the gorilla programme) if they had followed the IUCN reintroduction guidelines", which were unavailable when they began. However, no other zoo has tried to release gorillas. Their persistence, and final success, in this ambitious programme brings important learning to the skills base.

6.1.2 Breeding for Release: Ex-situ / In-range*

13 zoos described 24 breeding components that were conducted ex-situ/in-range. The outcomes from 13 were considered successful, 6 unsuccessful and 5 were unknown.

*
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- a.) The FFI Philippine Programme for warty pigs, *Sus cebifrons*, hornbills *Penelopides panini*, spotted deer, *Cervus alfredi*, bleeding heart doves, *Gallicolumba spp.*, and cloud rats *Crateromys spp.*, at several 'Biodiversity Conservation Centres' on three separate islands has been supported by multiple zoos in Britain and Europe.
- b.) A British conservation NGO and a government agency refused to collaborate with a zoo, keen to release female choughs to boost the population of a single group of five, of which four are males.
- c.) Supporting the blue and gold macaw, *Ara ararauna*, breeding and reintroduction programme in Costa Rica, the director of Paradise Wildlife Park makes it clear, "there is no point in breeding and transporting stock from several thousand miles away. Put skills on the plane."
- d.) Newquay Zoo chooses to send funds to build a rescue and breeding centre for Pangolins in Vietnam, a cost effective enterprise consisting of one researcher and one keeper.
- e.) The King Khalid Wildlife Research Centre, supported by the Zoological Society of London, has bred and released large numbers of mountain and sand gazelle, *Gazella gazella* & *G. subgutturosa*. The fenced pre-release areas open into unfenced, protected wild areas, patrolled by rangers. The rangers using radio collars to carry out post release monitoring of released herds.
- f.) Both London and Bristol zoos, and possibly others, breed the Barbary carpet moth, *Pareulype berberata*, in support of an English Nature programme. Bristol Zoo stock was released at a site in Lincolnshire.
- g.) Paignton Zoo is part of the English Nature species recovery programme for interrupted brome grass, *Bromus interruptus*. This English endemic became extinct in the wild in 1972 but has now been successfully reintroduced back into the wild. All of the seed for this reintroduction was grown at Paignton.
- h.) The conservation genetics of the threatened plant, meadow thistle, *Cirsium dissectum*, a key species of Rhos pasture, is also a Paignton funded project. It was initiated by a member of the Science Department, supported by the Head of Research, who asked the zoo to fund her part-time PhD on this important local plant.

Comment:

The question arises, of the hundreds of British Lepidoptera, why is only one species represented? And why are two major zoos breeding it? One answer may come from the question in the survey, 'how did it begin', which cites an approach by English Nature who, manifestly, 'drive' this project.

The endangered grass project has benefited from a group of enthusiastic zoos and gardens and, no doubt, from the dramatic rediscovery of a specimen in a flower pot at the Edinburgh Botanic Garden.

A 'driven' individual or group of people and a story that catches the imagination, can be a powerful combination, as demonstrated by the energy generated around two, little known plants (of more than passing interest to this survey, is that they are plants – not animals).

Although zoos are keen to meet their conservation obligations, the three examples above are driven by another sector, the Government Sector (English Nature), and by an individual making a convincing case. While zoos are clearly responding to conservation needs, the impression is one of a reactive, rather than proactive, approach by some zoos to the scheduling of conservation endeavours.

- j.) The Paradise Wildlife Park has committed overseas funds to support Owston's Palm Civet, *Chrotogale owstoni*, at the new breeding centre for small carnivores in Cuc Phuong, Vietnam, while building a quarantine centre at home from which to distribute stock for an ex-situ, ex-range breeding programme*. The Director of Newquay zoo has done much to promote this programme, demonstrating the applied value of exchanging conservation information, at least between zoos.

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Comment:

After some thought, this project was given ex-situ / in-range status because it has been established as a satellite of the in-range programme, which requires on-going resource input. The value of considering this decision is probably greater than splitting it into two projects for the sake of statistics.

'Grey area' between in and ex-range conservation activity could be seen as desirable in the context of this study and as a positive indicator for 'Integrating Conservation' as recommended by the World Zoo and Aquarium Conservation Strategy (Chapter 1).

- k.) Thrigby Hall Zoo also makes donations to the palm civet and other projects the Director knows and trusts, sometimes via another Zoo, for example Jersey Zoo's Pygmy Hog project in Assam. Part of the motivation to support conservation projects for this Director is to choose where to send his support.

Comment:

The extent to which zoos cooperate with each other appears exemplary. Most conservation active zoos know and trust each other through remarkably well attended and popular national, regional and international association conferences, specialist group meetings, workshops and symposia. They are therefore inclined to cluster around certain taxa via a regional zoo association or a campaign, such as the Lion Tamarins of Brazil Fund, which earned considerable funding from the zoo sector. The EAZA annual appeal last year, 'Shellshock', in aid of chelonians, would have been difficult for a member zoo to ignore.

- l.) Marwell Zoo has programmes for the sand lizard, *Lacerta agilis*, and natterjack toad, *Bufo calamita*, including the preparation of habitat and follow-up monitoring.

6.1.3 Breeding for Release: Ex-situ / Ex-range *

8 zoos described 16 breeding components that were conducted ex-situ, ex-range. The outcomes from 9 were considered successful, 4 unsuccessful, and 3 were unknown

- a.) Durrell Wildlife Conservation Trust set about – and succeeded with – breeding programmes in Jersey for three previously un-propagated species, a tortoise, a mongoose and a rodent, while legislation was slowly assembled to protect Kirindi, the remains of their dry tropical forest habitat on the south west coast of Madagascar. As negotiations advance, it becomes increasingly unlikely that releasing captive bred stock will become necessary – which is, by any definition, a successful conclusion (discussed under 6.1).
- b.) As the example that best describes their activities, however, Durrell Wildlife prefers to cite the translocation of St. Lucia whiptails, *Cnemidophorus vanzoi*, from Maria Island to other offshore islands. Interestingly the captive breeding component failed, as all animals in Jersey died from a parasite infection. Even a failed breeding programme generated this zoo's commitment to a ten-year recovery programme for one diminutive species that finally succeeded as an in-situ/in-range project.
- c.) The World Parrot Trust, headquartered at Paradise Park, shares an ex-situ breeding programme with a private breeder in the United States for the Blue Throated Macaw of Bolivia, *Ara glaucogularis*. Birds confiscated from the illegal pet trade are held and bred pending their eventual repatriation.
- d.) Marwell and Edinburgh zoos, with ZSL in support, exported scimitar horned oryx, *Oryx dammah*, to the Bou Hedma National Park in Tunisia in 1985. The animals bred well in the large fenced release area. This led to Marwell coordinating a further release of stock, selected from several EEP zoos, at Sidi Toui and Oued Dekouk National Parks as part of a national meta-population management plan.

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- e.) Howletts and Port Lympne have exported nine captive bred Western Lowland gorillas to Gabon, seven Przewalski horses, *Equus ferus przewalskii*, to Mongolia and two (non-breeding) Sumatran rhinos, *Dicerorhinus sumatrensis*, to Sumatra. They also have sent three eastern black rhinos, *Diceros bicornis michaeli*, to holding sanctuaries in South Africa.

Comment:

Examples such as d.) and e.), although few in number, demonstrate both that captive breeding for release works, even from great distances, and the dedication of some zoos to prove it.

6.2 Education

9 zoos described 13 conservation education project components.

Comment:

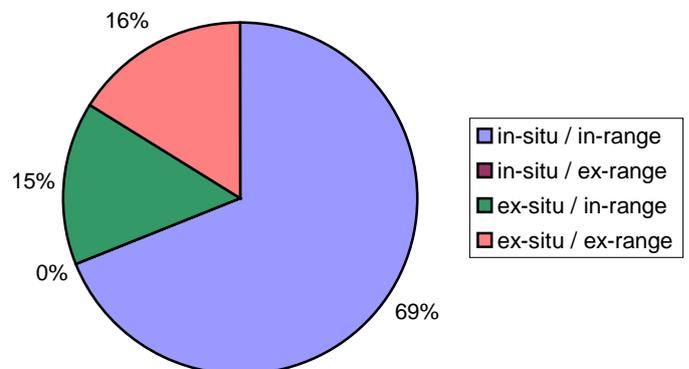
The great majority of 'Conservation Education' examples are cited as being undertaken away from the zoo in the country of species' origin.

This may demonstrate the perceived value of teaching species conservation in the vicinity of the species, and the interviewee's understanding of what is meant by "Conservation' Education.

Most of a zoo's education budget is expended on its own education department, which is why it is important to differentiate between zoo and conservation education, a distinction these education officers would appear to recognise.

It is, however, rather surprising, having accepted the principle that zoos have a role in conservation education, that there were only two cases given of zoos improving and building the capacity of local zoos as one means of achieving this important conservation measure.

Education



6.2.1 Education: In-situ / In-range*

6 zoos described 9 education components that were conducted in-situ, in-range. The outcomes from 4 were considered successful, 1 unsuccessful and 4 were unknown.

- a.) Newquay zoo's education department is well advanced with its programme to link up with schools in Madagascar.
- b.) Paignton Zoo pursues an ongoing and closely-focused commitment to an environmental education programme in primary schools in the Omo Forest, Nigeria, including funding the salaries and expenses of two local educators and a forest warden .

Comment:

It is of interest that a zoo education department may sometimes provide the vehicle for a zoo's first tentative steps into an overseas conservation policy.

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6.2.2 Education: Ex-situ / In-range *

2 zoos described 2 education components that were conducted ex-situ, in range. The outcomes from both were unknown.

(examples covered elsewhere)

6.2.3 Education: Ex-situ / Ex-range *

2 zoos described 2 education components that were conducted ex-situ, ex-range. The outcome from 1 was considered successful, and 1 unknown.

- a.) Colchester Zoo gave the EAZA Shellshock Campaign, on behalf of tortoises, terrapins and turtles, as a major 'Conservation Education' initiative.

Comment:

The context is entirely valid, given the opportunity it provided to persuade would-be tortoise pet owners to think again before buying.

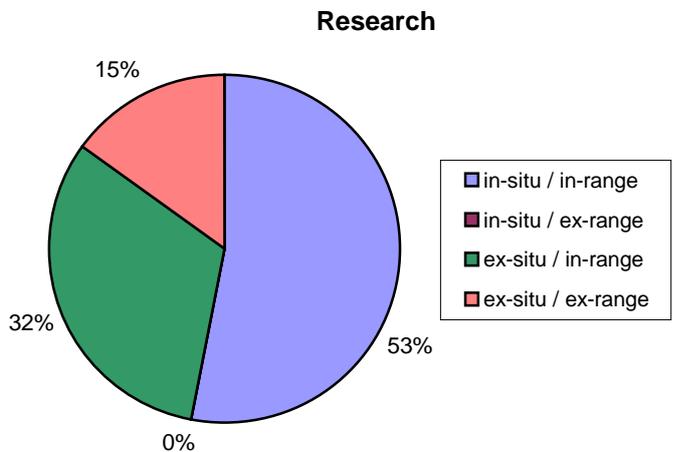
6.3 Research

11 zoos described 34 conservation research project components

Comment:

Such a high proportion of 'Conservation Research' given as being undertaken overseas shows a determination to underpin conservation breeding with good science.

Another review, however, might usefully look more closely at what research is being done in zoos. Examples exist of sorely needed baseline research on animal behaviour, breeding biology, bio-chemistry and physiology, much of which can be undertaken ex-situ/ex-range, in order to improve an understanding of species requiring interventions to improve their chances of survival. Zoo based research is all the more valuable if it complements and tests observations made in the field, especially when this leads to a common conservation goal.



6.3.1 Research: In-situ / In-range *

8 zoos described 18 research components that were conducted in-situ, in-range. The outcomes from 8 were considered successful, none unsuccessful and 10 were unknown

- a.) One zoo, when partnering an ICNGO, attempted field research and intervention that might more logically have been carried out by their research-based partner. The relationship foundered and left the zoo feeling that "the experience has coloured (our) thinking regarding working with ICNGOs"

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- b.) Bristol Zoo provides funds, not only to house bleeding heart doves in the Philippines, but also to survey the island of Cebu for a conservation strategy – as well as paying wardens to protect the small remaining patches of intact forest.
- c.) Paignton zoo shares an endeavour with the Kenyan Wildlife Service, to study the seriously threatened Aders' duiker, *Cephalophus adersi*, other duiker species and mini-antelope in East Southern Africa. The field research is directed largely towards a better understanding of the species' biology, behaviour and economic value. In Tanzania, Paignton supports a research project that investigates the habitat and population genetics of the Abbott's duiker, *Cephalophus spadix*, another critically endangered species.

6.3.2 Research: Ex-situ / In-range *

4 zoos described 11 research components that were conducted ex-situ, in-range. The outcomes from 7 were considered successful, none unsuccessful and 4 were unknown.

- a.) When the Otter Consultancy wanted to revisit 50 artificial holts of the European otter, *Lutra lutra lutra*, to see whether or not they had been used, the Welsh Mountain Zoo (WMZ) built one in their otter enclosure and recorded how their otters used it, in order to provide a model for what otter 'sign' the researcher should be looking.
- b.) When the Vincent Wildlife Trust required to test a new design of den box for pine martens, *Martes martes*, WMZ staff conducted a study of its relative popularity compared to other designs assembled in the Marten enclosures.
- c.) WMZ had bred red squirrels, *Sciurus vulgaris*, since 1992. In 1998, they began working with the Anglesey Red Squirrel Project to breed and release red squirrels into areas being cleared of the grey incomers. The first trial release attempts took place on the zoo woodland property in 1996. Almost all disappeared without trace although useful breed and release protocols were developed.

Since the early nineties there had been discussions about the possibility that red squirrels had been extirpated from their former habitat, not by the dominance of the invasive grey squirrel, *Sciurus carolinensis*, but by a parapox virus they carried. Of the WMZ squirrels released, just one was found with the secondary lesions brought on by the virus. Treated in time, it was restored to full health, the first recorded recovery from the virus – a zoo-bred, released and recovered animal.

Grey squirrels had been observed running across the red squirrel enclosures. It is likely that they will have marked, urinated and defecated onto or through the wire. It is also likely that they will have made nose to nose contact through the mesh with the red squirrels, yet none has died from parapox while remaining inside the enclosure. These observations are likely to add to an understanding of the factors affecting the survival of red squirrels, from an interesting combination of captive and wild interactions.

Comment:

Vincent Wildlife Trust Secretary observed "a good zoo has the advantage over private breeders because of the professional routines and disciplines in place to record data consistently."

Scientific opinion at the Anglesey Red Squirrel Project, is that zoos can play a significant role in cause-related research. "I think we are missing out here. Scientists are not paying enough attention to the captive breeding work going on and the discoveries made, sometimes accidentally, that can help piece together an understanding of what is happening. I don't know why this is. Perhaps because the information is largely anecdotal, and has not been written up, perhaps because the animals are released rather than truly wild." Perhaps it is because a zoo supplies the data.

Largely because of the motivation and enthusiasm of its Director to engage with other organisations and sectors, the small Welsh Mountain Zoo has made some noteworthy contributions to science and conservation, and "it hasn't cost a penny."

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- d.) In 1997, Marwell established the local NGO, Marwell Zimbabwe Trust, dedicated to wildlife conservation and research and focussing on cheetah, rhino and small antelope. The Trust has its headquarters at Dambari Field Station near Bulawayo. Paignton Zoo, a contributor to the Trust, studies duiker both in captivity (large paddocks at Dambari) and in the wild – mainly grey, *Sylvicapra grimmia*, blue, *Philantomba monticola*, and red, *Cephalophus natalensis*, duikers and a few individuals of other duiker and small antelope species.

6.3.3 Research: Ex-situ / Ex-range *

5 zoos described 5 research components that were conducted ex-situ, ex-range. The outcomes from 2 were considered successful, and 3 were unknown.

- a.) One zoo felt that there was a current overemphasis on 'Conservation Research' within zoos and that this means that the valuable role zoos can play in 'pure' research was not being recognized and encouraged. An example of 'pure' research given, concerned studies of social interactions between primates and the role of play and maternal style in determining future social status of juveniles.

Comment:

It is unclear why an understanding of the social interactions of species would not be important to their conservation. Some examples of conservation research given by zoos seem to illustrate confusion over the definition of, or need for, 'Conservation Research'. It should go without saying that captive breeding, hacking, introduction, reintroduction, translocation, head starting or any other management intervention, must be supported by good information on behaviour.

If zoos are unclear about their role in conservation, the zoo departments responsible for implementing this role, may lose direction. Achieving good conservation results demands good information, much of which will only come from good research. By definition, 'Conservation Research' is not an end of itself.

6.4. Welfare

5 zoos described 9 welfare project components.

6.4.1 Welfare: Ex-situ / In-range *

5 zoos described 8 welfare components that were conducted ex-situ, in-range. The outcomes from 6 were considered successful, and 2 were unknown

- a.) Paradise Wildlife Park supports, financially and in kind, Munda Wanga zoo in Zambia, because it is run by a known and respected ex member of staff.
- b.) Bristol Zoo collaborates with and supports Cameroon Wildlife Aid Fund (CWF) that works at two sites, Mvog Betsi Zoo and Mefou National Park, in and around Yaoundé, the capital. CWF receives financial support and technical advice from Bristol Zoo. CWF has two sanctuaries caring for gorillas, chimpanzees and other primates that are confiscated by the authorities, without which the Government would be unable to enforce laws against hunting and keeping great apes. Valuable welfare and conservation education measures are also achieved by this support.

6.4.2 Welfare: Ex-situ / Ex-range *

1 zoo described 1 welfare component that was conducted ex-situ, ex-range. The outcome was considered successful.

*
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Ex-situ / ex-range – in captivity, not in the natural range of the species

- a.) The World Parrot Trust at Paradise Park in Cornwall runs a nation-wide education programme on the correct keeping and management of pet parrots.

6.5 Training

5 zoos described 7 conservation training project components.

6.5.1 Training: Ex-situ / In-range *

5 zoos described 7 training components that were conducted ex-situ, in-range. The outcomes from 4 were considered successful, and 1 unsuccessful.

- a.) Newquay Zoo sends a member of staff to the Uanu rescue centre for Sloths, run by a Columbian couple. The centre works closely with Columbia City Zoo, which conducts x-ray and DNA analysis to identify the sub-species. Infants, taken at the time of parent kills, have an improved survival rate since training began. The Eden project in Cornwall is preparing to receive some animals.
- b.) The Monkey Sanctuary near Looe, Cornwall, began as a sanctuary for woolly monkeys, *Lagothrix lagothricha*. The Sanctuary advised on establishing a rescue centre for woolly monkeys run by a couple in Chile, while bringing funds, equipment and training to the centre.

6.5.2 Training: Ex-situ / Ex-range *

2 zoos described 2 training components that were conducted ex-situ, ex-range. The outcomes from both were considered successful.

- a.) Marwell provided training at their Hampshire HQ for overseas zoo staff requiring training in husbandry of red pandas.
- b.) Jersey is moving the strategic focus of its International Training Centre in-range, with less emphasis on its residential programme.

6.6 Sustainability

1 zoo described 1 sustainability project component.

6.6.1 Sustainability: Ex-situ / In-range *

One zoo described one sustainability component that is to be conducted ex-situ in range. The outcome is unknown.

- a.) The world's largest collection of primate species at Twycross Zoo, has taken up the sustainability challenge with a target of zero carbon emissions and a recycling regime that will be used as a major environment conservation education tool.

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Ex-situ / ex-range – in captivity, not in the natural range of the species

6.7 Campaigning

3 zoos described 4 campaigning/lobbying project components.

6.7.1 Campaigning: In-situ / In-range *

One campaigning component was conducted in-situ, in-range. The outcome was considered successful.

- a.) Thrigby Hall donated funds to WWF specifically to lobby a Sultan in Malaysia to reverse his decision to eradicate all tigers, *Panthera tigris corbetti*, in his province.

6.7.2 Campaigning: Ex-situ / In-range *

One campaigning component was conducted ex-situ, in-range. The outcome was considered successful.

- a.) Personnel from the Monkey Sanctuary, Cornwall, worked with a local sanctuary in Chile and the government agency SAG to draft welfare guidelines for Chilean legislature. The Government followed up with raids on zoos and circuses and with major television coverage. This had an impact on smuggling, for example by discovering the re-use of single licenses for multiple transits.

6.7.3 Campaigning: Ex-situ / Ex-range*

Two campaigning components were conducted ex-situ, ex-range. The outcomes from 1 was considered successful, 1 unsuccessful.

- a.) Parrot trading in the UK is still legal despite bans in range countries, seriously undermining international conservation efforts. The World Parrot Trust, headquarters at Paradise Park, Cornwall, lobbies for a ban on the trade and for the licensing of sanctuaries. WWF, EAZA, IUCN/CITES, and FOE all hesitated before signing the WPT petition to make the trade illegal. The petition of 22,000 presented to No.10 finally foundered at the EU in favour of 'Trade not Aid'. The campaign is ongoing.
- b.) Many primate species are still legally traded in the UK. The Monkey Sanctuary Trust maintains a constant lobbying presence at parliament to bring about a change in the law.

Comment:

A conservation issue that positions a zoo or zoo-based Trust more strongly than its ICNGO equivalent is worth further consideration.

6.8 Population Management

3 zoos described 4 population management project components.

6.8.1 Population Management: In-situ / In-range *

3 zoos described 3 population management components that were conducted in-situ, in-range. The outcomes from 2 were considered successful, 1 was unknown.

- a.) On hearing about the local extinction of African wild, or painted, dog, *Lycaon pictus*, from Serengeti, and the near local extinction of lions, *Panthera leo*, from an outbreak of distemper

*
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and rabies, the director of Paradise Wildlife Park in Hertfordshire took the matter into his own hands. £60,000 was needed to assemble and mobilise a veterinary team, and the resulting appeal brought in £250,000. Lions are now back to pre-epidemic levels; domestic dogs are healthier and live longer; painted dogs have returned to the Serengeti; and rabies, as a cause of child mortality, is down by 90%.

6.8.2 Population Management: Ex-situ / In-range *

1 zoo described 1 population management component that was conducted ex-situ, in-range. The outcome was unknown.

- a.) In an advanced development of zoo skills, Jersey Zoo is putting the final touches to a species recovery programme on an island in the Galapagos for the endemic mangrove finch, *Camarhynchus heliobates*. By a process of double clutching, head starting, and translocating on the same island, and with a concurrent training programme for Darwin Research Centre field staff, they hope to hand over a re-secured population of mangrove finches, maintaining their ecological niche in this micro biome.

6.9 Habitat Management

4 zoos described 5 habitat management project components.

6.9.1 Habitat Management: In-situ / In-range *

2 zoos described 3 habitat management project components that were conducted in-situ, in-range. The outcomes from all 3 were considered successful.

- a.) Chester analysed the value of holding giant pandas, *Ailuropoda melanoleuc*, and came to the conclusion that neither the conservation nor business (to support conservation) benefits were sufficient to justify this. Maintaining a presence in China, they chose, instead, to support a field project for the endangered Sichuan partridge, *Arborophilus rufipectu*, which has since expanded and evolved into a major programme securing broadleaf forest areas of biodiversity importance.

6.9.2 Habitat Management: In-situ / Ex-range *

2 zoos described 2 habitat management components that were conducted in-situ, ex-range. The outcomes from both were considered successful.

- a.) Both Marwell and Welsh Mountain Zoos have made available Przewalski horses to manage habitats in the UK, a marshland SSSI with extraordinarily rich biodiversity, where Marwell is responsible for all aspects of protected area management, and an upland Forestry Commission site with open grassland and mixed coniferous and deciduous woodland.

7. Don't Knows: Results and Comment

In considering the successful outcome of project components, there were a total of 41 'Don't Knows', over a third of the 121 project components discussed. Clearly the number is significant, so they were considered more closely.

The Don't Knows have been divided into four categories:

*
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7.1 Too Soon to Say: 19 ...

... of which 'Breeding' scored highest and largely reflects the number of new 'in-range' programmes being tried. If, however, if these nineteen embryo projects achieve the same 56% success rate given in the results above, adding a further 11 successful projects, and taking note of the 8% failure rate which adds 2 unsuccessful projects, leaving 6 Don't Knows, the in-range results could look more like this:

91 (75%) project components were given as in-range, of which 62 (68%) were considered successful, 9 (10%) were considered unsuccessful and 20 (22%) didn't know.

7.2 No Feedback or Follow Up: 12 ...

... implicating the number of zoos that contribute to conservation research and hear no more, though of course they could badger their beneficiary for information if they really needed – or wanted – to know, which begs the question, how applied to their own needs is the Research they have funded? Or put another way, they may be failing to ask, "did it tell me what I needed to know?"

Funding other people's research is a magnanimous gesture, but it may indicate an absence of full-on conservation focus, which demands major inputs of good, scientifically generated information.

7.3 Communications Breakdown: 3 ...

... implying real problems, or extreme examples of the milder reasons given above.

7.4 No, or Not Enough, Evaluation: 7 ...

... to which could be added the four donations made to unspecific appeals, a score that is probably too high, given the resources poured in to some of these projects. Not to evaluate the real benefits achieved from public raised funds might seem a little negligent.

8. Conclusions and Opinion

8.1 In-range conservation*

Bearing in mind the voluntary way in which these examples were raised, the early days of overseas-based zoo conservation, and the modest levels of in-range success - 56% or 68%, whichever is the preferred result - it may be considered that 'the jury is still out' on the wisest use of a zoo's conservation funds.

Unfortunately, however, time left to ruminate over statistical fine points is fast running out and it is suggested that every new opportunity should be allowed a chance to make its case with whatever data there are to hand. Certainly, from the 75% in-range bias of projects offered by zoos to describe their conservation activities, zoos would seem to recognise already that conservation funds are most effectively spent when applied in-range.

Marwell's projects for natterjack toads and sand lizards demonstrate just how successful in-country 'Breeding for Release' projects can be. And if this is the case for a zoo in England, why should it not be so for a zoo in Africa or Indonesia?

Despite the success of some zoos, like Marwell and Howletts, to transport large ungulates and great apes long distances, the logistics involved must favour in-range breeding and release, if the resources and expertise are locally available. With one or two notable exceptions, breeding for release from a distance, on a scale that has any demonstrable impact, is rare. A simple, diminutive life form might prove an exception to the rule, but not the programme for the snails from Moorea in the South Pacific, *Partula spp*, engaging much

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zoo and botanic garden energy, which has yet to achieve a successful reintroduction – and was not offered as an example of zoo conservation in this survey.

As the situation in Zimbabwe continues to deteriorate and bushmeat becomes ever more popular, it may soon become expedient to apply the good field research currently being carried out on duiker there and in other East African countries to a need for safety-net populations and localized restocking. It is hard to imagine the numbers of these diminutive and hyper-sensitive antelope, required for such a purpose, being bred and transported over thousands of miles.

The case being made here is simply that conservation output is more effective when carried out within the range of the species concerned than it is from several thousand miles away.

Some exceptions to the proposed 'in-range' rule include :

- breeding trials for little known species, when all the zoo's technology and professional resources need to be at hand
- fundraising, because money raised in a hard currency can multiply in value several times when expended on local materials and labour in-range
- research that is not practicable in the field e.g., oestrogen assay; egg incubation; (some) sealed nest observation
- campaigning or lobbying for ex-range change or support

8.2 Local zoos

There might appear to be some inconsistency in the corporate zoo mindset. Whereas, nowadays, zoos in the UK vigorously defend their role as conservation focused organisations, there is, with the notable exception of Bristol and Paradise Wildlife Park, little evidence that they see the same potential and value among zoos in-range. As the recently published World Zoo and Aquarium Conservation Strategy states, "*Well resourced institutions should attempt to work with local institutions to improve their standards and capabilities.*"

While zoos claim success for the breeding for release component of the highly regarded golden lion tamarin, *Leontopithecus rosalia*, programme at the National Zoo, Washington, they also balk at the cost of repeating the process for the other lion tamarin species. Has the suggestion been made to build or convert a breeding unit within Jardim Zoológico do Rio de Janeiro, which could duplicate the first success at an affordable cost?

Perhaps the experience of Washington and of other zoos, such as Howletts, investing heavily in breeding and exporting stock overseas, should be seen as ex-situ/ex-range trials for ex-situ/in-range breeding programmes*. If the initial expenditure can be viewed as an investment towards a broader, in-range strategy, it might not seem so costly.

The Convention on Biological Diversity, Article 9, signed in Rio in 1992, asked zoos "*to support ex-situ conservation, preferably in-country*", which was a direct invitation to zoos to build the capacity of local zoos and/or other conservation holding and breeding facilities in-range.

Building the capacity of in-range conservation facilities does not arise as a category in this survey. Despite the CBD Article, 'capacity building' is not yet commonly part of zoo vocabulary, possibly because they don't yet do it.

ICNGOs, however, almost without exception, put capacity building of local organisations highest on their list of priorities. Practiced in the skills of building capacity, an ICNGO would make a useful partner for a zoo wanting to improve the animal welfare and conservation practice of local zoos and animal holding facilities, while contributing to other components of conservation strategies. Such an outcome would realise the Aim of this inquiry to build a closer working relationship between zoos and ICNGOs.

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8.3 Practical skills

From a perspective of evaluating conservation programmes in the field carried out by many different conservation sectors, including the zoo sector, it is surprising that the wealth of practical know-how that zoos have, and for which zoos are undoubtedly bade most welcome by the other sectors, has barely arisen in this survey. Is this because zoos do not recognise their own value in practical skills?

Zoos sometimes appear disinclined to promote their core expertise of holding and breeding animals in captivity, in favour of a perceived more esoteric role (which other sectors already have and may specialise in) such as field research. There may be a connection.

Zoos have learned to be self-sufficient in many ways that could catalyse effective conservation results. Beyond Zoos' accomplished skills in animal husbandry, propagation and veterinary care, here are a few other examples that could easily be added:

- Enclosure, including water features, electric fencing, metal work etc
- Way marking, lighting and sign-writing
- Budgeting, book-keeping and accounting
- Education materials, innovative learning, teaching experience
- Marketing, fundraising, retailing
- Building (with almost any material), installing and maintaining main and auxiliary services
- Close observation, study, and collection of samples from captive animals
- Market research and surveys
- Data-base management and servicing
- Human resource management

... the list continues.

And if a particular skill is not available in-house, the urban zoo in particular brings the goodwill and contacts of entire municipalities with an endless list of non-zoo skills, and an outsourcing ability to procure resources, in kind or financially, for just about anything.

8.4 Evaluation

UK Zoos are now under pressure from the European Zoos Directive, the Zoo Act and its inspecting officers, and the Secretary of State's Standards for Modern Zoo Practice to address their responsibilities in conservation, and to expend more income and fundraising time on conservation. It is hoped, however, that expenditure is not the main arbiter of conservation commitment.

Of greater importance is the amount and quality of conservation *activity*, measured on a scale of *effective outcome achieved*.

The amount of in-range conservation research* contributed by the Welsh Mountain Zoo, "and it hasn't cost a penny", is impressive. It may be imagined what such focus and determination could be achieved if WMZ had the resources of some of the larger collections.

Of course, the ultimate aim must be to so infuse each zoo with the conservation ethic that everything it does contributes to its conservation role. So intrinsic would conservation become to the zoos' day-to-day operation that a survey such as this one would become irrelevant.

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8.5 The role of zoos

The role of UK zoos in overseas conservation is not entirely straightforward. Much good conservation has been achieved because of the cause driven, species-specific approach of zoo personnel and institutions. For example The (Woolly) Monkey Sanctuary in Cornwall wrote and guided the implementation of primate welfare legislation in Chile, and now leads a campaign to ban the monkey trade in the UK.

The question arises, although a zoo was not necessarily required to achieve this result, would the result have been achieved without a zoo?

What is beyond doubt is that zoos provide one means by which passions for particular species, genera or families can be transformed into hard conservation results.

The Monkey Sanctuary has now dropped its 'woolly' prefix, as there is no further justification for the rescue mission for which it was created, due, at least in part, to their successful lobbying in the country of species' origin. By this decision they reflect the cause-driven focus of Gerald Durrell who, when asked for his next ambition, would routinely reply, *"to close down the Jersey Zoo and Trust ... because there is no further need of us"*.

8.6 Inter-Sector Collaboration

The Philippine programme demonstrates the degree to which the zoo sector will fund ICNGO sector ex-situ/in-range conservation breeding programmes for many years, without any reciprocal arrangement to import breeding stock to their collections, nor with much likelihood of release in the short term.

The Cornish chough example, however, may indicate a general unwillingness by the national government and national NGO sectors to work with zoos. A scientist on the red squirrel programme also hinted that the academic sector too disregards the potential of zoos.

The reverse may also be true. 38% of ex-situ/in-range* 'Breeding for Release' project components cited in this research were for UK projects, yet collaboration with county Wildlife Trusts is hardly the norm.

Understanding ambivalent attitudes between other conservation sectors and zoos could help set the context for future collaboration. There will be the reciprocal benefit from matching the needs of one sector with the skills of another, but there will be other gains that grow out of the sum of these parts, unrealised until the partnerships form.

9. Summary and Recommendation

If the case is not yet entirely made, it is hoped the forgoing at least represents the case being adequately put

- that the future role of zoos, enforced by European and British law, is set largely in the service of wildlife conservation
- that wildlife conservation, generally speaking, is most effectively conducted within range of the species and ecosystem to be conserved

further

- that local zoos may represent the same principles above as do 'foreign' zoos and, therefore, the same opportunity to expand the conservation role of zoos worldwide
- that zoos have particular skills that other conservation sectors do not have, and vice versa

and therefore

- that UK zoos should consider their most effective strategy for the conservation of biodiversity to be by outsourcing their specialist skills and resources to in-range projects; by working with other conservation sectors for maximum expertise and effect; and by building the capacity of in-range animal holding facilities to sustain each initiative beyond the Zoo Counterpart's intervention.

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