



BIAZA

BRITISH & IRISH ASSOCIATION
OF ZOOS & AQUARIUMS

Top Ten Species Reliant on Zoos

2012



Compiled by: Andrew R. Marshall, Janine E. Robinson, Bethan Hindle and the
BIAZA Field Programmes Committee

Mountain chicken (*Leptodactylus fallax*)

- One of the world's largest frog species.
- Threats include exploitation, habitat damage, introduced predators and a deadly fungus.
- The future of this species may rely on successful reintroductions from captive bred populations.
- The Mountain Chicken Recovery Programme is a collaboration between zoos and the governments of Montserrat and Dominica.
- Amphibians are highly endangered; around 32% of described species are threatened.



Mountain chicken, Chester Zoo

Despite what you might imagine from its name this **Critically Endangered** species is actually one of the largest species of frog in the world. This frog got its unusual name from its chicken-like taste, which made it into a traditional West Indian dish. Once found on maybe as many as seven Caribbean islands, the effects of habitat loss, introduced species and over-exploitation have reduced its range to only two islands; Montserrat and Dominica. However it was the introduction of the pathogenic chytrid fungus *Batrachochytrium dendrobatidis* ('Bd' for short), that has brought the species to the edge of extinction.

Durrell Wildlife Conservation Trust has worked with the biodiversity of Montserrat for a number of years and first brought 13 to its Wildlife Park in Jersey in 1999 to form a captive breeding programme. The threats of Bd to mountain chickens were known from Dominica, where the introduction of the pathogen caused over 90% declines in population numbers within a very short space of time. Alerted by the appearance of dead frogs by the Montserrat Department of Environment in February 2009, a rescue mission was mounted to bring 50 frogs into a bio-secure captive breeding programme. The Mountain Chicken Recovery Programme was then formed between Durrell, Chester Zoo, Parken Zoo in Sweden and ZSL, as well as the governments of Dominica and Montserrat, with the aim of saving this species from extinction. Captive breeding of this frog is managed through a European StudBook, managed by Chester Zoo.

Efforts to save this species now incorporate a dedicated field project, funded by Defra's Darwin Initiative, which is linked to the captive breeding programme. So far two trial releases of frogs bred in captivity have taken place and frogs were radio-tracked and closely monitored by field teams post release. Another release is planned for autumn 2012. In Dominica, ZSL have been carrying out field work for a number of years, mapping the distribution, monitoring disease distribution and prevalence; educating the local people; facilitating captive breeding programmes in-country and creating a Molecular Diagnostic Laboratory equipped for testing samples for chytrid fungus for Dominica's amphibian fauna and the wider Caribbean. At ZSL's Institute of Zoology a research programme aims to understand the dynamics of the disease and identify how the frog may survive with this disease, making it a case study that will be applied to the global amphibian crisis

This model of combining dedicated field conservation programmes, with the captive breeding expertise within zoological institutions and applied research highlights how zoos can remain at the cutting edge of conservation efforts, which is exemplified by the Amphibian Ark and Amphibian Survival Alliance. Other amphibians that zoos are conserving include the Kihansi spray toad which is Extinct in the Wild and the Critically Endangered green-eyed frog.

White-clawed crayfish (*Austropotamobius pallipes*)

- Decline caused by introduction of North American signal crayfish and crayfish plague.
- Approximately 95% of populations in Great Britain have been lost.
- Zoos, including Bristol and Paignton, are breeding crayfish for release into safe sites.
- Zoos are also involved in raising public awareness as people can help to prevent the spread of disease and invasive species.
- One example of the many native species that British zoos are helping to conserve.



The South West White-Clawed Crayfish conservation project for Bristol Zoo.
Credit: Thousand Word Media

People often associate zoos with exotic animals, however many zoos are also involved in the conservation of native species. BIAZA zoos are thought to have supported over 150 native conservation projects in 2010. The white-clawed crayfish is classified as **Endangered** by the International Union for Conservation of Nature (IUCN), is a UK Biodiversity Action Plan priority species and is protected under the Wildlife and Countryside Act 1981 in the UK. This species has been in decline across Europe since the 1970s; approximately 95% of populations in Great Britain have been lost. The main causes of these declines are introduced crayfish species, such as the North American signal crayfish, and a deadly disease called the crayfish plague. The North American signal crayfish was introduced when individuals escaped from food and hospitality fisheries. It competes with the white-clawed crayfish for food and can be a carrier of crayfish plague which it is not affected by. This year's drought conditions could also affect the survival of our native species; flooding caused by increased run-off due to the dry conditions could increase the transmission of crayfish plague between waterways and movement of non-native species to new waterways.

BIAZA zoos are breeding white-clawed crayfish so that they can be released into safe sites, which haven't been affected by introduced species or disease. The Bristol Science and Conservation Foundation (sister organisation of Bristol Zoo Gardens) and Paignton Zoo Environmental Park are working with partners such as Buglife, the Environment Agency and the Avon Wildlife Trust on the South West Crayfish Partnership to help conserve this species. Bristol Zoo Gardens has set up a captive-breeding facility and is now supporting other BIAZA zoos in the setting up of further breeding facilities and public displays. They are also conducting behavioural research and developing husbandry guidelines, which have resulted in an improved hatchling survival rate. Education programmes, such as a 'Crayfish in Crisis' Roadshow for schools, also have an important role as people have aided the spread of the signal crayfish and crayfish plague.

The white-clawed crayfish is just one of many examples of native species that zoos are working to conserve. Another such species is the fen raft spider, which zoos have undertaken a rear-and-release programme to boost numbers in the wild. Last year over 1,200 spiderlings were distributed between four BIAZA collections.

Blue-crowned laughingthrush (*Garrulax courtoisi*)

- Less than 250 mature birds left in around nine breeding sites in the wild.
- Variety of threats facing this species including trapping for the live bird trade, local urbanisation and resulting habitat loss.
- European and international zoo breeding programmes were set up and managed by Leeds Castle with support from Chester Zoo.
- Currently 128 birds held in captivity by 20 zoos.
- Chester zoo and a consortium of European zoos have established a Memorandum of Agreement with the local forestry bureau in China to protect the birds breeding locations.



Blue-crowned thrushes. Credit: Xie Xiao-Fang

This Chinese bird species is **Critically Endangered**, with less than 250 mature wild birds left in around nine breeding sites. There are a number of threats which may have caused their decline in numbers including capture of birds for the pet trade and more recently, local urbanisation in China and the resulting loss of habitat. Zoo breeding programmes were set up by Leeds Castle with support from Chester Zoo and there are currently 128 birds held in captivity by 20 zoological collections. This species is managed under a European StudBook (ESB). In February 2012, an application for an International studbook was formerly approved – to move toward a global programme of captive breeding within zoos. Chester Zoo and a consortium of European zoos have established a Memorandum of Agreement with the local forestry bureau in China; this MOA has established protection of the birds breeding locations. Research is also being carried out into the characteristics of the blue-crowned laughingthrush’s habitat to inform future searches for wild populations.

Chester Zoo also supports a holistic conservation project in the Sichuan Mountains in China, which aims to protect the habitat of other endangered endemic birds as well as animals such as the red panda, giant panda and other threatened wildlife. Since 2001 this project has helped to establish several forest reserves in the area and financed the training of forest rangers, surveying equipment and field vehicles and building and furnishing of field accommodation. It has also provided community support, including helping to improve school facilities and providing alternative energy options such as biogas.

The spoon-billed sandpiper is another Critically Endangered bird that is gaining support from BIAZA institutions. The Wildfowl and Wetlands Trust collected 13 eggs to hand-rear for future reintroduction and is conducting field work to protect its habitat and educate local communities.

Amur leopard (*Panthera pardus orientalis*)

- One of the most endangered large cats in the world with less than 45 individuals in the wild.
- One of the last remaining northern races of leopard.
- Around 220 individuals in captivity provide a vital safety net.
- Reintroduction programme, which will use zoo animals, is in the planning stage.
- This subspecies would very likely be extinct without fundraising and awareness work, plus direct field involvement, on the part of zoos from the mid-1990s onward.



Milly the Amur leopard. Credit: J Thomas, Wildlife Heritage Foundation

This **Critically Endangered** subspecies stands at only about 45 animals in the wild, but the tiny population is at least stable – or even slightly increasing – thanks to concerted efforts from zoos and other groups. Threats include poaching, forest fires and habitat loss to development. There are 220 individuals in a global conservation breeding programme in zoos around the world, which generate many kinds of conservation support including training for vets working in the field and substantial funding for field work via the Amur Leopard and Tiger Alliance (ALTA), which is coordinated by the Zoological Society of London (ZSL). A reintroduction programme is currently in the planning stage with zoos involved on a number of levels, including providing animals for release, and if these plans succeed then this will be the first big cat reintroduction using individuals bred in captivity.

European zoos have provided over £380,000 to ALTA partners since 1996, with another £95,000 from North American zoos – a very significant contribution, close to half of what has been spent by NGOs overall in that time – and have also raised public awareness of this leopard, including helping to get it TV coverage over the last decade. Zoos working with ALTA are also providing conservation support to the endangered Amur tiger. With three subspecies of tiger already extinct and the remaining six subspecies either Endangered or Critically Endangered, zoos play a major role in creating awareness and raising funds for tiger conservation.

Owsten's civet is another carnivore that zoos are helping to conserve; the only known conservation project for this vulnerable species is almost entirely supported by zoos.

Potosi pupfish (*Cyprinodon alvarezii*)

- Freshwater fish species found only in one place in Mexico - the spring fed Laguna at El Potosi.
- Extinct in the wild, so completely reliant on captive breeding for survival.
- Held by a number of British zoos including ZSL and Bristol Zoo Gardens
- Captive-breeding programme managed by ZSL.
- Over half of the freshwater fish species assessed by the IUCN are Threatened, Endangered, Critically Endangered or Extinct in the Wild.



Potosi pupfish. Credit: ZSL Heiko Kirst

This species was declared **Extinct in the Wild** in 1996, so is reliant on captive-breeding efforts for its continued survival. Declines in the wild were caused by invasive species and their habitats being drained for farming. ZSL obtained individuals from private Spanish breeders and has since bred these in captivity and distributed them to other British zoos including Bristol Zoo. It is hoped that if there are sufficient improvements in their natural habitats, which may include aquifer rehabilitation, allowing some water to naturally flow to the spring, removal of introduced species and prevention of human interface and pollution, then they may be able to return them to the wild in the future. Following a review of Mexican freshwater fishes by the International Union for Conservation of Nature (IUCN) a proposal will be drafted for a trial rehabilitation and potential reintroduction for one of the Extinct in the Wild pupfish species (there are at least three).

FishNet, which was established in 2005 by ZSL, is working to conserve freshwater fish such as the Potosi pupfish. Their conservation activities include captive breeding, research, education and outreach, field conservation and rescuing species that require captive management for survival. Out of the 5096 freshwater fish species assessed by the IUCN 2506 are threatened and 688 are either Endangered, Critically Endangered or Extinct in the Wild. Another species they work closely with is the butterfly goodeid, which is also Extinct in the Wild and bred in captivity by ZSL. It isn't only fish that BIAZA zoos are helping to conserve; 'Project Seahorse' was co-founded by ZSL in 1996 to protect seahorses and their habitats. As well as conducting the world's first analyses of the damaging effects of harvesting seahorses they guided a landmark agreement among the 175 CITES nations to regulate international trade.

Polynesian tree snail (*Partula hebe*)

- *Partula hebe* is one of 11 species that have been extinct in the wild for over 20 years and have only survived due to an international zoo breeding programme.
- Extinction in the wild was caused by introduction of an alien predator.
- Reintroductions led by zoo community, with close collaboration with the French Polynesian Government.
- The Partulid Action Plan aims to reintroduce all surviving species back to their five island homes in Polynesia by the end of the decade.
- Just as important to conserve invertebrates as well as the more obvious vertebrate species.



Partula hebe bella. Credit: Dave Clark, ZSL

This species of Polynesian tree snail was originally threatened by the introduction of an exotic predator, the rosy wolf snail (*Euglandina rosea*). This carnivorous snail was originally introduced by humans as a biological control for the pest giant African land snail, but the animal in question quickly showed it liked snacking on *Partula* instead! *Partula hebe*, along with other *Partula* species held in captivity, has now been **Extinct in the Wild** for 20 years. It has been saved from extinction by an international zoo breeding programme. The same zoo community, in close collaboration with the French Polynesian Government, has led on the field conservation initiative to re-establish these endemic snails back onto their island homes. This has involved building reserves to exclude the predatory snail.

Whilst there does often seem to be an emphasis on the conservation of the more obvious vertebrates (such as the big cats), invertebrates such as *Partula* often play vital roles in ecosystems and should not be overlooked. This project, which involves several BIAZA members, shows that zoos are not only focusing on the larger species. It also shows that conservation efforts, including an *in-situ* fieldwork element, can be relatively inexpensive. *Partula hebe* is not the only Polynesian tree snail that has been saved by zoo conservation efforts; several species including *Partula faba* rely on captive breeding. The Partulid Action Plan aims to reintroduce all surviving species to their original ranges in five Polynesian islands by the end of the decade.

Verdcourt's polyalthia tree (*Polyalthia verdcourtii*)

- Endangered tree known only from three locations in the Kilombero valley of Tanzania.
- An example of the broad approach to conservation that many zoos now adopt, moving away from the traditional single-species approach
- Used as an indicator of conservation success by Flamingo Land's Udzungwa Forest Project (Best Field Conservation Project; BIAZA 2011)
- Conservation efforts include education, habitat management, ecological monitoring, human livelihood projects and tree seedling propagation
- Named after eminent botanist Bernard Verdcourt, who died earlier this year at the age of 86, after decades of dedication to plant taxonomy at the Royal Botanic Gardens, Kew.



Verdcourt's polyalthia tree. Credit: Andrew R Marshall

Given that a lot of people will associate a trip to the zoo with seeing animals, it may be a surprise that zoos are also involved in conserving plant species. This Endangered tree is only known from a few specimens near to the Udzungwa Mountains of Tanzania, mostly from Magombera forest, which continues to be threatened by illegal activities and lack of designated conservation status. There has been a rapid decline in habitat in the past three years which means that this tree should possibly now be classed as Critically Endangered; this would definitely be the case if it wasn't for the work done by Flamingo Land's Udzungwa Forest Project (UFP) together with the University of York in the UK.

UFP, which was awarded BIAZA Best Field Conservation Project in 2011, is a holistic conservation project with strong ecological, habitat management and human livelihood components. UFP is also providing data and advice to a legal task force that is seeking a conservation status for Magombera forest. In the meantime, field staff are now patrolling Magombera forest with the help of the Kilombero Sugar Company and Selous Game Reserve security staff, alongside a village education program. Tree nurseries are also being maintained to provide a supply of seedlings to reduce pressure on forest trees, and to develop stocks of IUCN Red-Listed trees including Verdcourt's polyalthia.

This conservation project is also important for conserving a range of other threatened species including the Udzungwa red colobus and a new species of tree which is still being described. The Magombera chameleon was discovered in the mouth of a snake in 2005, during development of this project; only four individuals have ever been seen. UFP is also assessing the habitat requirements of the Critically Endangered kipunji monkey.

Blue-eyed black lemur (*Eulemur flavifrons*)

- Critically Endangered due to large scale habitat loss and hunting.
- Restricted to a very small area of ~ 2,700km² in northwest Madagascar and only a small total population remains.
- Main organisation working to conserve this species is a consortium of European zoos and universities.
- Large level of community involvement e.g. over 200 villagers helping to maintain fire break.
- Research projects both in Madagascar and on captive populations in zoos.
- Rice-growing competitions are being used to promote sustainable farming techniques.



Female blue-eyed black lemur (*Eulemur flavifrons*). Photo: Christoph Schwitzer/
Bristol Zoo Gardens

This **Critically Endangered** lemur species (also known as the Sclater's black lemur) is found in primary and secondary sub-humid forest fragments, in a very small area of about 2700km² in northwestern Madagascar. There is only a small total population remaining which is in decline. There has been a huge reduction in their available habitat due to slash-and-burn agriculture, logging and forest fires. They are also hunted for food and sometimes kept locally as pets. Unlike most primate species the male and female blue-eyed black lemurs are different colours, although both have the same distinctive blue eyes.

The main organisation working to conserve this species is the Lemur Conservation Association, AEECL. This is a consortium of European zoos and universities, of which Gary Batters, Director of Education and Conservation at Banham Zoo, is vice president. Banham Zoo also administers the AEECL website. The AEECL works with local universities to study the ecology of the region, including providing support to Madagascan students to study PhD level projects in the forest. Studies so far have assessed the forest usage, nutritional requirements, the biodiversity of the forest and much more. Research has also been carried out on captive lemurs in AEECL member zoos, including nutritional and breeding studies.

The AEECL also plays a huge role in education, for example by supporting teachers by helping with their salaries and resources. They also help to organise festivals to increase the awareness of conservation issues amongst locals and they promote and train villages in sustainable rice growing and creating fire breaks in an attempt to save the remaining forests which provide vital habitat for the lemurs. The support from the community can be seen from the turnout to events and the support for the firebreak and forest protection, with more than 200 villagers helping to maintain the firebreak around Ankarafa Forest.

Other species that have been subject to studies and/or census work in Sahamalaza during the last years were the newly discovered Sahamalaza sportive lemur and the northern giant mouse lemur as well as various bird species.

Ploughshare tortoise (*Astrochelys yniphora*)

- Critically Endangered species found only in north-western Madagascar
- Threatened by habitat loss, introduced species and the illegal pet trade.
- One of the most sought-after tortoises on the illegal pet trade market.
- Field conservation efforts include establishment of Baly Bay National Park, dedicated, research programmes and community-led development initiatives.
- Possibly one of the most successful tortoise reintroduction projects in the world.
- Reintroduced individuals are known to have reproduced in the wild, which is great indication that the reintroduction project has been successful.



Ploughshare tortoise
Credit: Gerardo Garcia, Durrell Wildlife Conservation Trust

This **Critically Endangered** reptile is found only in north-western Madagascar. Like many Madagascan species it has been threatened by both habitat loss and introduced species. However, with the rise of the illegal pet trade, poaching has now become the dominant threat to this species' survival in the wild.

A captive-breeding programme in Madagascar has been managed by Durrell Wildlife Conservation Trust for the last 25 years. Trial releases for what has become a very successful tortoise reintroduction project, were started in 1998. Since then 65 individuals have been reintroduced, and 60 of these are still known to be alive. There was a long wait for these individuals to breed as ploughshare tortoises do not reach sexual maturity until they are at least fifteen years old, however some of the individuals are now known to have offspring. Durrell has also led field conservation efforts, including the establishment of Baly Bay National Park, dedicated research programmes and community-led development initiatives which integrate local communities into the management of the ploughshare's habitat. Durrell is currently working with international partners to address the pressures faced by poaching and the smuggling of animals primarily to markets in Southeast Asia.

The ploughshare tortoise is one of many reptile species that are reliant on conservation work done by zoos for their survival. Another example is the assemblage of reptiles restricted to tiny offshore islands of the coast of Mauritius such as the orange tailed skink. Long term field projects with the Mauritius Wildlife Foundation and captive breeding programmes have seen translocation, introduction and restoration of populations of Telfair's skink, lesser night gecko, Bojer's skink, Guenther's gecko and orange-tailed skink.

Scimitar-horned oryx (*Oryx dammah*)

- Extinct in the wild, so completely dependent on captive breeding and reintroduction for its continued survival.
- Successful reintroductions in parks and reserves in Tunisia and more planned for Chad.
- British zoos have contributed to the development of a global conservation and reintroduction strategy.
- Habitat management for this species has seen increase in general biodiversity.
- BIAZA institutions have been involved in the conservation of this species for over 30 years.



Scimitar-horned oryx at ZSL Whipsnade
Credit: James Godwin

The scimitar-horned oryx was declared **Extinct in the Wild** in 1999 and therefore depends completely on captive breeding and reintroduction for its continued survival. The causes of extinction include habitat destruction, competition with domestic livestock for sparse grazing, and hunting for meat, hides and trophies.

BIAZA zoos, including Marwell Wildlife, Edinburgh Zoo, ZSL and Fota Wildlife Park, have been involved in the release of scimitar horned oryx in parks and reserves in Tunisia since 1985. This included providing animals to be reintroduced. There are now approximately 180 oryx back in their natural habitat in their historical range in four fenced parks and reserves in Tunisia. Capacity building, training of rangers, community engagement, education, surveying, post-release monitoring and management are being carried out by Marwell Wildlife and ZSL, and supported by a number of other BIAZA institutions. Zoos also provide funding and support to the Sahara Conservation Fund. A programme of fencing and habitat restoration by the Tunisian authorities in preparation for the reintroduction of the oryx has seen the re-establishment of native flora and with it insect, bird, reptile, amphibian, and small mammal diversity.

Edinburgh Zoo, ZSL and Marwell have also contributed to the development of a global conservation and reintroduction strategy for the species. The strategy has led to a national workshop in N'Djamena early in May 2012 to assess the feasibility of a large scale release of free-ranging oryx in Chad, the country where the last significant population lived in the wild in the late 1980s.

The scimitar-horned oryx is among many ungulates that BIAZA zoos are protecting from extinction. Chester Zoo provides around £8,000 of funding a year for the conservation of the Critically Endangered Sumatran rhinoceros, whilst Durrell Wildlife have been essential to the survival of the pygmy hog through captive breeding and reintroductions.

Acknowledgements

This report was compiled by Dr. Andrew R. Marshall, Janine E. Robinson, Bethan Hindle and the BIAZA Field Programmes Committee.

BIAZA Field Programme Committee (Chairman: Rob Thomas, Royal Zoological Society of Scotland; Vice-Chairman: Scott Wilson, Chester Zoo; Members: Kevin Caley, Twycross Zoo, Sarah Christie, Zoological Society of London, Dave Coles, Beale Park, Maggie Esson, Chester Zoo, Karl Hansen, Living Rainforest, Andrew Marshall, Flamingo Land / University of York, Neil Maddison, Bristol Zoo, Rebecca Perry, Colchester Zoo, Amy Plowman, Whitley Wildlife Conservation Trust, Roger Wilkinson, Chester Zoo)

Other contributors:

Catherine Barton, Chester Zoo
Bryan Carroll, Bristol Zoo Gardens
Dave Clarke, ZSL London Zoo
Emma Edwards, Zoological Society of London
Gerardo Garcia, Chester Zoo
Tania Gilbert, Marwell Wildlife
Matthias Goetz, Durrell Wildlife Conservation Trust
Caroline Howard, Dudley Zoological Gardens
Maddy Ivey, Bristol Zoo Gardens
Clare Jenkinson, Banham Zoo
Heather Koldeway, Zoological Society of London
Simon Marsh, Yorkshire Wildlife Park
Christoph Schwitzer, Bristol Zoo Gardens
Ian Stephen, ZSL London Zoo
Andrew Terry, Durrell Wildlife Conservation Trust
Tim Wachter, Zoological Society of London
Tim Woodfine, Marwell Wildlife
Brian Zimmerman, ZSL London Zoo