



WAZA

*World Association
of Zoos and Aquariums*

2023

03

NEWS

**A Centre for Red
Panda Conservation
and Sustainable
livelihoods**

**Basel Zoo's
Unique Enclosure
Biodiversity Project**

**Jerusalem Zoo's
Persian Fallow Deer
Reintroduction
Project**

**Collaborative
efforts for the
conservation
of the Brown
Howler Monkey**



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WAZA Members as of 24 July 2023

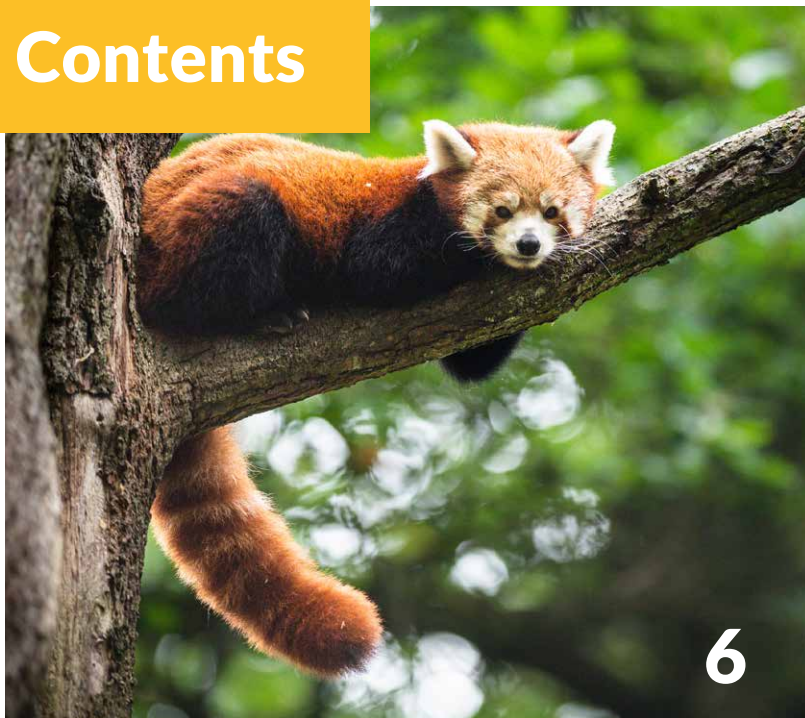
Affiliates	8
Associations	21
Corporates	30
Institutions	290
Life	102
Honorary	35

Future WAZA Conference

2023 San Diego Zoo Wildlife Alliance, San Diego, United States,
8-12 October www.waza2023.org

2024 Taronga Zoo, Sydney, Australia, 3-7 November

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President's Letter



Dr Clément Lanthier

WAZA President

Dear WAZA Members,

Welcome to the third edition of the WAZA News Magazine of 2023.

As this will be my last letter as President of WAZA, I would like to begin by thanking the WAZA members and Council for placing their faith in me to lead WAZA through the strategic planning process. It has been an honour and a privilege to see the ambition that our community has for the potential of what we can achieve together. I am confident that the new Council will support the Executive Office in implementing the new vision.

When you receive this magazine, it will be nearly time for the WAZA Annual Conference in San Diego. I hope to see you all there. It is always a pleasure to meet members of our community in person at this annual event and discuss new ideas.

I am especially pleased by the progress being made by the Association members in working towards the 2023 WAZA Animal Welfare Goal, which feeds into WAZA's strategic plan seamlessly.

I am confident that the upcoming Population Management Goal will receive the same support from the membership in raising the standards for the care that we provide the animals under our care.

I hope you will enjoy reading the articles and would like to invite you to please get in touch with the WAZA Executive Office to share your news and stories with us, so that we can distribute them to our wider community.

Yours sincerely,

Dr Clément Lanthier
WAZA President

CEO's Letter

Dr Martín Zordan

WAZA Chief Executive Officer

Dear members and friends,

I hope you will enjoy this third issue of the WAZA Magazine.

If time is on our side, you received this issue just prior to the 78th WAZA Conference in San Diego, kindly hosted by San Diego Zoo Wildlife Alliance.

As per usual, every two years, our conference is a moment for transition during which the term of our council members ends and a new council is formed. As an indication of good governance, we will announce the 2023-2025 WAZA Council at our upcoming WAZA Annual General Assembly, the term of which will start on 12 October 2023.

I would like to take this opportunity to thank our 2021-2023 WAZA Council and especially our President Dr Clément Lanthier. Dr Lanthier has been a formidable President of our association and a fantastic supporter of my role at WAZA. We initially met in 2016, before I began working for WAZA. After a meeting we both attended, he walked towards where I was seated and very decisively, pointed to me and said, "You will get very far". Those words had a transformational power, which is one of the many strengths of our President.

During its term the 2021-2023 WAZA Council has invigorated our association, and together with the WAZA Office, we have accomplished some remarkable work that is helping WAZA to evolve. To provide two examples, firstly the council rolled out the 2023 WAZA Animal Welfare goal. This goal is to encourage all our associations' members to either develop and implement their own animal welfare evaluation process or rely on another association's process. This is bringing a systematic change making progressive zoos and aquariums more consistent across the globe. Secondly, together with this council, we completed our strategic planning process which will allow us to cement a clearer way forward to achieve our vision of being a globally recognised and trusted leader advancing Conservation and Animal Welfare.



Now, although much has been achieved, I occasionally tend to think we progressed too slowly. Nevertheless, I have come to realise that long lasting change does not happen rapidly. So these days, I find comfort in WAZA's Administrative Assistant Emma Burke's motto: "Slowly but surely". There is so much we want our global community of zoos and aquariums to achieve and I am grateful we are traversing that path together.

Once again, thank you to our 2021-2023 WAZA Council for their commitment! You have set a high bar for the new WAZA Council, and I have no doubt you have inspired them to succeed at their task.

Many thanks,

A handwritten signature in black ink, which appears to read 'M Zordan'.

Dr Martín Zordan
WAZA CEO

The Himalayan Habre Centre

A Centre for Red Panda Conservation
and Sustainable livelihoods



Emma Nygren

Conservation Director, Nordens Ark, Sweden

Nordens Ark in Sweden has supported the Red Panda Network in the construction of a unique centre that will be an education and resource hub for red panda conservation and sustainable livelihoods. The centre, called the Himalayan Habre Centre, is located at 2,620 metres above sea level, inside a community-managed forest near Deurali, a mountain village in eastern Nepal's Taplejung district. At the Himalayan Habre Centre local people can develop skills like green and eco-friendly construction practices, sustainable energy use, rainwater harvesting, organic farming, handicraft production, sustainable herding, homestay management and ecotrip leadership skills.

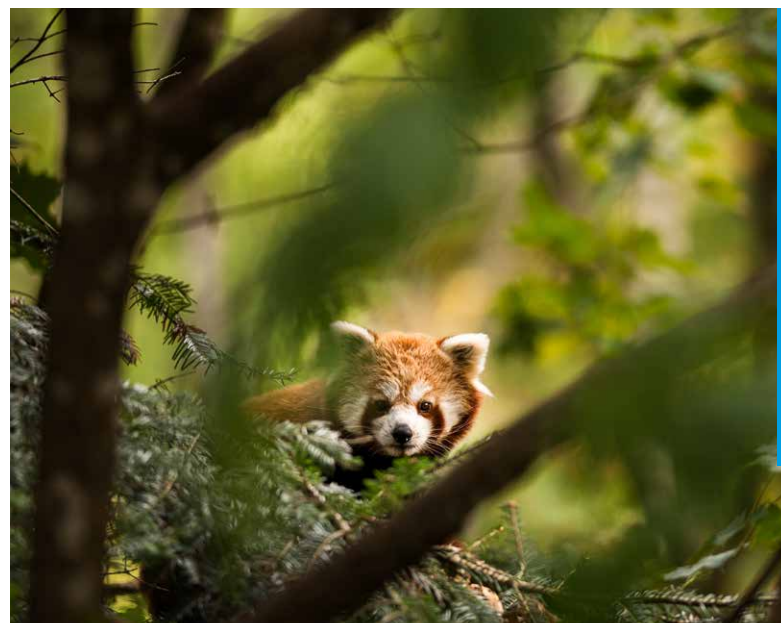
The Eastern Himalayas is one of the biologically richest areas on Earth. The area is home to an estimated 10,000 plant species, 300 mammal species, 1,000 bird species, 180 reptiles, 100 amphibians and 270 freshwater fish. Just as the area is known for its rich biodiversity and wildlife, it is equally known for its diverse people and their cultures. However, a significant proportion of the population of the Eastern Himalayas lives well below the poverty line and rely on crop agriculture, livestock rearing, and the use of non-timber forest products to survive. All of which has impacted on the natural habitats of the region. Only 25% of the original habitats in the region remain intact and many species that live in the Eastern Himalayas are considered globally threatened, one of them being the Endangered red panda.

Red pandas (*Ailurus fulgens*) live in the Eastern Himalayas in Nepal, India, Bhutan, Myanmar and China. Their habitat is temperate broadleaved forests with bamboo understories at altitudes between 2,400 and 3,900 metres.

The red panda habitat expands throughout the montane forests of Nepal where over utilisation of resources by local communities is causing forest degradation and fragmentation. This is driven by poverty and insufficient access to alternative resources and improved technologies.

The Himalayan Habre Centre will be a permanent platform for direct engagement of local people in biodiversity conservation through enhancement of their knowledge and skills towards sustainable living and thereby it will help to preserve the red panda's habitat and alleviate pressure on forest resources.

There is a strong connection between sustainable economic development and species conservation. The rural communities in the red panda range are often dependent on natural resources and ecosystem services for their well-being. Unfortunately, this also makes them more vulnerable when biodiversity is degraded or lost. However, the environment and economy are interdependent, and as the forests are protected and species' numbers improve, so can the livelihoods of local people, and vice versa.



↑ Red panda (*Ailurus fulgens*) © Nordens Ark

The construction of the Himalayan Habre Centre began in 2019 and it opened on Earth Day, 22 April 2023. Red Panda Network and local partner organisation, Himali Conservation Forum implemented the project in partnership with Nordens Ark, and with financial support from the Swedish Postcode lottery. Sustainable Mountain Architecture (SMA), a non-profit organisation dedicated to sustainable design and improving building methods at high altitudes has led the design and construction of the centre.

During construction, locals learned sustainable and green building techniques with locally sourced materials. The centre is an education and demonstration site that is earthquake resistant and among other features houses solar technologies, rainwater harvesting systems, improved cooking stoves and sustainable waste management. The centre's premises also include nurseries of organic vegetables, non-timber forest products (NTFPs), and medicinal and aromatic plants (MAPs).

The goal is also for the centre to attract ecotourists to the area which will improve the livelihood of local families and communities. The stakeholders in the Deurali Bhitri Community Forest area support sustainable development, and they will be responsible for managing the day-to-day operations and the centre will provide lodging and accommodation for red panda ecotrips and other ecotourists and travellers. The Himalayan Habre Centre is located on the route to Pathibhara temple, a famous pilgrimage site in the Taplejung district. The Pathibhara Temple is an important religious place for Hindus and Buddhists that attracts thousands of visitors every year. The centre will provide a comfortable and unique experience where tourists can learn about red panda conservation and sustainability. The forests surrounding the centre are a habitat for red pandas and many other fascinating species making it a natural haven for ecotourists. Additionally, you can also view the world's third-highest mountain, Mt. Kangchenjunga. The Himalayan Habre Centre will improve local livelihoods by increasing the living standards and annual income of at least 2,000 local families by supporting biodiversity, conservation and ecotourism.

The partnership between Nordens Ark and the Red Panda Network shows that zoos can play a key role in red panda conservation. The holistic approach to combine both breeding efforts in zoos as part of well managed *ex situ* breeding programmes breeding programmes combined with direct support to field conservation programmes by partnering with non-profit organisations like Red Panda Network can make a tangible difference in the fight to save the red panda. Zoos can also inspire people to take action and by actively participating in International Red Panda Day raise global awareness of red pandas and fundraise for the conservation of this endangered species.



↑ Himalayan Habre Centre © Red Panda Network



↑ Himalayan Habre Centre © Red Panda Network

Basel Zoo's Unique Enclosure Biodiversity Project

Nina Decrue

Zoo Education and Conservation, Basel Zoo, Switzerland

At Basel Zoo, the animals take centre stage. But it is also a magnificently designed park that invites people to relax, discover and observe, providing a habitat for a species-rich native flora and fauna. © Basel Zoo

Basel Zoo promotes biodiversity between its habitat using various structures. The spaces that separate visitors from the enclosures are kept as natural as possible, offering diverse habitats for local wildlife. Nest boxes offer additional breeding sites, and wild flowers provide food for insects looking for nectar.

Welcome to the urban oasis

Basel Zoo is a typical city zoo. With its 11 hectares, it is rather small. It houses around 9,346 animals from 551 species¹. Three quarters of these are found in the 'Vivarium', home to fish, invertebrates, amphibians and reptiles.

During a walk through the zoo, visitors encounter a variety of native animal and plant species. In spring, crocuses are blooming near the main entrance, frogs delight us with their concerts, lizards warm up on walls and nimble squirrels make children's eyes sparkle. In winter, kingfishers can be observed fishing in the ponds and are popular amongst photographers and other visitors.

Wildlife at Basel Zoo

A study^{2,3} conducted at Basel Zoo and published in 2008 showed that very high biodiversity is found in the areas between the enclosures. A team of 46 experts, including zoologists and botanists, detected 3,110 animal, plant and fungal organisms during the three-year study. Of these, 113 species were on Switzerland's Red List. The study's experts assume that the actual species diversity is probably higher, at around 5,500 species. This figure would equate to ten times more wild species than zoo animals.

How we promote native biodiversity

Basel Zoo promotes native biodiversity in a variety of ways. Designed as a naturalistic garden, it uses almost no herbicides or insecticides, which has a positive effect on biodiversity. Various habitats with different substrates, structures and conditions allow many species to coexist in a small space.

When new themed enclosures are planned, opportunities to promote native species are considered from the beginning. A good example is 'Tembea', which opened to the public in 2017. In addition to African elephants, it is home to Black-and-Rufous Sengis (shrews), harvester ants and several species of fish. Dozens of summer and winter roosts for bats and around 50 nesting opportunities for native birds, such as swifts, redstarts, barn owls and swallows have been created in and around the building.

A special biodiversity area was implemented in 2022 and is intended to encourage visitors to promote biodiversity in their own garden or on their balcony. To this end, a former animal enclosure was transformed into a model natural habitat. The existing structural elements, such as gravel areas, native hedges, branch piles, climbing plants, pollarded willows and a wildflower meadow help to promote biodiversity. Zoo visitors can get inspiration for their own balcony or garden via a QR code, which is placed on the signage.

Invasive species are actively combated at Basel Zoo. For example, employees have extensively removed the invasive Daisy Fleabane (*Erigeron annuus*) from the zoo grounds. This prevents the neophyte from spreading further and displacing native plant species.

How we monitor native biodiversity

There are currently 66 nest boxes for various bird species at Basel Zoo. Each nest box is numbered and recorded on a plan. Once a year, during winter time, the animal keepers carry out a nest box check. The inspection in 2022 showed a pleasing result: many bird species such as tits or sparrows had accepted the nest boxes. In comparison to the previous year, the number of nests in nest boxes had increased considerably.

For several decades, Basel Zoo has noted all wild vertebrate species observed between the enclosures. These observations provide important information and can be forwarded to other specialised institutions if necessary.

How we are organised

As in most zoos, species and nature conservation is one of the four main missions at Basel Zoo. Since 2021, the activities relating to nature conservation have been integrated into the education department. A member of the department is in charge of the strategic tasks and is the contact person for all matters concerning the topic. She also promotes the species between the enclosures. This topic has a high priority in various departments at the zoo. An animal keeper has been responsible for implementing and maintaining the biodiversity areas since 2019. He spends about seven working days per year on this. Finally, a scientific staff member keeps records of observations of vertebrate species. She also regularly writes blog posts about the respective observed animal, plant and fungus species.

How we talk about native biodiversity

“Do good and talk about it” is a common saying in Basel. It is important that efforts to promote native biodiversity are also communicated internally and externally. Often, this involves simple ideas that can easily be implemented at home. For external communication, Basel Zoo uses already existing communication channels, such as their homepage, newsletters, the zoo magazine or social media. The blog also presents inconspicuous or even unknown wild species, such as the coral mushroom (*Ramaria stricta*) or the Eurasian siskin (*Spinus spinus*). This makes the existing diversity more tangible and, in the most positive scenario, arouses curiosity or fascination for individual creatures. A tree brochure for visitors provides insight into the unique tree population of Basel Zoo. At public events such as the Zoo Night, native organisms and endangered zoo animal species are presented at an information stand and both receive high levels of visitor interest.

Conclusions

With the study published in 2008, Basel Zoo has gathered unique and extensive information about its species diversity between the enclosures. A comparison with other zoos is not possible because such a comprehensive study has not yet been carried out in any other zoo. Nevertheless, it is precisely because of this, that this study is also relevant for other zoos as it demonstrates that even a small city zoo has the potential to be home to a huge number of native species.

Targeted measures to promote native flora and fauna have been implemented at Basel Zoo for many years, e.g. through sustainable garden management. Numerous small structures create valuable habitats for wild species.

In our experience, limited human resources, rather than a lack of good ideas, is the main challenge when it comes to implementing projects. Since nature conservation is relevant to many different departments, it makes sense to clearly define responsibilities.

Native species are ideal for communication. They can be easily integrated into existing communication channels, thus creating awareness and fascination for native flora and fauna. And perhaps the most important conclusion: zoos can contribute significantly towards supporting native wildlife!

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¹ Annual Report Basel Zoo 2022

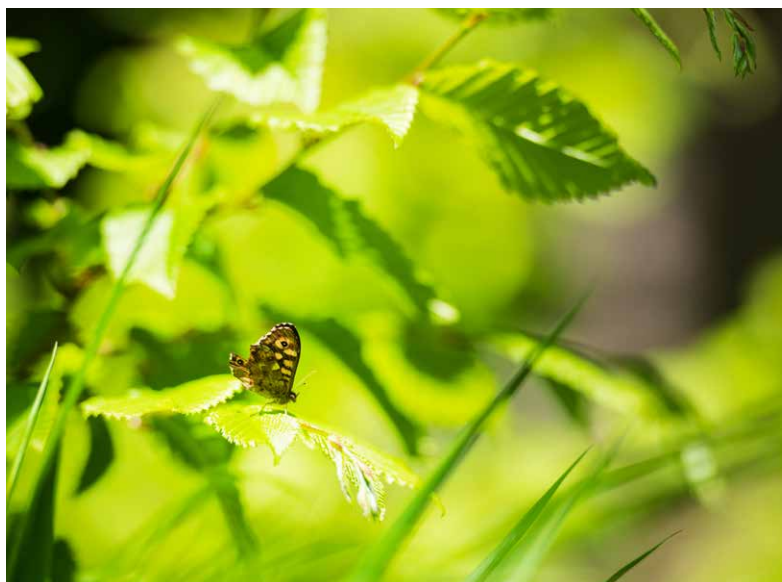
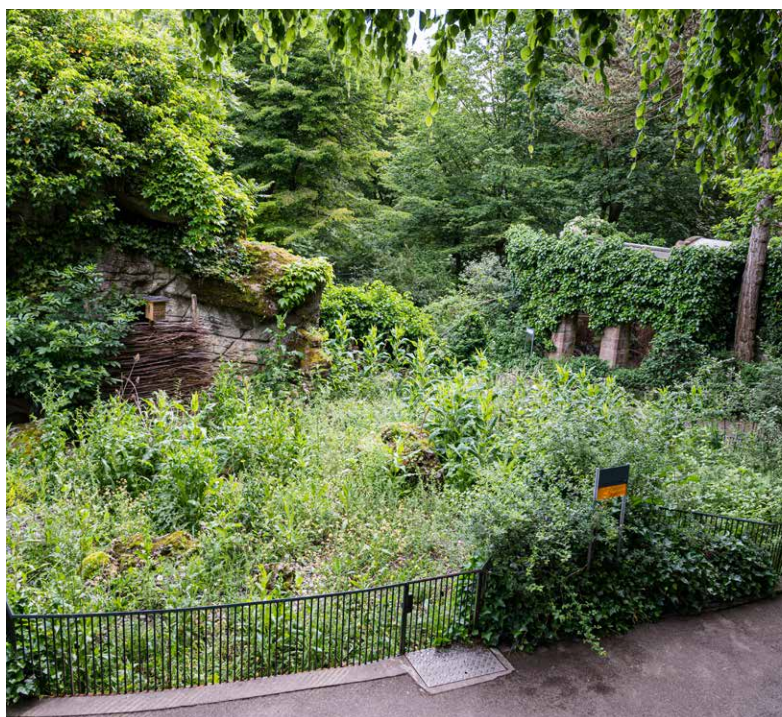
² Baur B. (2011) Zoo Basel and its native biodiversity between the enclosures: a new strategy of cooperation with academic institutions. International Zoo Yearbook 45: 48-54

³ Baur B., Billen W. & Burckhardt D. (2008) Vielfalt zwischen den Gehegen: wildlebende Tiere und Pflanzen im Zoo Basel

↑ For many years, the Entomological Society of Basel has offered direct encounters with native insects at their information stand – one of the most popular activities at the annual Zoo Night for young and old visitors alike! © Basel Zoo

↗ Imitation desired: The aim of the biodiversity area at Basel Zoo is to encourage visitors to promote biodiversity in their own garden or on their balcony. © Basel Zoo

→ When many flowers are in bloom at Basel Zoo, numerous species of butterflies can be observed. © Basel Zoo



Jerusalem Zoo's Persian Fallow Deer Reintroduction Project



Dr Yishai Weissman

Zoologist & General Curator, The Tisch Family Zoological Gardens at Jerusalem, Israel

The Tisch Family Zoological Gardens in Jerusalem in cooperation with the Israel Nature and Parks Authority (INPA) undertook the task of reintroducing the Persian fallow deer (*Dama mesopotamica*), a species that went regionally extinct over 100 years ago, back into its former natural habitat.

The Persian Fallow Deer: A Species on the Brink of Extinction

The Persian fallow deer once roamed the ancient forests of the Fertile Crescent of the Middle East, from modern day Iran to Israel. For millennia, this majestic creature has been hunted for meat but was able to survive in its ecological habitat of thick brush, far from the reaches of most humans. By the early 20th century, with the increase and ease of obtaining firearms, uncontrolled hunting and rampant habitat destruction have reduced their numbers to a mere handful of individuals. In the 1940's, as no remaining populations were known to exist, the Persian fallow deer was declared an extinct species.

In 1956, the discovery of deer hoofprints in North-West Iran, initiated a research expedition that discovered a small herd of the lost species and succeeded in bringing several individuals to the Opel-Zoo in Germany. With the discovery of these individuals, Israel's INPA began planning the idea of reintroducing the deer to Israel and in 1978 four females were flown to Israel from Iran. Together with three deer obtained from the Opel-Zoo population the INPA founded the Israeli breeding core of Persian fallow deer.

Over the next two decades meticulous efforts were made to establish a large enough population, as little was known of the biology and ecology of the species. In 1996 the initial attempt was made to reintroduce several deer in the Galilee of Northern Israel.

The Jerusalem Zoo's Reintroduction Initiative

Realising the potential of reintroducing them to additional areas, the Jerusalem Zoo took upon itself to increase the effort of protecting this endangered species. Thus, the zoo launched a second reintroduction project using its own resources, facilities,

and wide experience. In cooperation with the INPA, the zoo's dedicated team of experts thoroughly devised a comprehensive plan to reintroduce the deer to their former habitat in central Israel's Judean Hills.

The reintroduction site chosen was the Nahal Sorek Reserve, the largest nature reserve in the Judean Hills. This area is fit for Persian fallow deer, as it has a mix of open grasslands and densely wooded Mediterranean scrub as well as year-round available water sources, not something to be taken for granted in a heavily populated arid region where most natural water sources are exploited by man. The project began in 1996, when the zoo received its first Persian fallow deer from the INPA herd to establish the new breeding core.

These deer were carefully bred and raised at the Jerusalem Zoo, and less than ten years later, in 2005, the herd was large enough to support reintroduction. Today the herd consists of approximately 60 deer which produce 12 to 15 fawns yearly. Since 2005, every year an average of 10-12 yearlings are selected for release, amounting over 200 individuals up to date. A smaller number of animals are maintained at the zoo to sustain a breeding core that allows for the continuity of the group in good welfare conditions and the release of as many young individuals as possible into the wild every year.

Release Process

The reintroduction method was chosen to be a soft release including a gradual process where animals are weaned from relying on human care and has been shown to be more successful for *ex situ* animals. Thus, the zoo constructed an acclimation pen by enclosing an area on the banks of the Sorek stream, where the deer are initially released. In the pen, along with limited food and water provided by the staff, the released individuals learn to forage the natural vegetation, drink from the stream, and to develop the necessary fear from humans to which they were accustomed in the zoo.

After several weeks in the pen, the process of the controlled release begins. Every day for a period of a few hours, a large section of the fence is opened, and the process repeats daily until all the deer have left. The release process itself can take a long time depending on each deer's degree of independence. The release time has been set to early spring, when abundance of fresh green vegetation is optimal, before the onset of the hot dry Israeli summer.

Monitoring and Tracking

The monitoring of the wild deer population is carried out by the Jerusalem Zoo's conservation coordinator and is carried out by various means with support from the INPA.

Prior to release, each deer undergoes a series of tests and preventive veterinary care against parasites and diseases. The deer are tagged, and their ears are marked so that they can later be identified individually in photographs taken in the wild by an array of trail cameras set up throughout the nature reserve. This monitoring method enables tracking the distribution of the wild population, as well as the demographic situation in terms of life expectancy of marked individuals. During the last five years, 75% of the total individuals released were identified in photos, indicating the effectiveness of the method. The photographs have documented wild-born fawns, alongside their wild-born mothers.

Since 2013 several of the does in each release are fit with telemetry or GPS tracking collars so that the zoo can monitor and study their movements and behavioral ecology. Starting in 2022, for the first time, bucks were fit with special flexible collars that can expand with the neck during rut. The location data from the collars yields valuable information about their behavior and dispersal in the wild, and about the resilience of the habitat's resources. Likewise, the data allows to ensure that the released individuals are getting along in the wild. Just this year, thanks to the new male fitted collars, it was shown that there is a significant difference in the way that males and females utilise the habitat, and this detail not only helps understand the biology of the species but may be beneficial for improved planning of future reintroduction programmes.

Education and Public Awareness

Public awareness and community involvement are crucial components of the project. The zoo organised educational programmes, workshops, and outreach initiatives to engage local communities, creating a sense of ownership and promoting a harmonious coexistence with the deer. By fostering appreciation and understanding, the project aimed to reduce the likelihood of conflict between humans and the reintroduced species.

Challenges and Mitigation

Reintroducing a critically endangered species comes with its fair share of challenges. The project encountered a rough start that included fatal encounters with the trainline running through the nature reserve and predation by feral dogs. However, after these issues had been mitigated, the population has grown steadily and is now estimated to number at least 120 individuals including second and third generations of wild born fawns. It is the second largest wild population in Israel and the world, and still growing.

Conclusion

The Jerusalem Zoo's Persian fallow deer reintroduction project is a shining example of how zoos can be used to help save endangered species. Zoos are important conservation centres, and by raising under human care, zoos can help to build up healthy populations of endangered species that can then be reintroduced to the wild.



↑ Persian Fallow Deer © Jerusalem Zoo

Leading the Way Through Innovative Sustainability



Lindsey Wyld

PR Manager, Marwell Wildlife, UK

As recently as 30 years ago the concept of modern sustainability was in its infancy. Born out of the realisation that the human population of the world was outstripping the planet's available resources, sustainability has now reached almost every element of our lives; from the clothes we wear and the foods we eat, to the cars we drive and the homes we live in.

Whilst making sustainable choices in our personal lives is becoming increasingly achievable, the choices aren't always as simple when it comes to commercial enterprise. As a conservation charity this is something that Marwell Zoo in Hampshire is dedicated to redressing. Marwell first calculated its carbon footprint in 2008, when it was measured at 1,706 tonnes – the majority resulting from the use of electricity.

Since that initial calculation, Marwell Zoo has been closing in on its goal of having a 'net positive' carbon balance, effectively meaning that it removes more carbon dioxide from the air than it generates. While this may sound relatively simple, the reality of delivering such a promise has been significantly more complicated. As well as looking at ways of changing behaviours and improving technology to drive efficiencies and finding ways to remove carbon from the atmosphere through in-house conservation activities, Marwell Zoo set about generating its own energy.

In a world first initiative Marwell became the first zoo to heat its buildings directly from animal waste – something it had an abundance of. Before the state-of-the-art biomass technology that now heats most of the zoo's larger buildings was installed, 600 tonnes of animal waste was removed to be composted each year, a process which incurred carbon emissions and financial costs. A dedicated energy centre was built alongside the zoo's new 'Energy for Life: Tropical House' in 2021 and sustainability was at the very centre of the plans. In the Tropical House an innovative roof was installed to make maximum use of the available sunlight so the plants could breathe and grow and insulate the building during

the colder months to save energy. The exhibit itself showcases the effects of climate change, providing interactive displays around energy use and production – particularly of the renewable variety. Guests can see how much energy can be extracted from different animal waste and how much energy is being generated by the zoo's 170kWp solar panels in live time. Meanwhile two 50,000 litre tanks harvest rainwater from the roof making the building, in essence, a totally self-sufficient habitat for the animals and plants that live there.

Since this magnificent building was unveiled Marwell has been granted a number of sustainability awards in recognition of this ground-breaking work. As well as the WAZA Environmental Sustainability Award in 2022 for its "innovative and consistent approach towards sustainability management", in October last year, the zoo achieved The British and Irish Association of Zoos and Aquariums (BIAZA) Gold certificate for Sustainability for its Energy for Life project and had the great honour of winning a highly coveted Queen's Award for Enterprise: Sustainable Development – one of the last ever to be awarded by Her Majesty Queen Elizabeth II.



↑ Sustainability projects © Marwell Wildlife

Innovative sustainability initiatives continue to be something Marwell prides itself on investing in. To borrow an Albert Einstein quote from Marwell Wildlife's Conservation Strategy 2023-2028: "We cannot solve our problems with the same thinking used to create them." The strategy focusses on the interdependency between animals, people and ecosystems and the need to find nature-based solutions and sustainable ways of living, something it has termed 'Conservation Health'. Taken from the One Health model, which recognises the links between animals, people and ecosystems, Marwell's Conservation Health concept goes a step further and argues that "conservation actions led by zoos, focussing on people, animals and ecosystems, are interventions to assist nature's recovery from current crises."

By encouraging people to interact with the nature around them, appreciating it in new ways and enjoying the health and welfare benefits it has to offer, Marwell hopes to aid nature's recovery. It is in this vein that Marwell recently announced the upcycling of its old tropical house, which is being repurposed to create an accessible multisensory exhibit called Thriving Through Nature. This exciting new project, in a previously disused building that's been brought back to life, will explore the connections between animals, people and nature. It hopes to demonstrate that by engaging all the senses to truly experience nature, animal welfare, human wellbeing and the environment around us all thrive together. The project will encourage guests to trail their hands through a waterfall, smell the Mediterranean herbs planted around them and immerse themselves in the sounds of nature.

Marwell has stripped the signage in this new exhibit right back to lone Makaton symbols which are easily recognisable for a range of audiences with additional needs. Makaton is a unique language programme that uses symbols, signs and speech to enable people to communicate. The lack of written signage also simplifies the journey for guests allowing them to concentrate on what they are experiencing rather than what they are being told. Further in-depth information is available via QR code, and will help the zoo to measure guest interaction.

The intention is that in the future these Makaton symbols will be used throughout Marwell Zoo to guide the experience guests have when they visit and help them make more meaningful nature connections. Whilst seemingly unrelated to the concept of sustainability, Marwell believes that with a better understanding of nature and the role we play within it, will come a deeper level of comprehension around how we can begin to help nature recover. It came as little surprise to many that the recent Covid 19 pandemic, which resulted in millions of people working from home, factories grinding to a halt and airplanes being grounded, saw nature start to recover. Similarly, with much of society forced into lockdown, moments of escape to greener landscapes, parks and outdoor spaces reminded us of the importance of nature for our wellbeing and health, both physical and mental. Whilst the changes this global event brought about are not sustainable in the long term, there are adjustments all of us can make to reduce our impact on the planet.

It is with great pride that Marwell recently published its first Carbon Reduction Report, a document that measures progress against its original 2008 carbon footprint measurement. The report confirms for the first time that the Marwell estate removed 50 tonnes more CO² from the air than total combined emissions. This is the result of behavioural changes, new ways of creating energy and projects to plant trees that sequester CO² from the air around them. The headline here is that as an estate Marwell Zoo is officially carbon neutral. It's a massive accomplishment in Marwell's sustainability journey, but the organisation's aspirations certainly don't end there.



↑ Marwell staff © Marwell Wildlife

As part of the initiative to further reduce carbon, Marwell has plans to replace the use of fossil fuel in all buildings that still use it. Also, a system is being developed to harvest more rainwater and encourage innovative thinking at every level of the organisation's business. Since Marwell first measured their carbon footprint and set a carbon neutral target the global concentration of carbon dioxide in the atmosphere has gone from 385ppm to more than 415ppm today. At the same time the impacts of climate change have become ever more apparent with increased intensity of storms, rainfall, heatwaves and drought and it's happening now, not at some point in the future.

The world came together in Paris 2015 and recognised that much greater action was needed. Net Zero Carbon became the de facto target for the world. A net zero target includes not only an organisation's own emissions but also the emissions resulting from the production of goods and materials in the supply chain and the emissions from products sold. As a result, Marwell is starting the process of measuring emissions from the supply chain and will set a Net Zero target later this year (2023). As an organisation it intends to surpass net zero to become a carbon positive organisation that removes more carbon from the atmosphere than Marwell and its entire supply chain emits. This might seem a bold ambition, but to return once more to the Albert Einstein quote in the organisation's Conservation strategy; "We cannot solve our problems with the same thinking used to create them."

"At the same time as we ramp up our efforts to surpass net zero, we cannot take our eyes off other environmental and social impacts occurring around the world. Marwell is developing a total positive impact plan to ensure we are supporting the regeneration of both the ecosystems and social systems impacted by our activities. I would encourage all individuals and organisations to join us on our journey to support nature's recovery."

Dr Duncan East, Head of Sustainability

Collaborative Efforts for the Conservation of the Brown Howler Monkey (*Alouatta guariba*)

Population Management Planning of Argentina's Most Endangered Primate



Luciana Oklander^{1,2,7}, Eugenia Cordero-Schmidt^{3,4}, Silvana Peker⁵,
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Between 24-26 April 2023, the workshop entitled 'Evaluation of population management for the conservation of the brown howler monkey (*Alouatta guariba*) in the province of Misiones, Argentina' took place to analyse strategies for the long-term recovery of its populations in the country. The purpose of the workshop was to carry out one of the objectives of the National Plan for the Conservation of Primates in Argentina.

The workshop was organised by the National Direction of Biodiversity of the Ministry of Environment and Sustainable Development of the Nation, Ministry of Ecology of Misiones, the Institute of Biodiversity of Misiones (IMIBio), and the Neotropical Primate Conservation (NPC) Argentina. It was designed and facilitated by the IUCN's Species Survival Commission's Conservation Planning Specialist Group (IUCN SSC CPSG), in collaboration with the National Centre for Research and Conservation of Brazilian Primates (CPB/ICMBio), the governmental environmental agency in Brazil, and two Centres for Species Survival (CSS): CSS Brazil (hosted by Parque das Aves) and CSS Argentina (Fundación Temaikèn), which are members of WAZA.

This participatory workshop brought together representatives from governments of two countries at the local, state, and national levels, the IUCN SSC Primate Specialist Group, researchers, forest rangers, NGOs and other important stakeholders. Together, they assessed population management options for the species. This collaborative effort was made possible, in part, by the support of Reverse the Red partners, IUCN SSC and Re:Wild.

About the species and its threats

The five primate species found in Argentina are threatened with extinction at the national level, with the brown howler monkey (*Alouatta guariba*) being at extreme risk. It has recently transitioned from Endangered to Critically Endangered according to Argentina's mammal categorisation (MAYDS Resolution 316/2021), and their status may soon be changed globally from Vulnerable to Endangered on the IUCN Red List. It is also listed among the 25 most endangered primates of the world (Oklander et al., 2022)

The species is endemic to the Atlantic Forest in eastern Brazil and northeastern Argentina. In Argentina, it is exclusively found in the province of Misiones, where the population estimates indicate 30-50 remaining individuals. The main factors contributing to their decline are habitat loss, degradation, and fragmentation and recurrent yellow fever outbreaks (Agostini et al., 2014). Additionally, they face challenges such as hunting, the pet trade, low genetic variability, and the impacts of climate change (Agostini et al., 2019).

Historically, brown howlers had low densities in Argentina. However, their abundance has dramatically decreased after the yellow fever outbreaks in 2008-2009 and 2016-2021. Currently, the data gathered at the workshop show that the species presence has been confirmed in six localities in Misiones. These monkeys play a vital role in public health as sentinels for yellow fever, enabling early detection of the virus in different regions and guiding vaccination of surrounding human populations (Bicca-Marques and Freitas, 2010). Unfortunately, during the outbreaks, misinformation spread, leading to fear among the human population and direct persecution of the monkeys (Bicca-Marques, 2018).

Howler monkeys are resilient in fragmented forests where they feed on a great diversity of fruit species making them extremely important for the regeneration of disturbed environments (Oklander et al., 2022, 2023). Additionally, this species is part of the cultural heritage of both native peoples and settlers inhabiting the border area of Brazil and Argentina.

"The brown howler's monkey in Argentina is at a critical point where they could disappear if something is not done now."

Luciana Oklander, workshop coordinator (CONICET and NPC Argentina)

About the workshop

The workshop took place within the framework of the National Conservation Plan for the Primates of Argentina, officially approved by the government in 2021 (Resolution 430/2021). This comprehensive plan outlines a series of measures aimed at mitigating the impact of threats faced by primate species nationwide. Recognising the urgency to restore brown howler monkey populations, the plan identified the evaluation of population management strategies, and the potential establishment of an *ex situ* conservation programme, as high-priority actions. The workshop aimed to address these high-level actions and foster collaborative efforts toward the recovery of the species.

The workshop followed the IUCN SSC Conservation Planning Specialist Group (CPSG) Principles and Steps, the IUCN Guidelines for Reintroductions and Other Conservation Translocations, and the IUCN SSC Guidelines on the use of *ex situ* management for species conservation.

A total of 45 individuals participated in the workshop, including representatives of the Ministry of the Environment and Sustainable Development of the Nation, the Institute of Biodiversity of Misiones (IMiBio), the Ministry of Ecology and Renewable Natural Resources (MEyRNR) of the province of Misiones and the Ministry of Health of the Nation. Additionally, members from the IUCN SSC Primate Specialist Group (PSG), Brazilian specialists, park rangers, representatives of NGOs, security forces of the Misiones Police, as well as researchers participated. This diverse range of participants fostered a dynamic and inclusive environment for collaboration.

Results and next steps

Throughout the event, participants discussed the risks, benefits, requirements and challenges associated with four types of population management strategies: reintroduction, reinforcement, rescue and *ex situ* management. The analysis indicated that all four management options can be implemented, following the list of criteria and recommendations established for each option by the participants. Reintroduction was considered the first measure because it presents lower risks to natural populations compared to population reinforcement and test protocols. Simultaneously, the establishment of an *ex situ* management programme for *Alouatta guariba* in Argentina was recommended as part of the comprehensive species management programme (One-plan approach) and to contribute to its recovery and conservation. The rescue was recommended only in critical situations, provided that at least one of the four criteria defined by the group is met and the necessary minimum requirements are followed.

“The results of the workshop will set a precedent for the design of policy protocols for the management or reintroduction of species based on multisectoral consensus and scientific evidence. This working model is expected to be replicated for other species.”

Silvana Peker, National Coordinator of the PNCPA
(Dirección Nacional de Biodiversidad del Ministerio de Ambiente)

As a result of the workshop, a multisectoral Management Committee was formed, and the recommended population management strategies were agreed upon to restore ecological functions in the ecosystems inhabited by these monkeys, as well as to recover their cultural value among local communities, highlighting their role as sentinels and as seed dispersers.

“The workshop demonstrated a desirable network structure, as it marked the first formal collaboration between two Centres for Species Survival, both of which are members of WAZA. Under the leadership of the CPSG, these Centres worked with local experts and governments of two countries and received crucial support from the SSC Primate Specialist Group and funding from the SSC Chairs' office. The collective effort showcased the global network and structure of the SSC and the contribution of zoos, in assisting and uniting efforts at the national level, where actions are needed on the ground. This demonstrated the significance of these partnerships and emphasised a comprehensive approach to species conservation.”

- Fabiana Lopes Rocha, head officer (IUCN SSC CPSG | CSS Brazil, Parque das Aves)

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↑ Facilitator team © CPSG Brasil



Illegal Hunting and Trafficking of Pangolins in Cameroon

Miroslav Bobek

Director, Prague Zoo, Czech Republic

Pangolins, brush-tailed porcupines and Gaboon viper at one of the market sellers at the edge of the infamous Nkolondongo market. Yaounde, July 30, 2021 © Miroslav Bobek

Years ago, my interest in pangolins was sparked by the fact that the guards of the Dja Biosphere Reserve (Cameroon) where Prague Zoo runs the project Wandering Bus (one of our flagship conservation projects, focused on ecological education of children in local communities in Cameroon, including the issue of bushmeat), started confiscating large volumes of pangolin scales dedicated for sale to China and other Asian countries.

The use of pangolin scales in traditional Chinese medicine also raised international attention and it led to adding pangolins to Appendix I of CITES. The codification of their protection also took place in Cameroon, where they were included among the most strictly protected species – but as has already emerged from my previous comments and as I will also show below, they are protected only in a formal sense. The single good news is that compared with the period before the COVID-19 pandemic, today there is a significantly lower amount of pangolin scales heading for the illegal Asian market being confiscated. Several Cameroonian sources stated that independently of each other and there is no reason to doubt the veracity of the information (however, I cannot help but wonder if the lower number of seizures is not due to a lower number of controls and patrols).

In any case, the domestic trade with pangolins for consumption in Cameroon has reached the level that existed before the pandemic. In other words, it is extremely widespread. The entire trade chain begins with country hunters, or rather poachers. In this context, I must say that hunting of wild animals and consuming their meat – bushmeat – are traditional and very popular activities in Cameroon.

Hunting unprotected species for personal consumption is legal even in the buffer zone of the Biosphere Reserve. Therefore, the hunters become poachers only by breaking the stated rules, which they do knowingly. Near the town of Somalomo, I had the opportunity to watch two schoolboys preparing snares. Every week they catch four to six pangolins and sell these to traffickers for 2,500 CFA (3.8 EUR) apiece (while in Yaounde, the price is seven to eight times higher).

“The boys made no secret that they were aware of the rules on the protection of the pangolins and that they were capturing them to make some extra money. Having seen the conditions in which these boys live, I can hardly judge them. But not every poacher has such mitigating circumstances.”



→ Pangolins offered in a rural area. Much more often than in Yaounde these are live animals. Mbama, August 1, 2021 © Miroslav Bobek

To our surprise, we found that even the rural bushmeat trade is influenced locally by the Chinese impact. In the areas where the Chinese mine iron ore, their demand for bushmeat allegedly increased the price of pangolins from 1,500 up to 4,000 CFA (2.3 to 6 EUR) per piece.

Of course, those who buy pangolins and other bushmeat in the rural areas and sell it in the capital of Yaounde make the most money. Although it is illegal, there is almost no risk in transporting this commodity. Even the guards of the Dja Biosphere Reserve don't regularly patrol on roads; they don't have the capacity for such an activity. Despite that, they confiscate some bushmeat from time to time, and later auction or sell it directly to local people, mostly at very low prices (it would be socially unacceptable to liquidate it). The proceeds go to the State treasury, and the offender gets away with either a warning or a fine of approximately the amount for which the seized bushmeat was sold.

In Yaounde, the pangolins - mostly dead, but in some cases still alive - are sold in street stalls or markets for prices between 17,000 and 20,000 CFA (approx. 26 - 30 EUR). Many of them are sold at the marketplace Nkol-Ndong, where some time ago I took a few photos of pangolins and then my colleague and I had to run away from a shower of stones thrown by the pangolin sellers. In this market the pangolins are offered quite publicly, even their scales are removed unscrupulously, and beside the animals laying on the counters there are others hidden in coolers. According to our informants, the officials, who should ensure the law is enforced, do not dare to enter this marketplace alone. Any inspections must be done with the assistance of soldiers.

In a certain sense, an even worse experience than the selling of pangolins on the markets is their preparation in restaurants. I was shocked that probably the best restaurant in the town of Abong-Mbang offers them on the menu without hesitation and that small restaurants in the town of Mbalmayo have them on their menu quite regularly. The owner of one of the restaurants, smiling widely, showed me a pot with pangolin meat. She sells one portion for 1,500 CFA (2.3 EUR). According to her it is the most popular item on the menu.



↑ Bushmeat, including pangolins, is also sold at roadside stalls right in the Cameroon Capital. Yaounde, March 30, 2023 © Miroslav Bobek

The Wandering Bus is one of the key *in situ* conservation projects of Prague Zoo. Within its framework, we focus primarily on the conservation of gorillas, pangolins, and other endangered species in Central Africa through the education of the younger generation.

Since 2013, we have been introducing Cameroonian children to the idea of sustainable use of the rainforest and giving them the opportunity to get to know animals as fascinating living creatures, not just as meat on a plate. In other words, to raise awareness about and combat illegal hunting.

In addition to this, we support several local organisations that protect wildlife in their range areas. School children from the Dja Reserve complete an educational programme and then embark on a multi-day journey on the Wandering Bus to the primate rescue station in Méfou.

For most of the local children, the trip on the Wandering bus is the biggest trip they have ever experienced. For many of them, it is the first time they have looked outside their home village and they have travelled several hundred kilometres. In addition to seeing gorillas, they also learn about the rainforest ecosystem and sustainable livelihoods.

More than 70 rides have already taken place within the project, involving more than 1300 children, as well as teachers, some parents and forest guardians (ecoguards).



5TH JOINT TAG CHAIRS MEETING

(c) RZSS - Saving Wildcats

6-9 MAY 2024, RZSS EDINBURGH ZOO

Dear TAG Chairs, TAG Vice Chairs, and colleagues,

I hope this message finds you well and roaring with excitement for our upcoming gathering. It is with utmost delight that I extend a warm and heartfelt invitation to the 5th Joint Taxon Advisory Group (TAG) Chairs Meeting, to be hosted by the Royal Zoological Society of Scotland (RZSS) Edinburgh Zoo.

From 6-9 May 2024, we will come together at the enchanting Pollock Estate, a truly picturesque venue nestled in the vibrant city of Edinburgh. This location, with its historic buildings, provides an ideal backdrop for meaningful discussions and fostering new connections among colleagues.

As Chair of the WAZA Committee for Population Management and CEO of the Royal Zoological Society of Scotland, I'm buzzing with anticipation to welcome all TAG Chairs, TAG Vice Chairs, and esteemed colleagues who hold equivalent positions. Your unwavering dedication plays a pivotal role in shaping our shared mission, and we eagerly await your valued presence.

The 5th Joint TAG Chairs Meeting offers an extraordinary opportunity for us to come together, celebrate our successes, and learn from one another. It is a time to strengthen our networks, exchange innovative ideas, and deepen our connections with fellow stakeholders. Throughout the event, we will delve into critical topics that define our commitment to biodiversity conservation, from our collaboration with the IUCN, to the new WAZA Population Management Goal and other collaborative conservation strategies. Together, we'll enjoy harmonious conservation discussions inspired by the delightful music of the bagpipes and sustained by plates of haggis! Welcome to the Scottish way!

Please mark your calendars for the 5th Joint TAG Chairs Meeting, scheduled from 6-9 May 2024. We look forward to welcoming you in Edinburgh!

I eagerly await our reunion and the countless remarkable outcomes that will arise from our discussions.

*Yours aye,
David*



David Field

CEO, Royal Zoological Society of Scotland
Chair, WAZA Committee for Population
Management

Outreach to villages in Somaliland in the Horn of Africa help raises awareness of the cheetah and the illegal pet trade. An estimated only ~700 wild cheetahs live in Northern Africa. © Cheetah Conservation Fund

Saving Cheetahs in the Horn of Africa With Help from Our Zoo friends

Working to stop the illegal pet trade

Dr Laurie Marker

Cheetah Conservation Fund, Namibia

Two skinny cheetah cubs were tied up on ropes outside a restaurant in rural Ethiopia. They were sickly, and one of them had been blinded in an eye. United States military alerted the Cheetah Conservation Fund (CCF)*. In 2005, this began our conservation and education efforts to sustain the cheetah and preserve it from the illegal pet trade.

I'm writing to you now from Somaliland – where we are currently caring for 92 confiscated cheetahs. Somaliland is an officially-unrecognised, democratic state that broke away from Somalia, in the Horn of Africa. It is the location of our recently constructed 'Somaliland Cheetah Rescue and Conservation Centre' for housing cats rescued from smugglers who are working in the illegal pet trade, selling them in the Middle East.

Previously, confiscated cheetahs had nowhere to go. We began constructing our own safehouses and then the Somaliland government generously provided land for CCF to construct the new Rescue Centre. Thanks to the incredible assistance from international zoos and supporters, these 92 rescued cheetahs now have a safe place to live.

Middle East illegal wildlife pet trade

Situated along a popular smuggling route, much of Somaliland is arid desert and one of the poorest nations in the world. It's also ground-zero for the cheetah illegal pet trade, which is the reason for CCF's expansion here.

It was shocking to discover that cheetah cubs were being poached from the wild and sold as pets to rich buyers in the Middle East. A Google search reveals photos of pet cheetahs with pink rhinestone collars, lounging in luxury vehicles in the Middle East. Because the cheetah is light, built for speed and has a flight versus fight instinct, it is an easier species to 'tame' and has long been a sought-after companion. Today, the wild cheetah is extinct in over 20 range countries. Humans demand for cheetahs as exotic pets has brought them to the brink of extinction.

Although the cheetah pet trade is outlawed in the Middle East, cheetahs are still in high demand. When cheetah cubs are illegally poached and removed from their mothers, poachers are paid approximately USD 50, while the Middle East pet market will pay upwards of USD 15,000 for the same cheetah cub. We've learned that for every one cub that survives the journey, four to five cubs die, and the surviving cub may only live for two years, due to improper care. Cheetahs are delicate to care for even in the world's best zoos. As an animal lover and scientist, it is heartbreaking to try to save a cheetah cub as it struggles for its last breath, which I have now witnessed in Somaliland on countless occasions.

"It's a huge problem for the species. Taking young cheetahs from the wild can't be sustainable – especially in an already declining population. It's also an animal welfare problem when it's clear these cubs are suffering. We're glad we could send staff out to help and we're so grateful organisations like CCF can step in and not only care for the animals rescued from smugglers, but work to address the root cause of the illegal pet trade."

Rebecca Snyder, Senior Director of Conservation, Education, and Science, Oklahoma City Zoo

Laurie Marker, founder and executive director of the Cheetah Conservation Fund, with her medical team doing a workup on an injured cheetah. © Cheetah Conservation Fund



A crisis for the species

Most cheetahs live in southern and East Africa where all populations are in decline. The small population of cheetahs impacted by the illegal pet trade are from the Horn of Africa. The Northeast African cheetah (*Acinonyx jubatus soemmeringii*) are vulnerable, with an estimated 500 adult individuals left in the wild, in the Horn of Africa.

Since 2011, CCF has been assisting the government of Somaliland in caring for cheetahs intercepted from traffickers in more than 70 confiscation events. Most of the cubs are malnourished and in deplorable condition. Many do not survive. Thankfully, the ones we have saved, now have a permanent home at CCF's Centre.

If we don't stop the illegal trafficking trade now, we will lose this population forever.

Our breaking point

Many of you are familiar with CCF's Namibian Research Centre where, for over 30 years, we have cared for orphaned and injured cheetahs and worked with local communities to mitigate human wildlife conflict. The care for these cats is an enormous undertaking, as zoos know well! Imagine caring for over 90 cheetahs – in an impoverished nation, at a newly established, understaffed facility. We are practically the size of a zoo! Many would have said that saving these cheetahs was an impossible task. However, I knew CCF could help, and together, with the support of zoo partners, we are making progress, day by day.

Building our Somaliland Centre was pivotal. Construction work in Somaliland was challenging – with no local building expertise or available materials. We enlisted experts, brought in materials, a zoo architect donated his time to design the Rescue Centre, and zoo maintenance volunteers helped us construct over 20 large enclosures on over 800 hectares.

"We felt like we really had the skills to contribute meaningful work," said Rebecca Snyder, Oklahoma City Zoo's Senior Director of Conservation, Education, and Science. The OKC Zoo prioritises hands-on conservation opportunities for all employees and through their programme they were able to send two staff members: their assistant curator of carnivores and a maintenance team member, out to Somaliland to provide help.

At CCF, we are very grateful as zoos are essential partners in our on-the-ground conservation work. Having a safe space is a huge hurdle, but the cheetahs keep coming. We're now at breaking point – managing the care, logistics and safety of over 90 cheetahs. We desperately need your support. We have received help from many zoos including medicine, funding, advocacy and veterinary care, but we need more assistance. We also need the flow of animals to stop for everyone concerned.

How zoos can help:

- Actively **fundraise** for CCF and this illegal pet trade work.
- **Volunteer time** in Somaliland – zookeepers, vet/vet techs, maintenance staff and more.
- **Send supplies** – medicine, materials, financial donations.
- Offer **your staff the opportunity of a paid assignment with conservation partners like us**, to provide them with expertise in the field.
- Invite CCF as a **featured speaker** for your lecture series.
- Regularly highlight the illegal pet trade and demonstrate how zoo visitors can donate to make a difference in your **marketing materials and signage**.

Trafficking Statistics

The United Nations Office on Drugs and Crime lists wildlife trafficking as one of the top five transnational crimes, estimated to be worth between USD 50 - 150 billion annually. Cheetahs are listed as CITES Appendix 1. While not poached at the same high rates as elephants and rhinoceros, hundreds of cheetah cubs are smuggled out of the wild each year to supply the illegal pet trade, and many do not survive the journey.

Our path forward

Every animal we lose puts us one step closer to losing this species permanently. According to CCF's research, up to 300 wild cubs annually were removed in the Horn of Africa between 2010 and 2019. With less than 7,000 cheetahs left in the wild, this represents a large part of the once-wild population, and a blow to the survival of the species.

To help stop the illegal pet trade, CCF has received international grants from, IUCN/SOS, the EU, US Fish and Wildlife Service, and the UK Defra, to:

- Work in legal systems across the world to invoke stronger laws.
- Conduct research to better understand these cats and the issues surrounding them.
- Establish an anti-wildlife-trafficking network.
- Launch an outreach programme in the Horn of Africa, similar to the one established in Namibia for the past 30 years to provide training on predator awareness.
- Create, advocate for and support policies to upend the illegal pet trade crisis.
- Find partners to help us further investigate trade routes and players.
- Implore Hollywood artists and influencers to stop glamourising cheetahs as pets.
- Work with governments in the Middle East to stop the demand.

This work continues aggressively.

We have been bolstered by the incredible hearts and talents of our network of zoo partners. I cannot express enough gratitude for those who have assisted with veterinary care, equipment, supplies, medicines, labour, and actively seeking funds to help keep our growing Somaliland operation afloat.

Thank you for your dedication to care for wildlife and work to protect them. And it is thanks to YOU, I believe we can end the illegal pet trade and help save the cheetah.

Dr Laurie Marker is the Founder and Executive Director of the Cheetah Conservation Fund. For more information visit cheetah.org

**The Cheetah Conservation Fund (CCF) is a nonprofit organisation dedicated to saving the cheetah in the wild and—through integrated programmes—is the global leader in cheetah research and conservation. Founded in 1990, CCF is headquartered in Namibia, Africa with a field base in Somaliland, and fundraising partners, chapters and supporters around the world.*

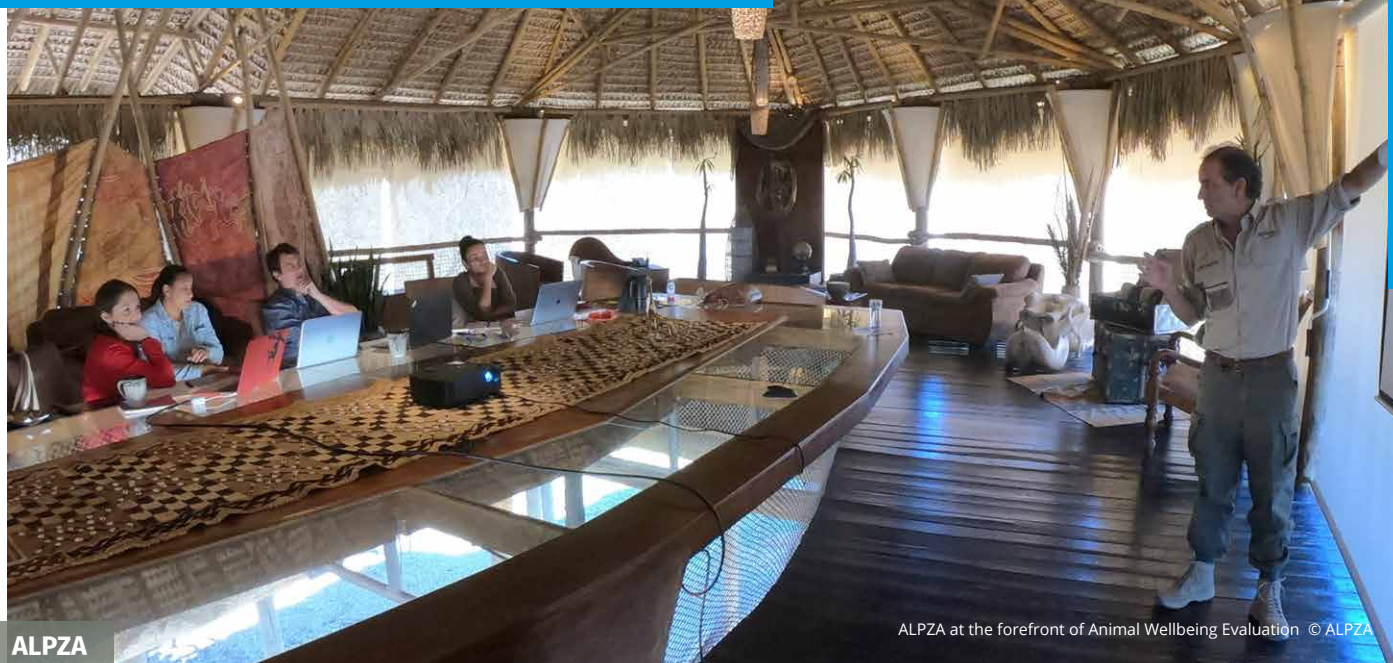
Young cheetahs saved from the illegal wildlife trade and nursed to health by CCF staff in Somaliland.
© Dr. Laure Marker, Cheetah Conservation Fund



Not a pet ...

The AZA, in partnership with the International Fund for Animal Welfare (IFAW) and the Wildlife Trafficking Alliance recently launched 'Not a Pet' campaign to help combat the rise of exotic pets like birds, turtles, monkeys, cats and more. Spread the word! www.notapet.net

ALPZA at the forefront of Animal Wellbeing Evaluation



ALPZA

ALPZA at the forefront of Animal Wellbeing Evaluation © ALPZA

In 2020, the Latin American Zoo and Aquarium Association (ALPZA), with the help of Africam Safari Park and the Zoo and Aquarium Association Australasia (ZAA), did a deep revision of ZAA's animal wellbeing evaluation method. The objective was to develop a simple, digital method for evaluating animal wellbeing under human care, while assembling a centralised database of communally fed data in Latin America.

Members of Africam Safari Park designed and wrote the code for the software programme that provides an objective and comprehensive evaluation of the physical and mental state of animals, based on ZAA's method and the Five Domains Model for animal welfare developed by Mellor and Beausoleil (2015). For the next two years, a multidisciplinary team of animal care professionals and members of various ALPZA committees carried out multiple field tests using the software in several zoological institutions in our region. Adjustments to the rating methods were made as well as careful consideration of the wording, so terms would apply to every country in our region. The result was the development of HEBA, the Spanish acronym for 'tool for evaluation of animal wellbeing'.

Data in HEBA is entered by answering simple, objective and easy to understand science-based questions. By making and logging certain specific observations, the user evaluates an animal, or a group of animals' nutritional state, health, adequate environment and behaviours associated with their wellbeing. Environment and all spaces used by the animals are also evaluated, including areas visible to the public, holding and sleeping quarters. By observing and recording these measurable factors, we can infer the mental or psychological state of the animal or animals evaluated. The Five Domains model facilitates systematic and structured assessment of positive and negative welfare-related affects, the circumstances that give rise to them and potential interactions between both types of affect. Answers are given in the form of numbers in order to obtain numerical and measurable results.

HEBA can be used free of charge by zoo and aquarium personnel of ALPZA member institutions. Results are only seen by the facility that carries out the evaluation. They are stored online and presented in a quantitative way, in the form of percentages and graphs that show, separately as well as collectively, the status of wellbeing of each domain. Thus, allowing for an x-ray view of the wellbeing status of an individual animal, a group of animals, or the entire population at a certain date or across time.

Compiled and numerical results allow the institution to identify problems and more importantly, develop and carry out a plan to maintain the highest standards of animal wellbeing. HEBA can filter results by individual animal, taxon, exhibit, date, user, etc. These filters allow the user to permanently evaluate how effective the actions that are implemented are in order to improve an animal's wellbeing in the short, medium and long term.



↑ The HEBA interface © ALPZA

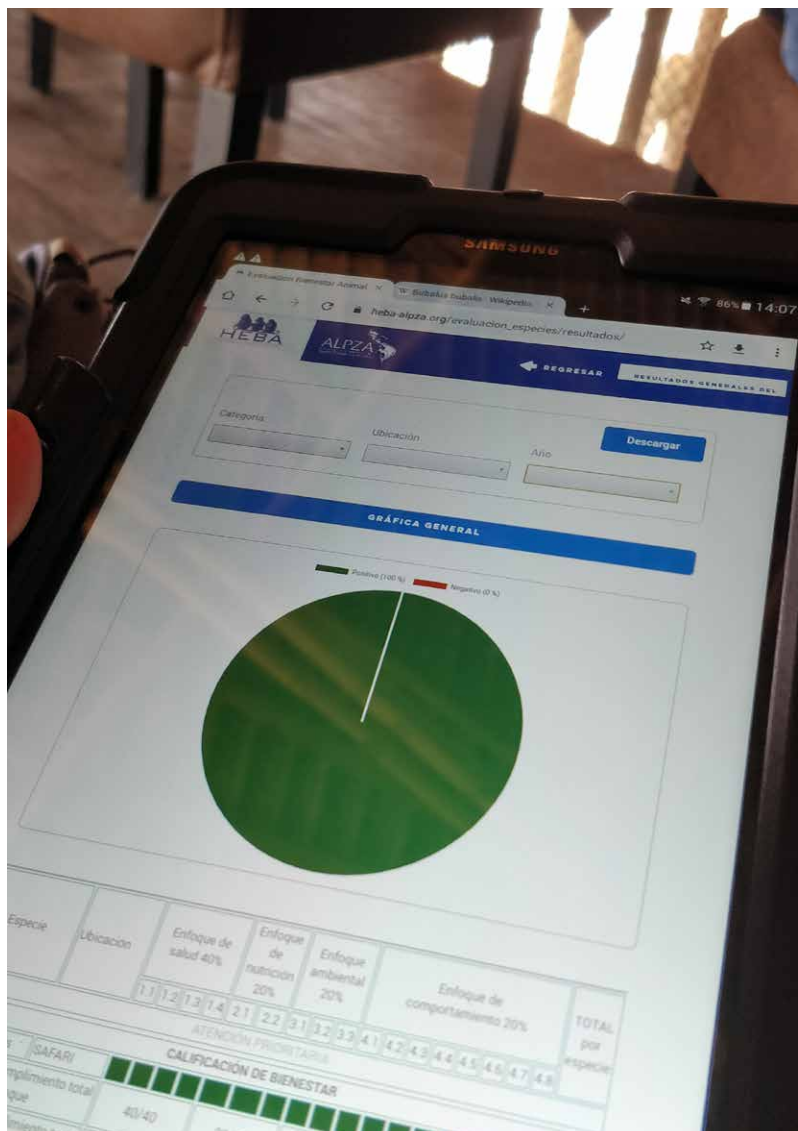
Each member institution has its own institutional HEBA access-protected account. The director assigns an individual account to each staff member that will conduct the wellbeing evaluations and can choose the level of access of data entry or retrieval that each person has. Every month, an automatic message is sent via email, to previously designated addressees, that includes a numeric and graphed summary of all wellbeing evaluations made the previous month, highlighting the areas in need of improvement.

HEBA can be used by keepers, and other staff who are responsible for the animals' wellbeing. It allows managers to develop action plans, allows keepers and other related employees to implement them, and keeps decision makers informed.

HEBA is currently being utilised by ALPZA member institutions with very positive results. It gathers user's feedback in order to improve the tool. While it is currently web-based, the App is in development for IOS and Android users.

Animal wellbeing is always changing and affected by multiple factors, some of which can be corrected by human intervention. It is important to know the state of wellbeing of an animal at a certain moment, and also across time, but more importantly, to develop and implement a plan that improves and maintains the general state of animal wellbeing.

ALPZA would like to express their gratitude to the Australasian Zoo and Aquarium Association, particularly to Nicolas Graaff, for sharing their prototype Welfare Management Tool and for many hours of conversation.



➤ HEBA interface © ALPZA

➔ ALPZA Meeting on Animal Welfare Evaluation © ALPZA



Japanese Association of Zoos and Aquariums (JAZA) holds its 2023 Annual General Meeting



Kumiko Hara

Executive Director, Japanese Association of Zoos and Aquariums

The JAZA Annual General Meeting for 2023 was held at Ube City Tokiwa Zoo in Ube City, Yamaguchi Prefecture, from May 23 to 24, 2023. In the presence of JAZA President His Imperial Highness Prince Akishino, 131 people from 105 of the 141 member institutions attended the meeting.

Dr Koichi Murata of the JAZA Chair introduced the booklet 'Reducing, Measuring and Offsetting Carbon at your Zoo and Aquarium', published by WAZA last October and translated by JAZA ahead of other regions in December 2022. Ms Karen Fifield, WAZA Vice-President, shared WAZA's vision: "To be a globally recognised and trusted leader advancing conservation and animal welfare". She also introduced the WAZA 2023 Animal Welfare Goal which demonstrates WAZA's commitment towards animal welfare and sets a global benchmark for regional animal welfare evaluation processes. At the general meeting, the business and financial reports for 2022 and the business plan and budget for 2023 were submitted and approved as agenda items.

In 2023, JAZA had a change of Vice-Chair, and Mr Hitoshi Murai, Director of Toyama Municipal Family Park Zoo, was newly appointed. Ms Mikako Kaneko, Director of Inokashira Park Zoo, was appointed as the new Educational Outreach Committee Chair on the committee. In addition, the Research Committee was established as the sixth committee of JAZA, and Dr Keiichi Sato, Director of the Okinawa Churaumi Aquarium, was appointed as Chair. This committee comprises three sub-committees: Animal Welfare Research, Nutritional Research and Academic Research.

The commemorative lecture was given by Mr Setsuo Yazaki, Director of the Misuzu Kaneko Memorial Museum for Children's Song Poets, where the Annual Meeting was held. Her poems appear in all Japanese elementary school textbooks and have been translated in

14 countries. Her best-known work is 'A Little Bird, a Bell, and Me', which ends with the words, "We are all different and all wonderful." The participants were impressed by Director Yazaki's words that, through Misuzu's poems, we should remember to look at life with all of its living creatures and to use the words "The earth is gentle" instead of "Earth-friendly" because the earth is still kind to human beings after all the destruction that humans have caused.

Dr Koichi Goka, Director of the Office of Ecological Risk Assessment and Countermeasures in the Biodiversity Area of the National Institute for Environmental Studies, gave a special lecture titled 'Society in Harmony with Nature After COVID-19 Pandemic'. Dr Goka also emphasised the importance of 'One Health', which is the comprehensive conservation between the natural environment, animals, and humans, as their health is linked. The concept of 'One Health' is important, but we must not forget that a healthy human society is needed for its mission.



↑ JAZA members at the Annual Meeting © JAZA



↑ JAZA members at the Annual Meeting © JAZA

Dr Minoru Miyashita, Honorary director of Ube City Tokiwa Zoo, gave a lecture titled 'Half a Century with the Zoo', in which he talked about the episodes in his 37-year career as a veterinarian at the Osaka Municipal Tennoji Zoological Garden and his efforts to renovate the Tennoji Zoo. He also gave details of his 'Director's Guide to the Zoo' manual which he produced after directing the Tokiwa Zoo for five years.

At the general meeting, there were two award ceremonies and a lecture by the winners. The Koga Prize was established to commemorate the achievements of Dr Tadamichi Koga, who served as director of the Ueno Zoological Gardens for 24 years (1937-1961), worked on the breeding and conservation of endangered species such as the Red-Crowned Crane (*Grus japonensis*), helped establish the WWF Japan Chapter, and served as JAZA Chair for 12 years (1950-1962).

This award is given to JAZA members for their efforts in breeding and progressive breeding of endangered animals and *ex situ* or *in situ* conservation. This year, two projects received awards: 'Efforts to reintroduce the Japanese rock ptarmigan (*Lagopus muta japonica*) in the Central Alps' in cooperation with 11 JAZA member zoos, and 'Ecology and conservation research of sea turtles through *ex situ* breeding' by the Okinawa Churaumi Aquarium.

The Japanese rock ptarmigan is a special natural treasure designated by the Cultural Affairs Agency of the Japanese Government. It is listed as Endangered IB (EN) (i.e., at high risk of extinction in the wild shortly) on the Ministry of the Environment's Red List of Threatened Species in Japan. JAZA has been cooperating with the Ministry of the Environment's 'Japanese rock ptarmigan conservation and propagation plan' and has been engaged in *ex situ* breeding within JAZA member zoos since 2015. Ms Yuki Akiba of Toyama Municipal Family Park Zoo, the Japanese rock ptarmigan planning manager for the JAZA Conservation Committee, spoke on behalf of the zoo. Based on the breeding techniques developed thus far, 22 *ex situ* bred individuals (three weeks to one-month-old), including chicks and parents, were reintroduced to the Central Alps of Japan in August 2022. In October, a survey by the Ministry of the Environment confirmed the survival of nine birds, including seven chicks.

Research on sea turtles was presented by Dr Isao Kawazu on behalf of Churaumi Aquarium. They have successfully bred four species of turtles (Loggerhead turtle (*Caretta caretta*), Green turtle (*Chelonia mydas*), Hawksbill turtle (*Eretmochelys imbricata*), Black turtle (*Chelonia agassizii*), and F2 generations (second generation of offspring) of the Loggerhead and the Hawksbill turtles have been successfully bred in human care. By breeding these individuals,

the age of sexual maturity of female Loggerhead, Green, and Hawksbill turtles was clarified. The results of these *ex situ* breeding studies, as well as reproductive physiological studies, revealed the yolk formation cycle and factors that predict estrus in the Hawksbill turtles, the relationship between the egg formation process, spawning interval, and water temperature in the Loggerhead turtles, and the development of artificial sperm collection techniques in the Hawksbill turtles. The results of the development of artificial sperm collection techniques for the Hawksbill turtles, including the establishment of various techniques for sperm collection, ovulation, and spawning induction, were also introduced. These results have been published in scientific journals.

JAZA publishes the 'Journal of the Japanese Association of Zoos and Aquariums' four times a year, which collects information on breeding and reproduction techniques, veterinary medicine, conservation activities, and educational activities. The Academic Research sub-committee edits this journal and recommends outstanding papers submitted to the journal during the year as 'Technical Research Award Papers' together with the Koga Prize, which is awarded after approval by the Board of Directors. This year's award is presented to Mr Yuki Oshima of Port of Nagoya Public Aquarium for his paper entitled 'Changes in the intermammary distance and rectal temperature in prepartum Bottlenose Dolphins (*Tursiops truncatus*).' Ms Ayako Noda of Hiroshima City Asa Zoological Park presented 'Development of Fox glasses: A new tool for the guests to experience mammalian dichromatic vision.'

In a study of the Bottlenose dolphins, the intermammary distance just before delivery was measured in six pregnant Bottlenose dolphins. The results were compared with rectal temperatures, a commonly used birth sign. They showed significant changes within 48 hours before delivery, indicating that a significant increase in the mammary interval is a helpful indicator for predicting the delivery date. The paper on the development study of 'Fox Glasses' is about educational materials designed to help people acquire knowledge about animals in an enjoyable format. This teaching material is a tool to experience the bicolour vision that many mammals have. Laminating a layer of blue and green cellophane paper makes it possible to reproduce bicolour vision, in which it is difficult to distinguish between red and green. This tool is inexpensive, can be made in large quantities, and is easy to use in zoos. It is highly applicable to environmental education activities in zoos and aquariums, creating an opportunity for visitors to consider colour vision and feel more connected to animals.

The next AGM in 2024 will be held in Tokyo in May 2024.

Don't Buy Lighting... Without Initiating a Light-Based Animal Welfare Programme

Dr James Karl Fischer

Executive Director, The Zoological Lighting Institute

How is artificial lighting related to animal welfare? Light is one of the most important factors for animal welfare, as the luminous environment conditions every domain inherent to the Five Domains Model of Animal Welfare. These can be described as mental 'perception', nutrition processes, health related developmental processes (including reproduction), behavioural imprinting and expression, as well as ecological factors dependent on individual, species and habitat variables over time. Much of an animal's life depends on light cycles.

When theatrical or architectural lighting casts radiation (light) into non-human animal spaces without consideration, it negatively impacts each of the Five Domains by clamping down upon what is normally a wide range of relationships. Stage lighting, safety lighting, and indeed all lighting fixtures change an animal's luminous environment. An animal welfare monitoring programme serves to mitigate these negative impacts, by identifying relevant challenges and outlining the actions that need to be taken to improve conditions.

The Five Domains approach marks a substantive advance over the earlier 'Five Freedoms'. The latter was based upon an anthropomorphic model of 'comfort', whereas the former underscores welfare as a matter of consciousnesses that are fundamentally unknowable as consciousness, but which express knowable parameters indicating capacities for consciousness. These capacities can be measured by attending to details within each of the Five Domains. The Five Domains Model advocates acting for another consciousness that retains its own independence, respecting what another living being is on its own terms.

Now, when we think of the Five Domains in terms of physical light, something very interesting happens.

First, with regards to the mental domain, directly. As a truism, physical light plays the role of an external hormone in the neurological systems of all animal life. Physical light naturally varies in intensity, quality and shape over time. By extension, natural light cycles condition perception accordingly, over time. Yet there are physical restrictions on how this can be accomplished.

To respond to high and low intensity levels of natural light, all vertebrate eyes boast of two sets of photoreceptors and at least two synaptic pathways connected within their nervous systems, the retina being considered as a surface of the brain. This complexity marks a robust mental capacity consisting of multiple states of perceptual consciousness (Pcpt-Cs). Artificial lighting shuts down at least half, if not more, of this capacity, by creating a very narrow set of physical conditions. In this direct way, light is related to positive and negative mental welfare outcomes. Light, when measured properly and accounting for sensorial relationships, serves as a metric for the mental domain as do hormone assays in general.

Yet, when thinking about light and the contributory four Domains (two sets of photoreceptors and at least two synaptic pathways), the relationships grow deeper. In addition to the photoreceptors in eyes that directly contribute to mental 'states', a second class of receptors directly contributes to endocrine cycling within an animal body itself. These extended domain effects are not separate from mental life, but contribute indirectly to it.

This clarifies monitoring the contributing domain protocols substantially. We can take nutrition as an example. Nutrition, from a photo-biologically sensitive perspective, is not simply the acquisition of nutrients but is an open process involving the targeting, processing, digestion, absorption, assimilation and excretion of food. Light is important to each of these phases. Firstly, it conditions the different modes of eye function in the targeting and processing of food. Secondly, hormone cycling impacts the absorption and assimilation of food into activities. Finally, the replenishing function of excretion and its associated behaviours introduce complex and sometimes inhibitory factors relevant to something we might call the animal's nutritive experience. Light-based endocrine cycling frames the mental space of the animals in our care across an open process.

One can justifiably consider health as reproductive and developmental biology, or immunology, in terms of phases surrounding the non-nutritive aspects of animal life. Reproductive health for example ought not simply to be judged on offspring produced, but from a welfare perspective covering the entire process of targeting, selection, copulation and functional aspects of gestation for either sex where relevant. Just as for nutrition, it entails phases from acquisition to rejection and recovery in a similar way and relates to light across each of these phases.



This also extends to behaviour. When considered in terms of light, behaviour relates not simply to available choice, but to the imprinting and idiosyncratic expression surrounding choices, and to the denial of choices, considered at specific times and relevant to specific organisms.

A photo-biologically sensitive approach to the environment demands attention to individual, species and ecological metrics as they shift in time, related to *in situ* phenomena as a differential metric. This is linked to the seasonality of life but also to the manner in which time is used as a resource or impressed upon an animal as a physical metric with perceptual-conscious (Pcpt-Cs) importance.

Approaching the Five Domains Model of Animal Welfare from a photobiological perspective enables zoos and aquaria to improve scientific understanding, by concentrating attention on mind-body connections in a rigorous way. Measuring light appropriately, with regards to specific biological processes, is far more important to the success of our missions than the addition of lighting. It improves our own capacity for leadership in the realm of public health and well-being. As the sciences of light and life are complex though, a slightly deeper dive is necessary to highlight what 'measuring appropriately' means.

The ZLI Framework

The Zoological Lighting Institute (ZLI), a charity which focuses on supporting the sciences of light and life through the arts for animal welfare and wildlife conservation, groups research into three broad organisational categories of experiments.

Firstly, animals and humans undergo direct physical relationships with light, that fall into the category of 'photo-physiology'. Photo-physiology, the first ZLI Framework Category, can be approached from bio-physical disciplines, biochemical disciplines, or an inter-organisational combination of the two, described as 'bioluminescence' though the term differs from 'signalling' studies and instead focuses on inter-organisational field relationships.

Secondly, animals and humans map space in their mental constructs facilitated by light. This research falls under the category of 'sensory ecology'. Sensory ecology, the second ZLI Framework Category, consists of visual ecology, animal 'colouration' (including bioluminescent signalling) and cross sensory modalities. The latter

recognises that though Pcpt-Cs is made evident by visual perception, it is not the only sense and outcomes are driven by not simply in combination with the others, but also by musculature innervation as an organism develops.

Thirdly, animals are not isolated entities, but rather exist as 'a part apart', integrated biologically as open systems to organic and inorganic elements in time. Integrative photobiology, the third ZLI Framework Category, highlights light-related research in community resourcing (food chains), epidemiology, and phenology (seasonality, broadly speaking, though time may be thought of across daily, lunar, solar, or stellar cycles as well).

ZLI Framework Categories facilitate potential metrics, research mining, and experiments across each of the Five Domains. These are, to reiterate, the Mental, Nutrition, Health, Behaviour and Environment Domains, considered to highlight potential capacity relationships and manage risks associated with necessary limitations in a given situation. The Zoological Lighting Institute offers Zoo and Aquarium Lighting Assessment (ZALA) protocols and physical stations to facilitate photobiologically sensitive Five Domains monitoring, using the ZLI Framework as a guide within more general, spatial assessments.

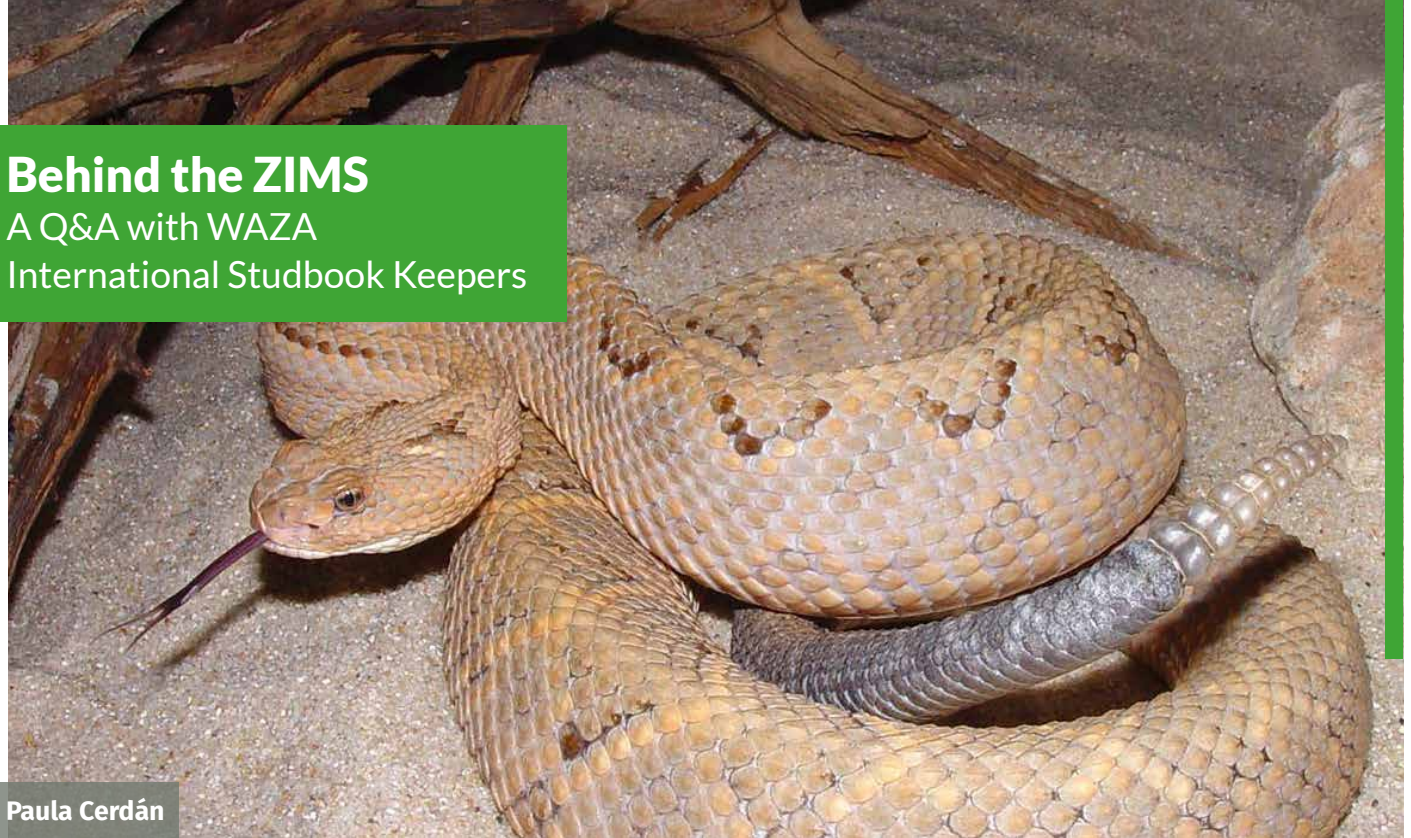
Why Monitoring Before Lighting?

Risks accounted for are better than risks unforeseen. Modifying conditions inherent to the Five Domains, as occurs across both *in situ* and *ex situ* conditions, carries risks. Such risks might be deemed necessary, but understanding what these are aids at an institutional level by creating a pro-active atmosphere of care and efficiency. Monitoring helps us to do that. As science needs participation, a light-based animal welfare monitoring programme opens new channels of relevance and benefit. The understanding that arises from data-driven *ex situ* monitoring is a unique asset available to WAZA Members. For zoos and aquariums, monitoring animal welfare with attention to light, such as offered by the ZLI ZALA programmes, is available in the here and now.

For more information, please visit www.zoolighting.org

Behind the ZIMS

A Q&A with WAZA
International Studbook Keepers



Paula Cerdán

Animal Welfare and Conservation Coordinator, WAZA
WAZA Office liaison to the Committee for Population Management

Behind the ZIMS aims to showcase the behind the scenes work of International Studbook Keepers and their management using Species360's Zoological Information Management System (ZIMS), to show the relevance and contributions of WAZA International Studbooks in the work we do in wildlife conservation and professional population management.

Q&A with Stan Mays



Stan Mays

Curator of Herpetology and Entomology, Houston Zoo, US, Aruba Island rattlesnake International Studbook Keeper, Aruba Island rattlesnake SSP Vice-coordinator

ISB kept: *Crotalus durissus unicolor*

ISB Host Organisation: Houston Zoo

Year Started as ISBk: 1998

For how many years have you been acting as the species' International Studbook Keeper (ISBk) and why did you become an ISBk?

The Aruba Island rattlesnake was the first snake designated by the Association of Zoos and Aquariums (AZA) as being a Species Survival Plan (SSP®) species in 1982. At that time, both the SSP coordinator, R. Andrew Odum, and the studbook keeper, Karl Peterson, were employed by the Houston Zoo. Odum remained the coordinator until his recent retirement, while Peterson resigned from being the studbook keeper in 1997. Given my familiarity with the species and with record keeping, I accepted the role of studbook keeper in 1998. After 25 years of commitment to the International Studbook Programme and the conservation of the Aruba Island Rattlesnake, I have now stepped down from my role as I retire in early July.

↑ Aruba Island Rattlesnake (*Crotalus unicolor*)

How has the International Studbook (ISB) contributed to the species' conservation? What do you see as the value of your ISB?

When the studbook and the SSP were first begun in 1982, basic demographic information on both the wild and *ex situ* populations were severely lacking. Many specimens in human care were kept in separate enclosures and there was only limited breeding. When there was breeding, often inbreeding was not avoided and the initial analysis of the studbook data revealed many individuals who had inbreeding coefficients greater than 0.25 with some as high as 0.375. Furthermore, the studbook data showed only 6 founding animals and only 69.7% of the expected genetic diversity of the wild population. The interest generated by the SSP, and the studbook information eventually drew the attention of the Aruba Island government and led to a cooperative working agreement between the SSP and Aruba.

Consequently, the first Population and Habitat Viability Assessment (PHVA) for the rattlesnake was held in Aruba in February of 1992 which was attended by representatives from AZA institutions, several universities, and the Aruba Island Government. This led to an action plan for both the wild and the *ex situ* populations and eventually resulted in the setting aside of about 19% of the island for the formation of Arikok National Park in 1997 dedicated to the preservation of the flora and fauna of Aruba.

How has the ISB contributed to *ex situ* conservation in practical terms?

Aruba Island rattlesnakes first appeared in North American zoos in 1969 when two individuals were brought in by the Houston Zoo. The first *ex situ* breeding occurred in 1969. However, *ex situ* management did not begin until the formation of the studbook in 1982. An analysis of the information in the studbook revealed that the *ex situ* population was inbred with two founders over-represented. Since then, in cooperation with the Aruba government, new founders have been brought into *ex situ* management and the genetic diversity of the population in human care is now 92.83% of the expected wild diversity. The number of founders has increased to 14 and the managed population has increased from 18 in 1982 to 86 in 2021.

Based on the data in the studbook, the Population Management Centre (PMC) has been publishing a masterplan for this species every three years, with the last masterplan published in 2021.

Data from the studbook has been used in several studies such as the following:

Flanagan, J.P. 1992. Disease impact on Aruba Island Rattlesnakes. In: R. A. Odum, (ed.) *International Symposium and Workshop on the Conservation and Research of the Aruba Island Rattlesnake*, Toledo Zoological Society, Toledo, OH.

Reinert, H.K., L.M. Bushar, and R.A. Odum. 2004. *The ecology and conservation biology of the Aruba Island Rattlesnake, Crotalus unicolor*. *Biology of the Rattlesnakes Symposium*, Loma Linda, CA.

How do you see your work as an ISBk supporting conservation action for the species in the wild?

The original intent of the studbook was to document and analyse the dynamics of the population in human care and to create a managed population in AZA institutions. From these modest beginnings, the *ex situ* management plan has grown into a global programme with extensive work being conducted on Aruba Island to preserve the species. This approach has not only provided zoological institutions with individuals representing a conservation success story not only for the *ex situ* population, but also for the preservation of the snake and the unique ecosystem in Aruba. The *ex situ* programme was one of the driving forces behind the formation of an Aruban government authority to oversee island conservation issues and led to the First National Congress for the Preservation of Aruba Wildlife which developed an overall conservation plan for Aruba (WildAruba.org).

“As one measure of the public interest on conservation in Aruba, The Central Bank of Aruba now issues paper currency that illustrates native wildlife species. The Aruba Island rattlesnake is featured on the 25 Florin bill!”

What do you see as the next chapter or role for International Studbooks?

One of the most important roles of the international studbook is to maintain a database that can be used to manage a healthy, genetically diverse *ex situ* population whether it be regional or global.

As more and more wildlife become imperilled in its native environment, the move towards managing more species on a global scale becomes increasingly important.

Ex situ managed programmes can not only serve as ambassadors for their wild counterparts but can also serve as potential sources for reintroductions in the future if necessary.

The presence of an *ex situ* programme can also be used to create public awareness not only for a single species, but also for local ecosystems as well. The Aruba Island rattlesnake conservation program is a prime example of this and can provide a model for future programs.



↑ Aruba Island Rattlesnake (*Crotalus unicolor*) © Josh More on Flickr



WAZA Welcomes New Members



© Seattle Aquarium ↑

Seattle Aquarium

In 2018, the Seattle Aquarium began expanding their conservation efforts beyond the United States, to include the Coral Triangle which has meant increasing their international collaborations to include organisations across Asia and Europe. The aquarium is actively involved in multiple IUCN SSC specialist groups such as the Cetacean Specialist Group, Otter Specialist Group, Sea Horse Specialist Group, Shark Specialist Group. The Aquarium now joins WAZA as an Institution Member.

The Scientific Center – Kuwait (TSCK)

Established in 2000, The Scientific Center – Kuwait (TSCK) is the first scientific centre and aquarium in the Gulf Region. TSCK has since become one of the most visited attractions in Kuwait and is home to a diverse collection of native marine life, and a variety of fishes. TSCK now joins WAZA as a new Institution Member.



Wildlife Collection, Fahlo

WAZA is also pleased to welcome a new Corporate Member to the global zoo and aquarium community – Wildlife Collection LLC DBA Fahlo.

As a non-profit, Fahlo works to help raise money to non-profits that are working to help save wildlife.



➤ © TSCK

➔ © Fahlo



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