



**Bristol Zoological
Society**
Saving Wildlife Together

BRISTOL ZOOLOGICAL SOCIETY **CONSERVATION MASTER PLAN 2018-2022**

A locally and globally renowned
conservation organisation



Photo: Lemur Leaf Frog
(*Agalychnis lemur*), Costa Rica

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IN THE NEXT FIVE YEARS...

We will work in
NINE
COUNTRIES

across
FOUR
CONTINENTS

to conserve
17 TARGET
SPECIES

using the
ONE PLAN
APPROACH

and share our message with more than
THREE MILLION
PEOPLE WHO COME TO OUR ZOOS

to ensure a
SUSTAINABLE FUTURE FOR
WILDLIFE AND PEOPLE

INTRODUCTION

Zoos have been playing an active role in wildlife conservation since over half a century, and Bristol Zoological Society has always been at the forefront of this movement. Collaborative conservation breeding in UK zoos started in the late 1960s with the formation of the Okapi Consortium, of which we were a founder member. This was one of the first formalized conservation breeding programmes worldwide. In the UK, Joint Species Management Programmes started in the late 1970s and were subsumed under the European Endangered species Programmes (EEP) in the mid 1980s. In both cases BZS played an active role from the very start, and today we are contributing to no less than 78 conservation breeding programmes for threatened species at Bristol Zoo, and to 23 at Wild Place. Going forward, we aim to increase these numbers even further and make active contributions to conservation with at least half the species in our two collections.

In the late 1980s, and further pushed by the publication of the first World Zoo Conservation Strategy in 1993, zoos started to fund, and run, field conservation projects. Bristol Zoological Society's first multi-year funding commitment to a conservation NGO was to the Hawk and Owl Trust in 1992/93. In 1998, the Cameroon project was started (initially by supporting the Cameroon Wildlife Aid Fund, now Ape Action Africa) as our first major conservation project abroad. Today, our staff and partners are running 13 field conservation projects in nine countries on four continents, which makes BZS one of the leaders in this field in the international zoo community. Our 5-year aim is not necessarily to increase the number of our projects, but to measure and enhance our conservation outcomes in every one of them, for the benefit of wildlife and people.

The third, and potentially most important strand of zoos' contribution to conservation is engaging people with the natural world, teaching all levels of society about the state of the world's natural environments and promoting positive behaviour change towards more wildlife-friendly actions. Education has been a major focus of Bristol Zoological Society since 1986, when we employed our first Education Officer. Behaviour change and its evaluation has only more recently become part of our portfolio. We ran our first dedicated behaviour change campaign, on FSC-certified charcoal, in the summer of 2013, and have run four more campaigns since then. Within the lifetime of this Master Plan, we aim to become a leading zoological institution in developing and delivering behaviour change campaigns.

Bristol Zoological Society has been actively contributing to wildlife conservation in all three of the above fields (conservation breeding; field conservation and science; behavior change and advocacy), and some of our work has been pioneering. In order for us to transition into a locally and globally renowned conservation organisation, this master plan will enable us to maximize the integration of the three strands of our conservation work and mobilise our strategic assets to achieve defined and measurable conservation outcomes.



Christoph Schwitzer
Chief Zoological Officer

Photo: Male and female blue-eyed black lemur in the Ankarafa Forest, Sahamalaza-Iles Radama National Park, northwest Madagascar



Photo: Releasing captive-bred white-clawed crayfish into the River Itchen, Hampshire

OUR MISSION

The Society's **charitable objects** are to advance:

- the public understanding and the conservation of wildlife and the natural environment and
- the scientific study of plants and animals.

Our vision is: 'a sustainable future for wildlife and people'.

Our mission is: 'to save wildlife, through conservation action and engaging people with the natural world'.

We are saving wildlife together.

OUR THREE STRANDS OF CONSERVATION

To save wildlife through **conservation action** and **engaging people** with the natural world, we group our conservation work into three strands:

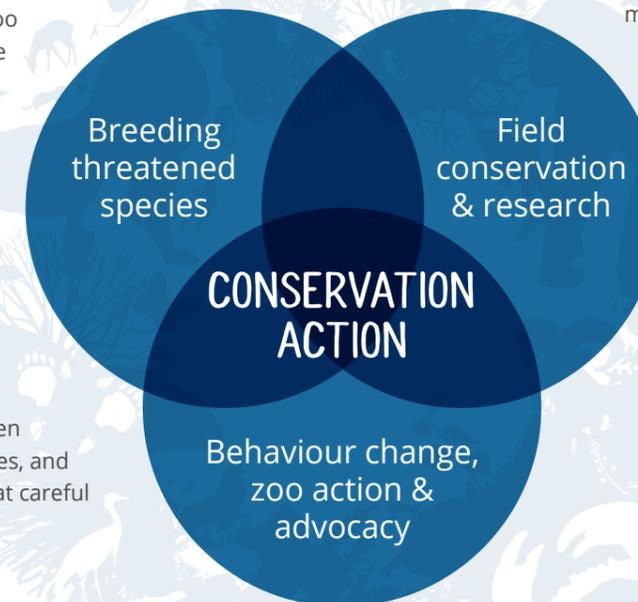
Breeding threatened species is crucial for those that are under severe threat in the wild, to buy time to reduce or eliminate those threats. A carefully-managed breeding programme, maintaining as much genetic diversity as possible, provides both a population to study to help find out how to address the threats, and an insurance population for reintroduction when appropriate.

For example, many amphibians are being attacked by a fungal disease which is rapidly wiping out wild populations. The only hope for them is to bring individuals into biosecure breeding units, such as the AmphiPod at Bristol Zoo Gardens. The infection can be controlled, and even cured, in captivity. When it has been addressed in the wild, the species can be returned.

Also, we hold *Partula* snails from Polynesia, where some species are already extinct in the wild due to introduced predators. Some of our snails have already been returned to small wild reserves, and are being studied to show that careful reintroduction can work.

Field conservation and research. Species have evolved as part of dynamic, complex ecosystems, and it is those ecosystems that need to be maintained for the benefit of wildlife and people. In many instances, characteristics of the populations of concern are not sufficiently understood, the threats are not fully studied, and effective responses to those threats are not clear. Using our expertise to study these complex systems, understand what is going on and how we can address the issues is of vital importance.

We work with specific communities and geographical areas, to study the ecology, survey and monitor the species populations, and take into account other factors such as economic pressures, local politics, or animal health issues, to come up with local solutions for the benefit of wildlife and people. This is highly interdisciplinary work, and by its very nature, long-term and locally-based.



Behaviour-change, zoo action and advocacy. Wildlife in the oceans is threatened by overfishing, forests by timber extraction, and swathes of the planet are impacted by livestock-farming and agriculture. For example, oil palm is a highly valuable and efficient crop, but the current widescale conversion of forest for its production as a monoculture is having a huge impact on natural ecosystems and the species that they contain. Such issues cannot be addressed by breeding, or locally-focused action, but require wider, societal change, often at a global scale.

Zoos are uniquely placed among wildlife conservation organisations in having direct contact with millions of visitors, and playing a major part in local economies. By using our buying power and local influence we can set the example for environmentally-conscious operation. Even more importantly, we can influence our visitors towards more wildlife-friendly behaviours. Sustainable fishing and timber production certification schemes are only effective if consumers positively discriminate in their purchasing decisions. Studies show that people want to be part of the solution, and some recent guest action campaigns have shown that we can play our part in encouraging and enabling wildlife-friendly behaviours. As part of wider networks, we can address these large-scale impacts on the natural world and thus bring about a sustainable future for wildlife and people.



OUR 'ONE PLAN' APPROACH

Overarching goal of this plan: We will increase our commitment to conservation through applying our **One Plan approach**, thus ensuring that within 5 years, conservation is considered in everything that we do and we become a locally and globally renowned conservation organisation.

The One Plan approach is a central concept of our Conservation Master Plan. It was developed by the IUCN SSC Conservation Planning Specialist Group (CPSG) with significant contribution from Bristol Zoological Society, and adopted by the World Association of Zoos and Aquariums (WAZA). The One Plan approach promotes integrated species conservation planning, which considers all populations of a species, inside and outside its natural range, under all conditions of management. It aims to bring together the zoo community and the field conservation community for conservation planning and define conservation roles for every part of a species' population, both in the wild and in captivity.

At Bristol Zoological Society we are taking this concept one step further and have developed our own institutional One Plan approach. For us, this means that when we develop new conservation projects, wherever possible, we aim to include all three strands of our conservation work (conservation breeding; field conservation and science; behaviour change and advocacy) and define roles for all of our main conservation disciplines. Our institutional One Plan approach allows us to make best use of the skills, experience and enthusiasm of a broad range of our staff in different departments; thus improving conservation outcomes. Also, importantly, it generates a workforce that fully embraces our conservation mission and vision. By rolling out our institutional One Plan approach across all our conservation projects, activities and operations, we are implementing the recommendations of the World Zoo and Aquarium Conservation Strategy (WAZA, 2015).

OUR STRATEGY

This Conservation Master Plan identifies the high-level strategic actions necessary to achieve our aim of becoming a locally and globally renowned conservation organisation. Bristol Zoological Society carries out its conservation work through its Institute of Conservation Science and Learning, based at Bristol Zoo Gardens, and through its two zoos, Bristol Zoo Gardens and the Wild Place Project. Our strengths lie in the disciplines of conservation breeding and reintroduction, conservation science, conservation education, conservation campaigning, conservation medicine and community-based conservation around protected areas. Nearly all of these disciplines include both zoo-based and field-based elements.

The aim of this plan is to maximise the integration of Bristol Zoological Society's conservation disciplines in order to achieve increasingly strong conservation outcomes and compete with the very best conservation organisations globally. It spans five years to 31st December 2022, answers to the Society's 10-year Strategic Plan 2015–2025 and sits alongside the physical Master Plans for our two zoos. We use four principles to determine where we focus our conservation action.



Using the skills, expertise and passion of our staff to make effective and targeted contributions to global species conservation.

We are proud to have many of the leading experts in their respective fields among our staff, which makes us stand out in the global zoo and conservation community. We have linked our Higher Education delivery directly to our field conservation projects to ensure that we can make best use of our staff's skills and expertise in our conservation work – a unique model in the zoo world. We will continue to nurture our people's passion and empower them to bring the Society's conservation work to the next level. Over the last two decades we have built up considerable expertise in all three main areas of zoo-based conservation: conservation breeding, field conservation and science, and enabling our guests to take conservation action. We are also very good at conservation advocacy and conservation medicine. We will build on these strengths and focus our interventions on those areas that we are best at and where we can make a real and lasting impact.

Identifying the conservation needs and assessing the wild population status of species.

Our focus is evidence-based conservation, underpinned by highest-quality conservation science. We use our expertise to help identify the conservation needs of species and higher taxonomic groups at the global level, often in close partnership with the International Union for Conservation of Nature (IUCN) and other multilateral, governmental and non-governmental agencies. We assess the status of wild populations before, during and after our conservation interventions, as halting and reversing the decline of species is the most important conservation outcome.

Working on projects in which we have the ability to make an impact for wildlife conservation.

Relative to many other conservation-focused zoological societies, we are small, but we have a long history of 'punching above our weight' and aim to make as big an impact on wildlife and habitat conservation as possible. In order to do so, we choose our projects based on our ability to make a measurable positive impact on the species and areas in which we work with the resources and expertise we have to hand. It is simply not possible for us to work to conserve every worthy species, so we must choose wisely based on where we think we can make the biggest contribution to wildlife conservation.

Building our conservation interventions around flagship species exhibited at Bristol Zoo Gardens or Wild Place Project in order to follow our One Plan approach.

The animal collections at our two zoos provide an important platform for our field conservation and science projects and an interface between these projects and our local constituency of more than 700,000 guests per year. By telling our conservation stories around flagship species, we engage our guests with our conservation message in order to encourage and enable them to be a part of the solution, and build our brand as a locally and globally renowned conservation organisation. Collection planning for our two zoos centers on choosing species that are part of collaborative conservation programmes.

OUR IMPACT

We are developing the conservationists of the future and use them as a force for wildlife conservation.

Our in-house team of conservation scientists and educators are teaching wildlife conservation and zoo management to university students on four undergraduate and two postgraduate degree courses. Bristol Zoo and Wild Place Project host local school children in our primary and secondary education sessions. We are also training students and field staff in the UK and at our project sites in the essential methods of wildlife monitoring and ecological data collection techniques. Thus, we are equipping our students with the skills to carry out field research at the forefront of contemporary conservation, and they leave our programmes ready to be a force for conservation.

We have an international profile in the global conservation arena.

Bristol Zoological Society is well-known for its conservation work among the global zoo community. We are now ready to extend our reach to other stakeholder groups, including the public (particularly the people visiting our two zoos), the wider international conservation community, as well as grant-giving organisations and other potential donors.

We are measuring our success and evaluating our conservation outcomes.

Ultimately, a conservation strategy must be effective and we must ensure our actions are working to conserve wildlife and habitats for the good of both wildlife and people. To do so, we have developed a BZS Conservation Index to continuously measure the success of our actions in each of the projects against their objectives and continue to develop 'Theory of Change' models for every large project.

We are working with and through local collaborators that share our goals and values.

In all our projects, we seek to work in partnership with local collaborators: other NGOs, statutory bodies or directly with local communities. The search for a reliable local partner that shares our conservation goals and institutional values is one of the first steps in any of our projects. We always aim to transfer capacity to our local partners to ensure project sustainability after our exit.

We are contributing to the creation of international conservation frameworks.

Many of our expert staff serve on national and international committees and specialist groups, such as those of the IUCN SSC or EAZA. We have helped develop IUCN's One Plan approach framework, as well as conservation strategies and action plans for lemurs, frogs and other taxonomic groups. We will continue to develop global conservation frameworks and use them as the basis for our own conservation interventions.

300
UNIVERSITY STUDENTS
enrolled per year

35,000
SCHOOL CHILDREN
annually in
education sessions

SEVEN
CONSERVATION
ACTION PLANS
for threatened species

30 LOCAL PARTNER
ORGANISATIONS
across our projects



Photo: Taken from a drone used to survey hippos and crocodiles in the Bénoué River, Cameroon

HOW DO WE WORK?

Our conservation work is based on nine initiatives that underpin our projects*. The short and long-term objectives for each project are driven by these initiatives, which are areas of focus that, if prioritised, should ultimately lead to an improved outlook for the species and habitats that we aim to conserve.

These initiatives are:

Long-term population monitoring

Habitat restoration

Conservation genetics

Conservation medicine

Conservation breeding & reintroduction

Human-wildlife co-existence

Building capacity

Promoting pro-conservation behaviour

Policy, advocacy & action planning

* Please see page 36 for a map of current projects.

CONSERVATION INITIATIVES

LONG-TERM POPULATION MONITORING

Ultimately, conservation success is determined by the state of populations of target species in the wild.

In order to determine if our conservation strategies, such as conservation education, promoting alternative livelihoods, or improving law enforcement capabilities, are benefiting the species we work with, we must have baseline knowledge of population size and distribution, as well as the health of their habitat, over the long-term.

The IUCN SSC Species Monitoring Group (www.speciesmonitoring.org) highlights that species are monitored by:

- conservation project managers to demonstrate and adapt the changes they bring about in biodiversity
- donors to understand the impact of their funding and return on investment
- scientists and NGOs to identify threatened species and plan conservation action
- local communities to manage their natural resources
- governments to track delivery of national biodiversity strategies and their contribution to the goals of multi-lateral environmental agreements (MEAs such as the Convention on Biological Diversity and the Ramsar Convention)
- businesses to monitor their sustainability or environmental impacts.

There is also the urgent need for increased capacity building in national agencies and NGOs, enhanced collection of data by conservation and research projects, improved harmonization of indicators and methods, and greater sharing of data in formats of use to conservation practitioners, policymakers and decision-makers. Thus, the BZS Conservation Strategy is underpinned by evidence-based conservation methods that strive to meet these needs.

We use a variety of methods to monitor the populations of our target species around the globe. These include:

Traditional transect surveys, drone technology, bioacoustics, GPS transponders, and remote camera trapping.

Five year objectives:

- Establish a baseline population size and distribution for our target species at each key project site
- Establish a systematic monitoring programme for target species at each key project site using appropriate methods for each taxa (transects, camera trapping, bioacoustics, etc.)
- Determine metrics for each key project that will help us determine if our conservation actions are effectively influencing the population of our target species

PROJECTS

Negros Bleeding Heart Dove

African Penguin

Northern Madagascar

(main photo)

Sanje Mangabey

Kordofan Giraffe

Western Lowland Gorilla

Lemur Leaf Frog

Desertas Wolf Spider

White-Clawed Crayfish

Avon Gorge & Downs

Wild Place Project Native Species

We are monitoring blue-eyed black lemur populations in Northern Madagascar using an annual survey in Sahamalaza-Iles Radama National Park.

CONSERVATION INITIATIVES

HABITAT RESTORATION

The planet has lost 1.3 million km² of forests since 1990; this is more than five times the size of the United Kingdom. Other habitat types, including grasslands, wetlands and marine ecosystems are also being impacted by human activity. Such areas are home to a variety of wildlife; thus, restoring degraded, damaged, or destroyed ecosystems is critical to the conservation of many species.

Without healthy, intact habitats, animals may not be able to find food or disperse safely in search of mates; activities necessary for survival and successful reproduction. In fact, recent studies have demonstrated that even minimal deforestation substantially increases the odds of a species being listed as threatened, undergoing recent upgrading to a higher threat category on the IUCN Red List, and exhibiting declining populations (Betts et al. 2017).

Given the close association between healthy habitats and healthy animal populations, at BZS we integrate wildlife monitoring activities with habitat restoration plans in several of our key projects where habitat destruction is a conservation threat. For example, our conservation breeding and horticulture teams are working on the restoration of native habitat for Desertas wolf spiders near Madeira, Portugal. In the Philippines, we are working with local communities to encourage 'rainforestation'; the planting of native trees to expand forest cover, rather than the use of exotics. In Madagascar, after evaluation of previous reforestation efforts revealed little success, we are initiating an experimental programme. The goal is to determine the most effective and efficient means of reforesting Sahamalaza-Iles Radama National Park in close association with local communities, before undertaking large scale reforestation efforts that may be temporally and financially costly. Our long-term plan there is to share best practice with other areas in the region that face similar issues in similar habitat types.

Five year objectives:

- Identify causes of habitat loss in our key project sites
- Work with other stakeholders at our project sites to implement habitat restoration activities
- Establish long-term habitat management plans for project sites where anthropogenic change threatens critical habitats for target species
- Monitor the effectiveness of habitat restoration activities at each site and modify plans as necessary to ensure they are contributing to species population stability or growth

PROJECTS

Negros Bleeding Heart Dove
Northern Madagascar
Lemur Leaf Frog
Desertas Wolf Spider
(main photo)
White-Clawed Crayfish
Avon Gorge & Downs
Invasive Weeds
Wild Place Project Native Species

The island of Desertas Grande near Madeira, Portugal, is home to the endemic Desertas wolf spider. In order to restore the spider's habitat, we are working on a plan to clear invasive grass which will make more breeding burrows available for this Critically Endangered species.

CONSERVATION INITIATIVES

CONSERVATION GENETICS

By including genetic analyses in our conservation projects we can gain a more complete understanding of species' threat status and use this to inform management decisions.

We use conservation genetics in both *ex situ* and *in situ* conservation projects; from management of breeding of threatened species in our animal collections, to understanding issues of inbreeding depression and determining population viability in the wild. We can also use forensic samples of products in the illegal wildlife trade to identify species and regions of origin. Similarly, molecular approaches can be used to identify and track disease incidence, increasingly important with increased human contact and emergent zoonoses.

In 2017, we began developing the BZS Genetics Laboratory in the Conservation Education Centre, as part of the Institute of Conservation Science and Learning at Bristol Zoo Gardens. This new facility will enable us to better support the maintenance of the studbooks we keep, expand our current Higher Education Provision to include practical lessons in genetic analysis and student research that involves such methods, as well as offer a genetic analysis service to external institutions or projects. Incorporating genetic analysis into our field conservation projects will prove invaluable for applications to uncover species' movement, habitat use and dispersal, as well as to identify isolated populations or even sub-species.

Five year objectives:

- Develop the BZS Conservation Genetics Laboratory
- Enhance population viability analyses for our target species with genetic information
- Integrate genetics into our capacity building initiative through ICSL Higher Education provision
- Carry out in-house genetic testing to enable inclusion of animals of unknown origin into studbooks

PROJECTS

African Penguin

Sanje Mangabey

Lemur Leaf Frog

Desertas Wolf Spider

Pancake Tortoise

(main photo)

The pancake tortoise is a species often confiscated by Heathrow customs officials when they are illegally smuggled into the UK. We are using conservation genetics to help us manage the studbook for this species. We also aim to create a rapid test to help customs identify area of origin of confiscated animals which may allow for reintroduction of these individuals to their native habitat.



CONSERVATION INITIATIVES

CONSERVATION MEDICINE

Conservation medicine is an emerging discipline that covers veterinary aspects of the conservation of endangered species, both *in-* and *ex-situ*, often with a focus on the complex relationships and interactions between animal, human and ecosystem health.

Bristol Zoological Society is one of the few zoological societies in the UK with an in-house veterinary department led by specialists in zoological medicine with knowledge and experience of both captive and wild animal health. As such, we are perfectly placed to lead in the field of conservation medicine. In addition to maintaining the health of our captive populations at Bristol Zoo Gardens and Wild Place Project, our veterinary team also participates in health assessment and monitoring of threatened species in the wild. Recent projects have involved biomedical evaluation of Critically Endangered Sahamalaza sportive lemurs (*Lepilemur sahamalaza*) in Madagascar and a disease survey of wild cranes in South Africa, part of a pre-release risk assessment for a wattled crane (*Bugeranus carunculatus*) reintroduction program. Carrying on this theme we are currently disease screening captive birds in the pink pigeon (*Nesoenas mayeri*) EEP (European Endangered Species Programme) population prior to a planned reintroduction of these genetically valuable birds to supplement the vulnerable wild population in Mauritius.

Five year objectives:

- Open the European Centre for Excellence in Zoological Medicine on the grounds of Wild Place Project
- Integrate conservation medicine projects into our existing field conservation projects as appropriate
- Supervise post-graduate students in conservation medicine projects
- Contribute to animal welfare audits for threatened species in our collections at Bristol Zoo Gardens and Wild Place Project to ensure the highest standard in our conservation breeding programmes

PROJECTS

Northern Madagascar

Wattled Cranes

Pink Pigeon Disease Screening

Our animals undergo routine health checks to ensure the highest standards of care and welfare.



CONSERVATION INITIATIVES

CONSERVATION BREEDING & REINTRODUCTION

***Ex situ* conservation breeding is an important component of wildlife conservation. Not only does it provide a reservoir for threatened species, it also creates an opportunity for people to see and interact with species from around the world, leading to a closer connection between people and wildlife.**

As stated by WAZA, individual zoo collections are often too small to be beneficial to the conservation of a species on their own; thus, collaborative breeding programmes are critical to maintaining viable populations *ex situ*. This requires that breeding programme populations be demographically stable, genetically healthy, well-maintained and capable of self-sustaining reproduction, distributed among several institutions to lessen the risks of catastrophic loss and of sufficient size to maintain high levels of genetic diversity. Many of these species will be maintained *ex situ*, as reserve populations; some will be reintroduced into natural habitats to bolster wild populations.

We participate in 78 breeding programmes for threatened species at Bristol Zoo Gardens and 23 at Wild Place Project. Target species for breeding include: red-vented cockatoos; Sumatran laughing thrushes; Asian box turtles; lemur leaf frogs; okapi; and several species of threatened primates such as the western lowland gorillas, blue-eyed black lemurs, and brown spider monkeys. We also have expertise in invertebrate conservation breeding with successful programmes involving the Lord Howe Island stick insect and the Desertas wolf spider.

We use a multi-disciplinary approach combining conservation genetics and conservation medicine research with our captive management to ensure breeding is optimal for the genetic health of populations, such as work with the pancake tortoise and lemur leaf frog. BZS staff are involved with studbook and EEP programme management, such as the EEP for the red river hog and Visayan hornbill. Many also sit on EAZA species committees and support IUCN Red List work.

Where appropriate, we use some of these animals to re-establish or bolster wild populations. Reintroduction is not always needed or possible, particularly where conservation threats are still present in the wild; however, we have been able to participate in the reintroduction of several key species such as the white-clawed crayfish and water vole in the UK, Partula snails in French Polynesia, and support African penguin re-stockings and translocations, as well as pink pigeon reintroductions, through our partners in South Africa and Mauritius, respectively.

Five year objectives:

- Continue to develop and coordinate important EEP programmes at Bristol Zoo Gardens and Wild Place Project
- Continue to bolster wild populations of target species for reintroduction and other conservation translocations, such as the white-clawed crayfish and Partula snail
- Work with key stakeholders in the IUCN SSC and in habitat countries to tackle *in situ* threats for species that need to be reintroduced in the future
- Develop the animal collections at Bristol Zoo Gardens and Wild Place Project to increase their direct contribution to *ex situ* conservation to at least 50% of the species we help

PROJECTS

Negros Bleeding Heart Dove
African Penguin
Northern Madagascar
Western Lowland Gorilla
Lemur Leaf Frog
Desertas Wolf Spider
White-Clawed Crayfish
Wild Place Project Native Species

Conservation breeding is critical to maintain healthy reserve populations of threatened species. For example, BZS was the first in the UK to successfully breed okapi. To date, we have had 41 okapi calves born at Bristol Zoo Gardens and Wild Place Project.



CONSERVATION INITIATIVES

HUMAN-WILDLIFE CO-EXISTENCE

Successful conservation cannot happen without the involvement and support of local communities. As human populations increase and wildlife habitat is degraded or destroyed, animals and people come into more frequent contact. This can result in a threat to people's livelihoods, negative perceptions of wildlife, and ultimately a lack of support for conservation initiatives.

In 2003, the 5th IUCN World Parks Congress in South Africa provided an international platform to address the urgent issue of human-wildlife conflict and its impact on wildlife conservation. Recommendations included the need to improve capacity, cooperation, recognition, and funding (Madden 2004). More recently the focus has shifted from 'conflict,' which tends to highlight technical solutions, to 'co-existence' which has an interdisciplinary approach and works to understand the cultural, political, historical and economic context of an issue. In 2016, an IUCN SSC Task Force on Human-Wildlife Conflict was established to provide interdisciplinary guidance and support to solve these complex issues.

Our conservation strategy recognises the importance of helping to empower local communities to work towards co-existence with wildlife and to acquire the tools necessary to manage their livelihoods in a sustainable manner that works for both wildlife and people. For example, in the Philippines we are supporting farmers to create a Community Based Farm Management (CBFM) area so they have a legal right to their agricultural land, and in Cameroon we are working to support the development of a local cattle herder's association. Both initiatives use an interdisciplinary approach and work with local people to provide them with the support to explore sustainable practices.

Five year objectives:

- For our key projects that involve wildlife in human-dominated landscapes, to establish a working relationship with local communities
- Create stakeholder maps to outline the key relationships within each project and understand how they impact, and are impacted by, our target species and our project objectives
- Determine effective strategies to promote value of wildlife and their habitats in local communities at key project sites
- Utilise the skills of an interdisciplinary team to develop co-existence strategies at our project sites

PROJECTS

Negros Bleeding Heart Dove
(main photo)

Northern Madagascar

Sanje Mangabey

Kordofan Giraffe

Western Lowland Gorilla

Avon Gorge & Downs

Wild Place Project Native Species

Community meetings are key to encourage communication among stakeholders of conservation. For example, such meetings have led to the creation of a community farmers' association in Naubo village, Negros Island, the Philippines, which allows the local people to come up with sustainable farming practices while protecting the habitat of the bleeding heart dove.

CONSERVATION INITIATIVES

BUILDING CAPACITY

If wildlife and wild places are going to survive in abundance in the long-term, conservation cannot be left just to conservationists. The conservation of wildlife needs to be embedded into the fabric of human societies, and the people that make up those interconnected societies need to be supported in considering wildlife survival alongside their own sustainable development.

Carrying out successful conservation requires skilled and knowledgeable people in both project management and on the ground leading the practical aspects of field activities. Many of our key projects involve hosting workshops and leading bespoke training to ensure local people we work with have the required skills and abilities to effectively carry out conservation actions on the ground.

While it is critical to promote building capacity of local people directly impacted by conservation actions, at BZS we are also committed to training the next generation of conservation scientists through our Education and Higher Education provisions at our Institute of Conservation Science and Learning. With our academic partners in the UK we deliver higher education courses, sharing our expertise to train the next generation of conservationists. More indirectly we deliver education sessions at Bristol Zoo Gardens and Wild Place Project to school groups of all ages. This encourages and nurtures an interest in wildlife from a young age. This then predisposes them to wildlife-friendly actions as they grow, and gives them some understanding of wildlife conservation issues and their part in the solutions. We also supervise UK and international Masters by Research and PhD students in conservation science projects based at our key project sites around the world and here at home.

Uniquely amongst conservation organisations, we have day guests – people on a day out with their families. We are visited by a wide cross section of society, and have an amazing opportunity to engage them in some of the issues affecting wildlife, both locally and globally, and enable them to support our conservation endeavours, and even to be actively part of the solution through public action and behaviour change campaigns. In addition, we work with other partners to further these goals, including, for example, the Bristol Natural History Consortium, putting on public engagement events as well as specialist conferences to share best practice in turning conservation awareness into meaningful action.

Thus, our role is to build the capacity of all of the people with whom we work and interact, to either ensure they have the skills needed to implement direct conservation action, or to nurture and shape the supporting societal structures in which those involved in wildlife conservation must work.

Five year objectives:

- Identify training needs and capacity limitations in our key projects
- Establish training workshop schedules for each key project to ensure we are able to achieve our objectives
- Deliver education sessions to 50,000 pupils and students per annum on booked visits on educational sessions
- To expand our HE delivery in direct conservation-related courses, and to develop and deliver a suite of complementary courses, both short and long-term, to support capacity building for more wildlife-friendly practices in other fields

PROJECTS

Negros Bleeding Heart Dove

African Penguin

Northern Madagascar

Sanje Mangabey

Kordofan Giraffe

(main photo)

Western Lowland Gorilla

Avon Gorge & Downs

Palm Oil

Wild Place Project Native Species

We are training eco-guards in Bénoué National Park, Northern Cameroon, to use drones and other technologies to more effectively survey wildlife and monitor the park for illegal activity.

CONSERVATION INITIATIVES

PROMOTING PRO-CONSERVATION BEHAVIOUR

Human behaviour has a large impact on the world's biodiversity, and the actions that people take can benefit both wildlife and the environment. Through understanding how people think and behave, initiatives can be designed which affect positive change.

This requires a detailed understanding of psychology and human behaviour. By applying psychological knowledge to conservation issues, we can promote pro-conservation behaviour and 'nudge' people to perform simple actions which help conserve the environment and biodiversity.

Bristol Zoological Society is dedicated to inspiring behaviour change. As outlined in our 10-year Strategic Plan we aim to promote behaviour change in at least 15% of our guests. However, we are committed to going beyond this and aim to enable a wide proportion of the public (not just zoo guests) to take actions which will benefit wildlife and the environment. This is done by empowering people to carry out simple and effective behaviours which they can perform as part of their everyday lives. In addition, we teach behaviour change as part of our undergraduate and post-graduate programmes through our Institute of Conservation Science and Learning. In our courses, students learn the theory behind behaviour change and techniques to effectively promote pro-conservation behaviour.

Bristol Zoological Society has been delivering behaviour change campaigns for many years. Previous campaigns have included purchasing FSC certified products to reduce unsustainable deforestation, eliminating invasive aquatic species by cleaning water equipment and helping native species by safely disposing of litter. However, our behaviour change efforts are expanding and we are currently developing a global behaviour change campaign focused on the consumption of certified sustainable palm oil. To help promote this message we are reaching out to other organisations to support this campaign, both locally and internationally. We hope that by working together and promoting a consistent message we will have a larger impact on influencing people to perform pro-conservation behaviour and only use certified sustainable palm oil.

Five year objectives:

- To create a strong global behaviour change campaign on certified sustainable palm oil
- To be a leading zoological institution in developing and delivering behaviour change campaigns
- To support EAZA lead behaviour change campaigns
- To work with local communities in our field projects to promote pro-conservation behaviour as a method of ensuring the survival of our target species and the preservation of their habitat

PROJECTS

- Kordofan Giraffe
- Western Lowland Gorilla
- White-Clawed Crayfish
- Avon Gorge & Downs
- Palm Oil
- Wild Place Project Native Species

One way we promote pro-conservation behaviour is through our education sessions with school children at Bristol Zoo Gardens and Wild Place Project.



CONSERVATION INITIATIVES

POLICY, ADVOCACY & ACTION PLANNING

Ultimately, all of our conservation initiatives are aimed at ensuring a sustainable future for wildlife and people. In order to ensure this is achieved we must look to the future; one of the most effective tools for this is conservation action planning.

Action planning is an adaptive management framework of setting goals and priorities, developing strategies, taking action and measuring results in order to determine the success of conservation projects. BZS have been instrumental in the creation of several conservation action plans such as the Lemurs of Madagascar 2014-2016 Conservation Strategy, Amphibians of Sahamalaza, Madagascar, Desertas Wolf Spider Conservation Strategy, and the African Penguin Biodiversity Management Plan, which have been used to raise awareness and funds which have led to successful conservation initiatives for these taxa.

We also work closely with the IUCN Species Survival Commission Specialist Groups to contribute to conservation action plans for other threatened taxa around the world, including the Crau plain grasshopper and red colobus monkeys.

Five year objectives:

- Update existing Lemurs of Madagascar strategy for the next three years
- Work with external collaborators and colleagues to advise on the creation of action plans for other threatened taxa
- Ensure that conservation action plans have achievable objectives, timescales and financial projections
- Use existing action plans to guide conservation actions at our field project sites

PROJECTS

Negros Bleeding Heart Dove
African Penguin
Northern Madagascar
Sanje Mangabey
Kordofan Giraffe
Western Lowland Gorilla
Lemur Leaf Frog
Desertas Wolf Spider
White-Clawed Crayfish
Wild Place Project Native Species
Palm Oil

Conservation action planning is key to ensure we are following well-designed and effective protocols for saving species and protecting their habitats. BZS Field Conservation and Science staff participated in the Red Colobus Action Plan Workshop at the Inaugural African Primatological Society Congress in Ivory Coast in 2017.

WHERE ARE WE WORKING TO CONSERVE WILDLIFE?

In this five-year plan, we are focused on 13 national and international conservation projects. Each project presents its own unique combination of conservation challenges and thus, requires a particular combination of initiatives and actions to tackle the threats facing wildlife and the community at each site. Our dedicated team of conservationists works closely with local and global collaborators and stakeholders in order to help ensure a sustainable future for wildlife and people.



Avon Gorge & Downs
United Kingdom
We are working in partnership to manage, monitor and raise awareness of this site of international conservation importance.

Wild Place Project Native Species
Bristol, United Kingdom
We are monitoring populations of native species on site at Wild Place Project to ensure we are conserving the wildlife with which we share our habitat.

White-Clawed Crayfish
South west, United Kingdom
We aim to identify and protect all remaining Endangered white-clawed crayfish populations within the south west of England and to reintroduce captive bred crayfish to secure ark sites.

Invasive Weeds
South west, United Kingdom
We are organising local teams of volunteers to control the spread of invasive weeds that disrupt local ecosystems and working with the UK government on biosecurity protocols and invasive species management plans.

Lemur Leaf Frog
Central valley, Costa Rica
We are surveying the historic range of these Critically Endangered frogs to establish their current distribution, as well as breeding them in our AmphiPod at Bristol Zoo.

Bleeding Heart Dove
The Philippines
We are focused on the protection of the forest habitat for the Critically Endangered Negros bleeding heart dove, as well as working on the conservation of Visayan warty pigs.

Desertas Wolf Spider
Madeira, Portugal
We are helping to restore the habitat for the Critically Endangered Desertas wolf spider, and bolstering the population through captive breeding.

Northern Madagascar
We are working on the conservation of threatened lemurs and sacred ibis in northwestern Madagascar, as well as the protection and restoration of their habitats.

Kordofan Giraffe
Cameroon
We are conserving the Vulnerable Kordofan giraffe in northern Cameroon by working with the Conservation Service of Bénoué National Park and the surrounding communities to reduce illegal activity and protect the habitat.

African Penguin
South Africa
We are monitoring Endangered African penguin populations in wild colonies, working with a local rehabilitation centre, SANCCOB, to rescue, rear and release abandoned penguin chicks, and tracking penguins to understand how they are affected by threats such as over-fishing and climate change.

Western Lowland Gorilla
Central Africa
We are working to conserve the Critically Endangered western lowland gorilla in Central Africa by protecting habitat and combating the threats of the bushmeat trade.

Sanje Mangabey
Tanzania
We are monitoring the population of the Endangered Sanje mangabey monkey and working to understand the threats to their survival in the Udzungwa Mountains.

Sustainable Palm Oil
Global
We are promoting the production and use of certified sustainable palm oil by working with consumers, companies and policy makers worldwide.



NEGROS BLEEDING HEART DOVE

Visayan Islands, Central Philippines

We have been working hand-in-hand with local communities in the Philippines since 2014. Together with our partners, we aim to stop illegal hunting and habitat destruction to protect the remaining forests.

The Philippines are one of the few nations that are both a biodiversity hotspot (regions with significant levels of biodiversity that are threatened with destruction) and a megadiverse country (nations that harbour the majority of the Earth's species and high numbers of endemic species), placing them among the top priorities for global conservation. They also have a rapidly expanding human population, many of whom live in poverty and are dependent on subsistence agriculture for food. Thus, as the demand for more farmland increases, so does the amount of forest loss. On the islands of Negros and Panay, total deforestation may occur within a few decades. However, this is one of the last homes to our flagship species, the Critically Endangered Negros bleeding heart dove (*Gallicolumba keayi*) and many other threatened species such as the Visayan warty pig (*Sus cebifrons*), the Visayan tarictic hornbill (*Penelopides panini*), and the Philippine spotted deer (*Rusa alfredi*). Recent population estimates of Negros bleeding heart doves, endemic to the islands of Negros and Panay, suggest there are fewer than 400 individuals remaining in the wild.

Bristol Zoological Society has worked with local partners in the region since 2014. We have worked together to create sustainable alternatives to forest depletion and built capacity within local communities to carry them out. In addition, the Society employs several forest wardens to monitor the forest and report any illegal activities. Finally, BZS has recently established a field station to support graduate students to carry out research onsite (e.g., students have been conducting systematic surveys of the area to assess population size and habitat use of the Visayan warty pig, the bleeding-heart dove and other threatened birds endemic to the area). We keep several of the species from this region at Bristol Zoo Gardens and Wild Place Project.

Five year objectives:

- Long-term monitoring of the threatened wildlife through regular and systematic surveys
- Establishment of an additional field site in partnership with the local municipality, local university and the Department of Environment and Natural Resources of the Philippines
- Assessment of alternative livelihoods to promote reforestation, such as native seedling tree farming
- Development and strengthening of our collaboration with local captive breeding centers with prospect of reintroduction of threatened species
- Creation of a conservation action plan for the Negros bleeding-heart dove in collaboration with universities, captive breeding centers and national NGOs

Total budget for 5 years: £180,000



CONSERVATION INITIATIVES

Long-term population monitoring

Annual surveys and systematic data collection



Habitat restoration

Sponsoring a reforestation program



Conservation breeding

Collaboration with local captive breeding centers to share best practice in animal management



Human-wildlife coexistence

Employment of forest wardens from the community to report illegal activities and supporting the establishment of a local community association



Building capacity

Train local and international research assistants, as well as promote sustainable alternative livelihoods



Policy, advocacy and action planning

Lobby governments to improve protected area management, creating Negros bleeding-heart dove action plan (main photo)

AFRICAN PENGUIN

Southern African Coast

Like all penguins, African penguins are iconic, charismatic and enormously popular. They generate economic activities for local communities through tourism and are key components of marine ecosystems. Concerted conservation effort is needed to avoid the extinction of this critical marine predator.

The African penguin (*Spheniscus demersus*) is the only penguin species found in Africa. It can survive in temperate climates by benefitting from oceanic upwellings which bring cold, nutrient-rich ocean water to the surface, supporting an abundant food chain. Between 2001 and 2013 alone, the global population of African penguins fell by a devastating 70%, leaving less than 18,000 breeding pairs in the wild. As such, this species is now classified as Endangered and faces a significant risk of becoming extinct if no action is taken to reverse their decline. One of the dominant reasons behind this is a decline and distribution change of their main prey items, anchovies and sardines, caused by overfishing and climate change. In South Africa, these species spawn further east than two decades ago, out of reach of penguins in the Western Cape much of the time. However, because fishing vessels mainly operate from west coast ports and, like birds, are limited in how far they can go to find fish, the result has been heavy fishing pressure where the fish have already become scarce.

Since 2006, Bristol Zoological Society has been a key partner of SANCCOB (Southern African Foundation for the Conservation of Coastal Birds), in setting up the Chick Bolstering Project. This project was needed as many penguin pairs were failing in their first breeding attempts of the season due to low fish stocks, resulting in secondary clutches later in the breeding season. When egg laying and hatching is delayed in this way, chicks are not yet old enough to fledge and feed themselves before their parents start the moult process, where they lose their waterproof feathers. Without the ability to swim to find food to feed their chicks, the chicks can starve. In 2016 alone, the Chick Bolstering Project rescued 980 chicks. After extensive rehabilitation, to date the project has successfully released 83% of the chicks back into established colonies. In the next 5 years, there is far more scope for BZS to have a powerful conservation impact, particularly with new research initiatives and collaborations, which will help to ensure the survival of this Endangered species.

Five year objectives:

- Continue our support and partnership with SANCCOB and the Chick Bolstering Project, including joint research into the long-term success of hand-raising abandoned chicks
- Lead yearly Earthwatch teams on the Robben Island African Penguin expeditions, in order to contribute to the long-term population monitoring dataset
- Investigate breeding site selection and initial mate choice decisions to assist with the creation of a new breeding colony
- Study the foraging and prospecting behaviour of juvenile penguins to better understand initial dispersal and foraging behaviour during this little known life-phase
- Develop environmental DNA as a non-invasive tool for tracking both African penguins and associated prey stocks across space and time

Total budget for 5 years: £290,000



CONSERVATION INITIATIVES

Long-term population monitoring

Use GPS transponders and nest monitoring for African penguins in the Western Cape, South Africa



Conservation genetics

Assess of penguin and fish stock movement using cutting-edge environmental DNA techniques



Conservation breeding and reintroduction

Continued support of the Chick Bolstering Project at SANCCOB, as well as participate in the African penguin EEP through breeding at Bristol Zoo Gardens



Building capacity

Supervise and train international graduate students working on penguin ecology and conservation



Policy, advocacy and action planning

Continued involvement to enact the current Biodiversity Action Plan, including participation in the African Penguin Population Reinforcement Working Group





NORTHERN MADAGASCAR

Reconnecting forests, wildlife
and people

Madagascar is one of the world's most important hotspots for biodiversity, yet it is also one of the world's poorest countries, with 92% of people living below the poverty line.

Local people are forced to use unsustainable livelihood practices such as slash and burn agriculture to remove the forest for cattle grazing and traditional agriculture, and illegal logging. The resultant forest destruction, degradation and fragmentation means that Madagascar suffers from extraordinarily high rates of habitat loss, with 90% of its original natural vegetation estimated to have already been destroyed. For many species, such as lemurs, the additional threat of hunting adds further pressure to their already imperilled populations. This has put incredible pressure on the island's huge number of rare and endemic animals.

Bristol Zoological Society has been working in northern Madagascar since 2006, and we are involved in a number of projects that are helping to safeguard the futures of wildlife on this unique island. Most of our work is focused in and around the Sahamalaza-Iles Radama National Park (SIRNP), with additional foci in human-dominated environments such as vanilla and cacao plantations. We work primarily with lemur species, such as the blue-eyed black lemur, the Sahamalaza sportive lemur and the Sambirano mouse lemur, as well as the Madagascar sacred ibis. However, the project also includes other taxa found in their habitat, such as invertebrates and the herpetofauna. To date, the scope of our involvement includes lemur behavioural ecology and conservation medicine, sacred ibis surveys, evaluation of reforestation efforts, and vegetation surveying. In addition, we have a number of Malagasy species in Bristol Zoo/Wild Place Project that are part of captive breeding programmes.

Our strategy is to use a series of evidence-based initiatives to monitor biodiversity and mitigate the threat of habitat loss. In order to make a real difference, we work with local people to help them to save their natural heritage. This approach will enable an organised research focus in SIRNP and other strategic sites, that generates ongoing data on the density and distribution of key taxa. These metrics will provide baseline data on populations, which can, ultimately, be used to assess the efficacy of our conservation actions aimed at improving habitat quality and connectivity.

Five year objectives:

- Develop the SIRNP research station and create a formal process to manage research projects
- Develop experimental procedures for evaluating reforestation, explore use of plantations as wildlife corridors and reservoirs of biodiversity
- Understand biodiversity present within fragments and evaluate impact of fragmentation on population density and distribution
- Work with local communities to investigate sustainable use of natural resources
- Build local capacity through research and conservation opportunities; e.g., training research station staff, field researchers, project managers and guides
- Continue to contribute to the *ex-situ* breeding populations of local species, including lemurs, amphibians and invertebrates at Bristol Zoo Gardens and Wild Place Project

Total budget for 5 years: £213,000



CONSERVATION INITIATIVES

Long-term population monitoring
Implement surveys to establish baseline biodiversity, and develop long-term monitoring protocols (*main photo*)

Habitat restoration
Develop protocols for reforestation interventions, and evaluate their effectiveness



Captive breeding
Manage captive populations of Malagasy species to inform conservation measures *in situ*



Human-wildlife co-existence
Explore use of plantations as sustainably used wildlife corridors and reservoirs for biodiversity

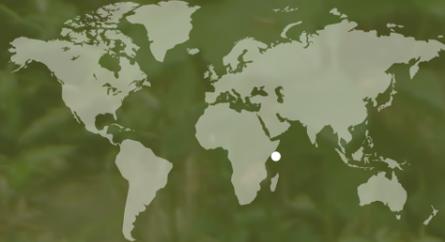


Building capacity
Collaborate with, and train, members of local communities, conservation organisations and academic institutions



Policy, advocacy and action planning
Devise action plans for key taxa to enable evaluation and monitoring of conservation interventions





SANJE MANGABEY

Udzungwa Mountains, Tanzania

There are seven recognised species of *Cercocebus mangabey* monkeys, across sub-Saharan Africa, all facing a high risk of extinction according to the IUCN Red List, and all are relatively understudied.

They are found across Africa, from the sooty mangabey in the west (Ivory Coast) to the Tana River mangabey in the east (Kenya). Also known as 'white-eyelid' mangabeys for their distinctive white-eyelids which they flash in threat displays; they are highly terrestrial, spending a large amount of time on the forest floor rather than up in the trees like the majority of primates. Part of the reason they are so little-known is that they are usually found deep in the forest, in regions that are difficult to access and not often visited by tourists or researchers.

Bristol Zoological Society has partnered with the Sanje Mangabey Project (established in 2006) to aid in the conservation of one of the least studied of the *Cercocebus mangabeys*. The Sanje mangabey (*Cercocebus sanjei*) is endemic to the Udzungwa Mountains of south-central Tanzania; also known as the Galapagos of Africa, for their high level of endemism in such a small area. The mangabeys are listed as Endangered due to declining population size, habitat loss and forest fragmentation. The species is divided between two isolated forest block populations: the well-protected Udzungwa Mountains National Park and the relatively unprotected Udzungwa Scarp Nature Reserve.

The first and only survey of the species was completed in 2000 and estimated the population size to be between 1300-3500 individuals. Seventeen years on, it is time for a reassessment, as the pressures facing this region intensify. For example, the human population in the Kilombero Valley is growing at a rapid rate; i.e., between 1964 and 2015 the population rose from 56,000 to more than half a million people, most moving to the region to set up small-scale farms that require clearing of the forest. Given the conservation threats, small population size and restricted range of this species, it is essential that we work with local and international stakeholders to ensure the protection of the Sanje mangabey and its remaining habitat in the Udzungwa Mountains.

Five year objectives:

- In 2016, we were awarded a NERC Industrial Case PhD Studentship in partnership with Cardiff University to conduct a population-wide survey of the Udzungwa Mountains and determine population viability (with incorporation of population genetics)
- Continue long-term monitoring of the habituated groups of Sanje manabeys in the Udzungwa Mountains National Park
- Develop potential conservation strategies through a series of workshops in association with the local stakeholders
- Study wildlife corridors and dispersal opportunities between the two sub-populations
- Understand local perceptions of the protected areas and barriers to the creation of value for the park and the wildlife
- Create of a conservation action plan for the mangabeys in collaboration with local and national Tanzanian authorities in a series of workshops

Total budget for 5 years: £332,000



CONSERVATION INITIATIVES

Long-term population monitoring

Systematic data collection on a habituated group in UMNP since 2006



Conservation genetics

Population genetics to determine inbreeding depression and gene flow between sub populations



Human-wildlife co-existence

Work with neighbouring communities to understand issues related to co-existence with wildlife



Building capacity

Train local field technicians and collaborate with local research teams, as well as supervise international graduate students on field projects in the region



Policy, advocacy and action planning

Create an action plan for the conservation of the Sanje mangabey in the Udzungwa Mountains



KORDOFAN GIRAFFE

Western Bénoué Ecosystem,
Northern Cameroon

At the species level, giraffes are considered Vulnerable on the IUCN Red List; however, the population as a whole has dropped substantially in recent decades with less than 80,000 individuals remaining across Africa.

The subspecies of Kordofan giraffe (*Giraffa camelopardalis antiquorum*) numbers less than 2000 individuals across West Central Africa. In addition to their diminishing population size, the Kordofan giraffe inhabits some of the most unstable regions in the world: southern Chad, the Central African Republic, northern Cameroon and northern Democratic Republic of Congo. Conservation of threatened species is difficult under the best of circumstances, but protecting species in areas with significant political and/or socio-economic challenges, or regions that lack enforced laws, is even more difficult.

The North Region of Cameroon is one of the last strongholds for the charismatic species of the Sudanian savanna woodland, including the Kordofan giraffe. In the heart of this area, the Western Bénoué Ecosystem (WBE) is composed of a UNESCO Biosphere Reserve (Bénoué National Park) and four neighbouring hunting zones. Despite its rich biodiversity, the WBE is faced with several threats, the most critical of which is uncontrolled pastoralism by non-local herders. Overgrazing by cattle can negatively impact large herbivore populations by reducing food abundance.

Our project will address the key problem of uncontrolled pastoralism inside protected areas. Unlike the densely-populated areas of Central Africa, the WBE is still largely covered by natural vegetation, which attracts large numbers of non-local cattle herders (predominantly *Mbororo*, a tribe from the *Fulani* ethnic group) during the dry season. They enter into direct competition with large herbivores, such as the giraffe, by cutting branches from high quality trees that are important components of their diet, such as *Azelia africana*. As a consequence, herbivore populations are now small. This impacts the entire ecosystem as lack of wild prey for apex predators, such as lions and leopards, has led to their population decline, and may be the reason for the local extinction of African wild dog. The situation is not irreversible however, as long as quality habitat remains. Thus, the main aim of our project is to preserve the habitat of northern Cameroon along with its rich and threatened wildlife, by targeting the threat of overgrazing through an increase in the efficiency of eco-guard patrols, thereby reducing the impact of cattle herders. We will be working in close cooperation with local communities, the Cameroonian Ministry of Forestry & Wildlife, and Sekakoh, a Cameroonian NGO.

Five year objectives:

- Support routine monthly eco-guard patrols of WBE
- Create a horse riding unit of eco-guards in order to improve the efficiency of the patrols
- Undertake routine wildlife surveys in the WBE in order to evaluate the effectiveness of our conservation actions and monitor the giraffe population
- Create a management plan for the wildlife corridors within the hunting zones of the WBE, in collaboration with the Conservation Service of Bénoué National Park
- Support the local communities in the creation of a formalized local cattle herder association, and allocation of pasture lands for local herders
- Formal collaboration with other protected areas in Cameroon that also have Kordofan giraffe

Total budget for 5 years: £500,000



CONSERVATION INITIATIVES

Long-term population monitoring

Systematic surveys of the Kordofan giraffe population in the WBE



Human-wildlife coexistence

Understand the impact of cattle grazing, mining and poaching within the protected areas



Building capacity

Train eco-guards in wildlife survey techniques and use of new technologies



Promoting pro-conservation behaviour

Support the initiatives of the Conservation Service to promote alternative livelihoods



Policy, advocacy and action planning

Work with the IUCN and Cameroonian government to create a regional action plan for the conservation of the Kordofan giraffe



WESTERN LOWLAND GORILLA

Central Africa

The western lowland gorilla (*Gorilla gorilla gorilla*) is assessed as Critically Endangered on the IUCN Red List. Found in six countries across Central Africa, it is threatened with habitat loss and bushmeat hunting across much of its range.

In 2014, the IUCN Species Survival Commission Primate Specialist Group Great Ape Section released the Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees 2015-2025. In this plan, these experts highlight priority landscapes and actions to ensure the conservation of this species. One of the sites of Exceptional Importance (i.e., holds more than 5% of the global population of gorillas) for gorilla conservation is the Monte Alén-Monts de Cristal-Abanga Landscape, a transboundary region between Equatorial Guinea and Gabon. The heart of this landscape is Monte Alén National Park, in Rio Muni, mainland Equatorial Guinea. This region is also highlighted for its high 'irreplaceability value', meaning that it is an area that must be preserved in order for effective conservation of the target species to occur, and where the same level of conservation impact cannot easily be achieved by conserving another region. This, coupled with the estimate of over 2000 gorillas remaining as of 2013, and reports of 15 other primate species occurring in the park, with limited active protection and currently no research presence, is why we have chosen to focus our conservation efforts in National Park Monte Alén.

Bristol Zoological Society has been focused on the conservation of apes in Central Africa since 2003. Our initial project centered on the creation of a community hunting zone in the buffer region around the Dja Biosphere Reserve in southern Cameroon; an important gorilla habitat. However, many international conservation players are currently active in the Dja region and little attention has been given to other regions designated of higher priority for gorilla conservation according to the IUCN Action Plan. In addition to our work in Dja, we have also provided long-term support to the primate sanctuary, Ape Action Africa, based at Mefou National Park, Yaoundé, Cameroon, since 1998. In the UK, we are also participating in the Western Lowland Gorilla EEP with our breeding group at Bristol Zoo Gardens, which included two new births since 2016.

Five year objectives:

- Establish a research base camp at Monte Alén National Park, Equatorial Guinea, in collaboration with Equatoguinean Institute for Forestry Development (INDEFOR)
- Establish a partnership between BZS and universities in the UK and government agencies in EG to facilitate international research collaboration and further ape conservation in the region
- Establish standardised great ape (and other large mammal) monitoring programmes, including training in monitoring methods for personnel
- Reinforce capacity and structures for effective law enforcement support for the recruitment, training and deployment of eco-guardians in the national park
- Continue to support Ape Action Africa, Cameroon
- Continue to participate in the gorilla EEP with breeding at Bristol Zoo Gardens

Total budget for 5 years: £500,000



CONSERVATION INITIATIVES

Long-term population monitoring
Population monitoring of gorillas and other large mammals in Monte Alén NP



Conservation breeding
Participate in Western Lowland Gorilla EEP at Bristol Zoo



Human-wildlife co-existence
Work with local communities to find sustainable alternatives to bushmeat hunting



Building capacity
Train local field technicians and international graduate students in research methods



Promoting pro-conservation behaviour
Promote behaviours that conserve gorilla habitat among local communities and BZS visitors (e.g., use of fuel efficient stoves or FSC charcoal)



Policy, advocacy, and action planning
Work with EG government to implement active protection of Monte Alén and enforce laws against primate hunting





LEMUR LEAF FROG

Central Valley, Costa Rica

One of eleven currently recognised leaf frog species, the lemur leaf frog is Critically Endangered, having disappeared from half its historic range.

Previously found across a large portion of Costa Rica, the lemur leaf frog (*Agalychnis lemur*) is now only known to occur in three locations within the country. The range extends across through Panama and into Colombia where declines are also being seen. The preferred habitat is pre-montane forest between 400 and 1600m elevation. The extent to which different threats are impacting the amphibians of the Central Valley is unknown. It is likely that human-caused habitat modification in combination with invasive plant species and the chytrid fungal disease are all contributing to declines in this and other species. Estimates suggest an 80% decline in numbers of the lemur leaf frog over the last ten years.

Having successfully bred the lemur leaf frog at Bristol Zoo we have been part of initiatives such as Project Lemur Leaf Frog. This has involved habitat management and considering reintroductions from captive populations. The uncertainty of the occupied range is now hampering conservation efforts and needs immediate action. As such, the main aim of our project is to understand the current range of the lemur leaf frog within Costa Rica and the threats facing these remaining populations. During this process, we can also collect information on other threatened species in the region.

Five year objectives:

- As of 2017 Bristol Zoological Society holds the stud-book for lemur leaf frogs with a breeding population for potential re-introductions based in Bristol Zoo Gardens' AmphiPod
- Conduct surveys to determine how much of the species' historic range in Costa Rica is currently occupied and the size of the remaining population
- Analyse threats to determine primary causes of decline and extirpation from habitat
- Prioritise conservation action based on results of surveys and threat analysis
- Expand local involvement, and develop of stakeholder investment and awareness of conservation issues facing the lemur leaf frog, including engagement with local communities and the ecotourism industry

Total budget for 5 years: £170,000



CONSERVATION INITIATIVES

Long-term population monitoring

Establish site occupation and estimate population size and distribution
(main photo)

Habitat restoration

Support the removal of invasive understory plants around known breeding ponds



Conservation genetics

Studbook maintenance and use of methods to describe new populations and identify subspecies



Conservation Breeding

Maintenance of an insurance population *ex-situ* with potential for reintroductions



Policy, advocacy and action planning

Use range maps, threat analysis, and population trends to create an action plan for the species





DESERTAS WOLF SPIDER

Desertas Grande Island, Madeira

The Desertas wolf spider (*Hogna ingens*) is endemic to Vale da Castanheira, Desertas Islands, Madeira, Portugal. Despite having an impressive 40mm body size and being the largest known species of wolf spider, very little is known about this species.

Even though some taxonomists have provided redescriptions, every other aspect of this remarkable species has remained unknown until recently. It was assessed as Critically Endangered according to the IUCN (Cardoso 2014) but is not protected by any international, national or regional legislation or agreements.

In the absence of any native terrestrial mammals, this spider is a top predator in its habitat. Although its major prey consists of other invertebrates, such as beetles, woodlice and millipedes, adults have also been seen preying on juvenile lizards. The latter, along with birds and mice, are the major predators of *H. ingens*, mostly during its juvenile stage. This is when the spider is most vulnerable to predators, because in addition to its smaller size, it tends to disperse in order to find new shelters, thus maximizing the likelihood of encounters with potential predators. As spiders grow and find proper shelters, mostly below rocks but also in soil crevices, their inclination to disperse gradually decreases. It takes about two years for spiders to reach maturity.

The small valley where the spider lives is currently mostly covered by *Phalaris spp.* The colonization of this grass in the Vale da Castanheira was hidden for some years due to the presence of rabbits that grazed and controlled the spread of the plant. With the eradication of rabbits from the Valley in 1996, *Phalaris* lost its main predator and now proliferates. This grass appears to not only displace many native plants, but also many of the native animals. It covers the surface of the soil and rocks, making the microhabitats below the rocks harder to access for the spiders.

A workshop was held in Funchal, Madeira, on May 9 - 10, 2016. Participants from the Regional Directorate of Environment, Madeira Natural Park Services (two bodies that have now merged under the Institute of Forests and Conservation of Nature - IFCN), University of Madeira, IUCN Species Survival Commission and Bristol Zoological Society were involved. Following this an *ex-situ* programme was started for the species with the focus being at Bristol Zoo Gardens, where an EAZA EEP is being coordinated in line with the management proposals discussed during the strategy workshop.

Five year objectives:

- Restore the ecological balance in the Castanheira Valley through reduction of *Phalaris* density on the assumption that a viable population of spiders will persist across the entire valley
- Analyze the genetic structure of the population, its habitat preferences and the potential consequences of climate change
- Maintain and breed a second spider population at Bristol Zoo Gardens
- Raise awareness of the importance and uniqueness of the spider to visitors at Bristol Zoo Gardens

Total budget for 5 years: £15,000



CONSERVATION INITIATIVES

Long-term population monitoring

Assist rangers to monitor spider populations and support monitoring of other threatened invertebrate taxa



PHOTO: MARK BUSHELL

Habitat Restoration

Work with park rangers and use our horticultural knowledge for habitat restoration



PHOTO: MARK BUSHELL

Captive breeding

Coordinate a captive breeding programme to advance knowledge of life history and produce a reintroduction population



PHOTO: JAMES DUNBAR

Building capacity

Demonstrate that invertebrate conservation is a feasible and effective tool, and share best practice to encourage other zoos to undertake similar projects



PHOTO: MARK BUSHELL



WHITE-CLAWED CRAYFISH

South west, United Kingdom

The white-clawed crayfish (*Austropotamobius pallipes*) is the UK's only indigenous freshwater crayfish and is a keystone species of our aquatic habitats. It is globally Endangered throughout its range, both within mainland Europe and the UK.

Since the 1970s there has been more than a 70% decline in this species in south west England due to habitat fragmentation, pollution and, most importantly, the introduction of the non-native invasive signal crayfish *Pacifastacus leniusculus*. This invasive species not only predated our native species but carries crayfish plague, a disease which is lethal to white-clawed crayfish.

In 2008, in response to this decline, the South West Crayfish Partnership was set up including Bristol Zoological Society, The Environment Agency, Cefas, Wildlife Trusts, Buglife and associated partners. They developed four main conservation strands in an attempt to halt the decline of the species within the south west: establishing ark sites, a captive-breeding hatchery, a communication strategy and an invasive crayfish control programme. Since the partnership's inception, 17 ark sites have been established within six counties, which provide safe refuges for threatened crayfish. More than 4,000 captive-bred crayfish have been produced by Bristol Zoo's hatchery for ark site release and river supplementation. Over 5.5M people, such as water-way users and key stakeholders, have been targeted to ensure that rivers and lakes are used carefully and that the risk of spreading both disease and invasive species is reduced. In addition, the first *in-situ* signal crayfish control programme has been initiated to help assess the most effective method to reduce invasive crayfish species. The South West Crayfish Partnership has successfully increased the native white-clawed crayfish populations within the south west by over 75% and forms an effective working model for crayfish conservation within the UK and mainland Europe.

Five year objectives:

- Biennial monitoring of current south west white-clawed crayfish ark sites
- Monitor native crayfish populations within the south west
- Identify a minimum of two Somerset signal crayfish populations and trial a control programme
- Identify and set up a minimum of two white-clawed crayfish ark sites
- Establish a national crayfish hatchery / field station
- Provide practitioner support and training
- Publish aquaculture guidelines for white-clawed crayfish

Total budget for 5 years: £375,000



CONSERVATION INITIATIVES

Long-term population monitoring

Monitor established ark sites, native populations and crayfish invasions in order to respond appropriately to change and ensure conservation actions are appropriate



Habitat restoration

During ark site establishment, the aquatic habitat is enhanced to ensure that it is optimal for crayfish and other ecosystem species



Conservation breeding

Supplement wild populations through captive-breeding and release



Promoting pro-conservation behaviour

Use a combination of displays, outreach events, and publications, and promote crayfish conservation and Defra's Check, Clean, Dry campaign



Policy, advocacy and action planning

Produce clear short, mid and long-term strategies and biodiversity action plans for each river catchment





AVON GORGE & DOWNS

Bristol, United Kingdom

Despite being just two miles from Bristol City Centre, the Avon Gorge, Clifton Down and Durdham Down are home to a wealth of wildlife. The Gorge is internationally recognised as a Special Area of Conservation and nationally designated as a Site of Special Scientific Interest. The Downs are a Site of Nature Conservation Interest.

Over 30 different kinds of nationally rare plants grow in the Avon Gorge, making it one of the top botanical sites in the UK. The majority of these rarities belong to a limestone grassland habitat that has been under threat from scrub encroachment since the cessation of grazing in the 1920s.

The Gorge is also home to a large number of nationally rare invertebrates including the silky wave moth (*Idaea dilutaria*). This is the only English site for this Red Data Book species whose caterpillars feed on limestone grassland plants.

Launched in 1999, the Avon Gorge and Downs Wildlife Project works to protect this important site through wildlife surveying and monitoring and habitat management. It also provides opportunities for everyone to discover and learn about the wildlife and management of the site through an Education Programme. The Project is a partnership of Bristol Zoological Society, Bristol City Council, Natural England, Society of Merchant Venturers, University of Bristol, and the Downs Committee. We are also working with the National Trust and Forestry Commission (on the North Somerset side of the Gorge) and the Friends of the Downs and Avon Gorge. Bristol Zoo has been a key partner in the project from its inception. The Education Manager and Education Officer for the project are based in the Conservation Education Centre and managed by the Head of Conservation Learning. The Education Programme is part-funded by BZS.

Since the programme began in September 2001, 105,270 people have taken part in walks, talks, courses, children's and family events, formal education sessions, play scheme sessions and major community involvement projects. A wide range of interpretative materials have also been produced and the site and its wildlife have been well promoted via social and print media and through appearances on local and national TV. The BZS UK Conservation Manager also co-ordinates the annual surveying and monitoring programme for the rare silky wave moth.

Five year objectives:

- Continue to annually monitor the silky wave moth and advise on the habitat management of their priority sites
- Continue to support and develop the Education Programme. Increase the involvement of people from a diverse range of backgrounds, through the production of an Audience Development Plan
- Use the Audience Development Plan to develop a 5-year Education Work Plan
- Use the Audience Development Plan and 5-year Education Work Plan to secure additional funding

Total budget for 5 years: £430,000



CONSERVATION INITIATIVES

Long-term population monitoring

Survey the silky wave moth population since 2011



PHOTO: MARK PARSONS

Habitat restoration

Help to maintain a herd of goats that restore wildflower-rich grassland by controlling scrub in this sensitive area



PHOTO: DENICE STOUT

Human-wildlife co-existence

Enable people of all ages and backgrounds to learn about and enjoy wildlife through education programme activities



Building capacity

Train and support volunteers, work experience students and researchers



Promoting pro-conservation behaviour

Continue to promote pro-conservation behaviour (e.g., wildlife-friendly gardening) through education programme activities and interpretation





INVASIVE WEEDS

South west, United Kingdom

This project addresses the ever increasing need to reduce the negative impacts of invasive non-native species (INNS) on our ecological heritage. INNS are species that have been moved outside of their natural range by humans, either accidentally or deliberately, and are causing environmental and/or economic damage in their introduced range.

According to the Convention on Biological Diversity, INNS are the second greatest threat to biodiversity and are said to have contributed to 40% of animal extinctions where the cause of extinction is known.

There are currently more than 3,000 non-native species in the UK alone, of which 10-15% are classified as invasive, the majority of which are found in England. The rivers of Avon and Frome, within Bristol, are currently subject to this threat. Suffering from years of invasion from non-native species, the riverbanks have been dominated by a monoculture of INNS with native species struggling to survive.

The overall Avon Invasive Weeds Forum project aim is to establish the status of non-native plant species and prevent, control and reduce their negative impact in the River Frome and River Avon catchments. We aim to prevent the deterioration of the catchments' natural ecosystems and protect biological diversity. These are directly in line with the GB Non – Native Species strategy and Water Framework Directive aims. The target species for this project are Japanese Knotweed, Giant Hogweed and Himalayan Balsam.

During 2017 the AIWF surveyed over 30 km's of river bank and carried out over 100 invasive species management events on approximately 30km's of river bank, involving over 350 volunteers. In addition we have carried out habitat restoration with native seeding on 10 sites throughout the region. We have held 15 awareness raising events and managed to get the biosecurity message of Check, Clean & Dry out to approximately 4,000 water users and stakeholders.

Five year objectives:

- Embed biosecurity measures to halt the spread of INNS into relevant local stakeholder groups
- Increase the network of trained Rapid Response individuals and groups to recognise Alert Species such as Water Primrose, Asian Hornet & Quagga mussel & know the protocols once they have been confirmed to ensure swift eradication and control
- Develop a more robust and cross border relationship with Invasive Species groups across the south west to look at species on our horizon and increase education to the same level throughout the region
- Roll out invasive species biological controls across the region and ensure these are tracked and their individual efficacy is monitored

Total budget for 5 years: £150,000



CONSERVATION INITIATIVES

Long-term population monitoring

Continuous surveys of riverbank in the south west of England to monitor for invasive species such as Japanese knotweed and Himalayan balsam



Habitat restoration

An AIWF bank restoration project focusing on invasive species management, colonisation and recreating a native plant assemblage



Building capacity

Empower local community action groups to carry out autonomous invasive species control and rapid response



Promoting pro-conservation behaviour

Train local stakeholders in bio-control protocols and methods



Policy, advocacy and action planning

Create robust links with cross-county invasive species organisations. Increase rapid response and awareness of species on the horizon



PHOTO: JEAN HAXAIRE

WILD PLACE PROJECT NATIVE SPECIES

Bristol, United Kingdom

Bristol Zoological Society's Wild Place Project is comprised of 55 hectares of mixed parkland, open fields on the flood plains of the Severn, a steep escarpment of scheduled ancient woodland, a patch of broadleaf woodland, and historic parkland.

Within the greenbelt of Bristol, the site hosts a large number of native species, many of which have protected status, as well as locally important grasslands and hedgerows. Some of these important species include badgers, bats, hedgehogs and several other small mammals; grass snakes; a range of bird species, particularly those favouring woodlands, scrub and hedges; and a multitude of invertebrate assemblages. A wetland habitat, Webb's Brake hosts several amphibian species including great crested, smooth, and palmate newts, common frogs and toads. Maintaining the populations of the woodland and wetland species is critical to ensuring the area remains a healthy, functioning ecosystem.

In 2013, the BZS UK Conservation Team produced the first Wild Place Project Native Species Strategy, primarily to ensure that the site is developed sustainably and that the value of conserving the natural heritage of the site is recognised. The document set out how the Wild Place Project should be managed to conserve and enhance native species and their habitats on site, in line with the Bristol Zoological Society mission to save wildlife through conservation action.

Our native species conservation work at Wild Place Project is one of the Society's newest flagship conservation projects, which will be shared with guests to our site through the proposed British Ancient Woodland exhibit and Webb's Brake Wetland area. It will allow us the opportunity to promote native species conservation, and encourage pro-conservation behaviour in the everyday lives of our guests.

Five year objectives:

- Update the current Wild Place Project Native Species Strategy for the next five years of the project, in line with local, relevant biodiversity action plans
- Conserve, monitor and enhance the habitats and populations of species of conservation interest, as integral components of the site
- Maintain and enhance the linkages of semi-natural habitat and wildlife corridors across the site, as a natural framework for Wild Place, and with connections to the wider environment beyond
- Restore Webb's Brake wetland area and the satellite ponds, ensuring connectivity for wildlife between these areas
- Engage guests with native species conservation and encourage them to think about the positive choices they can make in their own 'backyard' (e.g., gardening for wildlife)

Total budget for 5 years: £250,000

CONSERVATION INITIATIVES

Long-term population monitoring

Monitor native habitats and species and establish a research programme



Habitat restoration

Ensure all new development is appropriately mitigated so that native biodiversity is enhanced and implement habitat management plans (*main photo*)

Conservation breeding and reintroduction

Maintain involvement in UK reintroduction programmes to halt local declines of native species under threat



Building capacity

Work with staff, students, volunteers and the local community, promoting skills and experience in survey techniques and habitat restoration



Promoting pro-conservation behaviour

Demonstrate effective conservation techniques to our visitors which they can apply in their own homes



Policy, advocacy and action planning

Develop strategy documents linking to local biodiversity action plans





PALM OIL

Promoting sustainable palm oil

Palm oil is the most widely used vegetable oil in the world with approximately 60 million tonnes produced each year, but when produced unsustainably it can have negative consequences on the environment and biodiversity.

Cultivated from the African oil palm (*Elaeis guineensis*), the majority of palm oil is produced in Southeast Asia, although in recent years oil palm plantations have been expanding rapidly in Africa as well as Central and South America. Due to its high yield, producing up to ten times more oil per hectare than any other crop in the world, the demand for it is increasing. This high demand has resulted in palm oil being produced unsustainably, causing an array of negative environmental and social consequences, including mass deforestation, biodiversity loss and complex human welfare issues. Fortunately, sustainably produced palm oil limits or eliminates these issues while benefiting people and aiding economies. Currently only 19% of palm oil is certified as sustainable.

To help promote a world where all palm oil is 100% sustainably produced, Bristol Zoological Society has developed the Global Alliance for Sustainable Palm Oil in collaboration with San Diego Zoo Global, Uganda Wildlife Education Centre, Wildlife Reserves Singapore and Zoos Victoria. Together, we are promoting certified sustainable palm oil by working with consumers and companies. The Alliance acts as a supportive platform for organisations to collaborate, communicate and share ideas, and aims to develop a global behaviour change campaign which can be delivered by both zoo and non-zoo organisations.

Five year objectives:

- Create a strong Alliance that supports members in promoting certified sustainable palm oil
- Create a behaviour change campaign that influences consumers to actively seek out certified sustainable palm oil in products they purchase
- Collaborate with zoo and non-zoo organisations on the Alliance's work and in delivering the behaviour change campaign
- Conduct sound research which demonstrates the effect of the behaviour change campaign on consumers knowledge and purchasing behaviour
- For Bristol Zoological Society, to update its palm oil policy and to only purchase products that contain palm oil certified as sustainable

Total budget for 5 years: £256,600

CONSERVATION INITIATIVES

Building capacity

Develop partnerships with zoo and non-zoo organisations to widely promote the consumption of certified sustainable palm oil



Promoting pro-conservation behaviour

Encourage consumers to purchase products that contain certified sustainable palm oil



Policy, advocacy and action planning

Work with partner organisations and zoo bodies to develop methods of promoting, and gain support for the production of sustainable palm oil



OUR MANDATE

The European Commission Zoos Directive (Directive 1999/22/EC), transposed into national legislation in the UK by means of the Zoo Licensing Act 1981 (as amended), as well as the Secretary of State's Standards for Modern Zoo Practice (updated 2012) make it a formal statutory requirement that zoos participate in conservation and education measures. The World Zoo and Aquarium Conservation Strategy (Barongi et al., 2015) appeals to the directors of zoos and aquariums to take an action-driven leadership role in the conservation of wildlife and to give highest priority to increasing our commitment to the conservation of wild populations.

At Bristol Zoological Society, we collaborate closely with the taxonomic and functional Specialist Groups of the International Union for the Conservation of Nature's (IUCN) Species Survival Commission as well as with the corresponding EAZA Taxonomic Advisory Groups, breeding programme coordinators and studbook keepers and with other national and international bodies to determine the conservation needs of species – of those in our care as well as those that we are not keeping at our zoos. A number of our staff serve on these Specialist Groups and expert committees and contribute directly to conservation prioritisation for entire taxonomic groups, which in turn helps us decide where to invest our funds. We aim to carry out our conservation interventions as part of international or national action plans mandated by the IUCN and/or the governments of the respective habitat countries. Examples are the IUCN Lemur Action Plan 2013–2016 that we lead-authored, the South African government's Biodiversity Management Plan for the African penguin that mandates Bristol Zoological Society to carry out our 'Chick Bolstering Project', and the recent Amphibian Action Plan for the Sahamalaza Peninsula in northwest Madagascar.



Photo: South African penguin,
Seal and Penguin Coasts,
Bristol Zoo Gardens





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