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ZOOQUARIA

SPRING 2025

ISSUE 125



TEAM EFFORT

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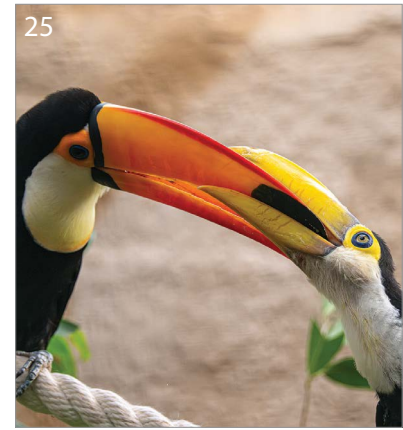
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- 4 From the Director's chair**
Why working together makes us stronger
- 5 Noticeboard**
News and updates from the EAZA community
- 6 Births and hatchings**
Some of the newest arrivals at EAZA zoos
- 8 Standing in solidarity with Ukraine**
How EAZA Members are continuing to support our colleagues amidst the ongoing war
- 10 Embrace your superpower!**
The many benefits of the annual EU Study Visit
- 11 Preserving our future**
EAZA's position statement on cryopreservation and biotechnology
- 12 The power of shared data**
A collaboration between the IUCN Red List and ZIMS is proving greater than the sum of its parts
- 13 Lead – the silent killer**
Why it's time to ban this deadly ammunition
- 14 Vietnamazing progress!**
An update on EAZA's latest campaign
- 16 Centres of excellence**
How the Centres for Species Survival are maximising conservation impact
- 18 Aquatic challenge**
Updating our conservation priorities for threatened freshwater fish

- 20 Urgent action for wild camels**
Joining forces to save the Critically Endangered *Camelus ferus*
- 22 Inglorious bustards**
A 2023 RSP workshop clarified the conservation priorities for threatened gruiformes
- 24 Amphibian rescue**
The international efforts to save the lemur leaf frog
- 25 Let's talk about toucans**
Creating a sustainable future for threatened species
- 26 Five years on – reflections on a pandemic**
Examining the legacy of the COVID-19 pandemic
- 29 Inside the forest**
Nuremberg Zoo's stunning new visitor experience
- 30 Swimming lessons**
What new research can teach us about fish welfare

KEY: a quick guide to frequently used acronyms

- CITES:** Convention on International Trade in Endangered Species
- EEP:** EAZA Ex situ Programme
- IUCN SSC:** International Union for Conservation of Nature Species Survival Commission
- LTMP:** Long-term Management Plan
- RSP:** Regional Species Plan
- TAG:** Taxon Advisory Group
- ZIMS:** Zoological Information Management System

Zooquaria

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FROM THE DIRECTOR'S CHAIR

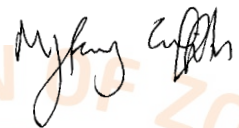
I'm sure many of you are aware of the African proverb 'If you want to go fast, go alone. If you want to go far, go together.' This issue of *Zooquaria* celebrates our 'togetherness' and the importance that our community places on collaboration to achieve more than if we act individually. The EAZA community also values solidarity and support, and never has this been better proven than in the article on pages 8-9 about our activities over the three years since the start of the Russia-Ukraine war. We thank all the individuals and Members who have provided, and continue to provide, funds and expertise to support our Ukrainian colleagues in these difficult times.

The ability to go far together is also demonstrated by the many and varied conservation-linked articles in this issue – from individual species efforts and EAZA Conservation Campaigns through the outcomes of Regional Species Plans (RSPs) to IUCN Species Survival Commission Centres for Species Survival. The progressive leadership and effective collaboration in each and every one of these activities is helping to secure species into the future.

This issue of *Zooquaria* also contains a number of articles that reveal the power of combined data to aid decision-making across all areas of zoo and aquarium activities and lobby work. Anyone who knows me even a little bit will not be surprised to hear me champion the power of data-driven decisions. Our ability to share and combine data is a true strength of the EAZA community. It helps to underpin research, identify trends and evidence our worth in internal and external forums. With over 400 Members, the ability of the EAZA community to leverage our data and go far together is enormous. However, this only works if individuals commit to providing their data and agreeing with one voice on the decisions arising from analysis. Understanding and reaching consensus on EAZA policies so that everyone speaks with one voice is vital. This year will see the next term for EAZA Council members, and it is through our democratic processes that we strengthen our collaborative unity. You will be introduced to EAZA Council members in a future issue of *Zooquaria* and I encourage everyone to connect with them and stay involved.

I'd like to finish by highlighting the article on pages 26-28, 'Five years on: reflections on a pandemic'. The COVID-19 pandemic was yet another example of how our community pulled together to continue our important

work of caring for and saving species, all in a challenging new environment. Many things are different now to pre-2020, not least the increasing pace of change. Effective collaboration takes time; however, the time available is becoming ever tighter. It is easy to feel left out of processes and decisions that happen faster than we might be prepared for. There is an increasing need for trust and communication to help us continue to move forward together. I very much hope that this issue of *Zooquaria*, and indeed all our varied EAZA communications, assist with this. I feel that we are in an era where we need to revisit the African proverb with a new reflection; we have to go faster together if we want to go far.



Myfanwy Griffith
Executive Director, EAZA

NOTICEBOARD

UKRAINE FUND UPDATE

As much as we wish we had better news, our Ukrainian colleagues are still living in difficult and dangerous circumstances, facing constant power outages and shelling by Russian missiles.

We thank all the generous donors who have contributed to the EAZA Emergency Fund for Ukrainian Zoos (www.eaza.net/emergency-fund) and enabled EAZA to support them in the past three years with animal feed, veterinary supplies, power generators and more.

The Fund resources are running low and we urge you to please consider donating (again) if you can. Your support – financial and moral – means everything to our colleagues in Ukraine.

SAVE THE DATES FOR EAZA EVENTS IN 2025

EAZA DIRECTORS' DAYS AND ANNUAL GENERAL MEETING

This meeting will be hosted by Oceanogràfic Valencia from 1–4 April 2025. The programme includes inspiring presentations and discussions about business and the future strategic directions of EAZA. The Annual General Meeting (AGM) includes key updates about EAZA activities, approval of EAZA policies and the new EAZA Council (2025–2028 term).

The meeting also provides an essential networking opportunity for leaders to share insights, best practices and solutions to challenges. Directors/CEOs of EAZA Members should have already received a specific invitation with links to the programme and registration. Please reach out to mirko.marseille@eaza.net if you have not.

In addition, we are looking for Member Sponsors! If your zoo, aquarium or corporate business is interested in joining our generous host in supporting EAZA Directors' Days and AGM 2025 as an event sponsor, please contact Mirko on the email above. We look forward to welcoming you in Valencia.

EAZA CONSERVATION EDUCATION CONFERENCE

The education work of zoos and aquariums has the potential to contribute to local communities, national agendas and global conservation goals and targets. Hosted by Chester Zoo (UK) from 17–21 March 2025, this edition of the Education Conference will explore the role and impact of zoo educators through five themes: Evidencing Our Impact, Developing Our Role as Leaders, Enhancing Human Wellbeing, Ensuring Everyone Has a Voice, and Finding New Ways to Engage People with Conservation.

A pre-conference workshop about Ocean Literacy will be held on 17 March. The Ocean Literacy message is interwoven into many topics, such as climate-change education, the water cycle, habitat protection and species conservation and is relevant to all, not only to aquarium staff. Visit www.eaza.net/events/education-conference-2025 for more details and to register.

OBITUARY: HUGO FERNÁNDEZ



We were deeply saddened to learn of the tragic passing of Hugo Fernández, the Executive Director of the European Association of Zoo and Wildlife Veterinarians (EAZWW) and Vice Chair of the EAZA Veterinary Committee, early in January 2025.

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Hugo was well known in our community for his dynamic and visionary management of EAZWW and, before that, for 20 years of work as the lead vet at Barcelona Zoo. Many early-career veterinarians have lost a most empathetic mentor, and many of us have lost a dear friend. Those who knew Hugo are welcome to post their memories and photos in an online memorial (www.weremember.com/hugo-fernandez/9p5s) set up by EAZWW.

NEW ARRIVALS

SAVING THE SOCORRO DOVE AT HEIDELBERG ZOO



© HEIDELBERG ZOO

LAST YEAR, 12 SOCORRO DOVES (*Zenaida graysoni*) hatched at Heidelberg Zoo (Germany). In total there are only 182 individuals of this species left in the world, and a notable number of those were bred at Heidelberg Zoo. The Socorro dove may appear unspectacular, but the fascinating history of this almost extinct bird species shows the important role that zoos play in saving animal species.

The Socorro dove was originally found only on the isolated volcanic island of Socorro, which measures less than 132 km² and is located around 700 km off the coast of Mexico. The Socorro dove's habitat was forests with dense vegetation; they fed on seeds and small insects and nested in dense scrub where they were safe from predators. However, humans brought goats and sheep to the island, which browsed the brushwood and destroyed the pigeons' habitat. Later, cats were also introduced and preyed on the last pigeons. The Socorro dove has been Extinct in the Wild since 1972.

Thankfully at that time there were still some Socorro doves in zoos and private holdings in the USA and Europe. A conservation breeding programme was initiated to save the species, and zoos faced the great challenge of caring for the small

pigeon species. This turned out to be a difficult task, as Socorro pigeons are very selective in their choice of mates and can be extremely aggressive towards each other. When new animals are put together, injuries and even death can easily occur. Keeping them and successfully increasing the population is therefore particularly complex. New mates must be carefully selected and observed. In addition, female Socorro pigeons are capable of reproducing for only four years, which makes long-term maintenance even more difficult.

However, when a male and a female get on well with each other and start building a nest, they almost always lay exactly two eggs, which they incubate together. The young are also fed together with a special substance produced in the crop, known as crop milk. Socorro pigeons have been kept at Heidelberg Zoo since 2016 and have regularly bred with success. A new pair has been living at the zoo since 2023 and they seem to be getting on particularly well. Within a year, this couple has already raised 12 young. As far as we know, there is no other successful breeding pair like this one.

As there are currently around 200 Socorro pigeons in the world, every single juvenile is extremely important for the conservation of the species. European zoos are currently working with the Mexican government to restore the habitat on Socorro Island. Sheep and goats have been removed from the island and the first reintroduction aviaries have already been installed. The conservationists involved hope that the first Socorro pigeons can be released into the wild within the next few years. It is possible that animals from Heidelberg will then also return to their natural habitat after an absence of more than 50 years.



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ORIENTAL WHITE STORKS HATCH AT PLANCKENDAEL ZOO

PLANCKENDAEL ZOO (BELGIUM) has been the home for oriental white storks (*Ciconia boyciana*) since 2011 when two females arrived from Avifauna Birdpark (the Netherlands). This imposing large stork is threatened and listed as Endangered on the IUCN Red List.

In the beginning of May 2019, we received a seven-year-old male from Hyogo Prefectural Homeland for the Oriental White Stork in Japan. This bird, along with four others, was imported by the Studbook keeper with the assistance of Walsrode Birdpark (Germany) to give a boost to the EEP.

It was only in autumn 2022 that the two birds showed interest in each other and started to form a pair. They built a large nest and, surprisingly, produced a first clutch in February 2023. This female produced rather large clutches, with six eggs in February and seven eggs in April. The birds were clearly inexperienced and needed help with the feeding of the chicks on the nest. This resulted in only one fledged male in May.

In 2024, their first clutch was laid in



February with five eggs, and the parents again had problems rearing the chicks. Five eggs hatched from the April clutch, of which four were left in the nest and one kept in an incubator. This last chick hatched eight days later than the fourth egg and was therefore hand-reared. The chicks in the nest were given several feedings a day by the keepers, but this time the adults did bring food to the nest. They raised three chicks this way, which later fledged.

We are very happy that the two male and two female oriental white storks born at Planckendael Zoo will give a boost to the EEP. With only 16 birds prior to the hatching, including seven birds held within the Russian federation, the EEP is again working towards receiving an additional import from Hyogo Breeding Centre. This is mainly to get more genes in the EEP, to pair up the juveniles in the future and for building an insurance population here in Europe.

RED PANDA SUCCESS AT MADRID ZOO AQUARIUM

MADRID ZOO AQUARIUM (SPAIN) has set a benchmark for the conservation of the red panda (*Ailurus fulgens*) for three decades. The species is Endangered according to the IUCN Red List, due to habitat destruction. Since Madrid Zoo Aquarium started receiving red pandas in the 1980s, its efforts to preserve the species and increase the population have been impressive: 89 out of the 107 cubs born in human care in the European region were born in Madrid. This success reflects the zoo's commitment to the conservation and welfare of this species.

The history of the red panda at Madrid Zoo Aquarium began in 1983, when the first pair arrived from Nepal, a country with which the zoo had a conservation agreement. In 1985, the first individual was born at the zoo. The male unfortunately did not survive beyond five days. However,

the second offspring born that year, a female, lived until 17 years of age. The reproductive success continued over the years.

Two twins were born at the zoo in June 2024 from a female born in Parc Merveilleux (Luxembourg) and a male born in Parc de la Haute Touche (France). Following the zoo's tradition that all the red pandas born in Madrid are given names starting with 'Ma', they were named Malik and Marti. They are the only red panda cubs born in Spain in 2024, which counts 16 individuals, six of them in the capital.

In this context, the reproductive success at Madrid Zoo Aquarium is especially significant. The zoo believes that its success could be due to factors such as the animals' diet – as was the case with giant pandas – along with the excellent care provided and Madrid's continental climate with its dry and cold winters.



Each birth of a red panda is a celebration and another step towards preserving one of the most beloved species in the animal world.

Standing in solidarity with Ukraine

DESPITE THE ONGOING WAR, SEVERAL UKRAINE ZOOS HAVE REMAINED CANDIDATES FOR EAZA MEMBERSHIP AND ARE RECEIVING VITAL SUPPORT FROM OUR MEMBERS

Marc Damen, Mentor for Kyiv Zoo, Alpenzoo Innsbruck

It has now been three years since the official start of the war between Russia and Ukraine, escalating a conflict that had been ongoing since 2014.

Ukraine is home to around 100 zoos, three of which hold the status of 'Candidate for Membership' (CfM) within EAZA: Kharkiv Zoo near the Russian border, Mykolaiv Zoo and Kyiv Zoo. Since the onset of the conflict with Russia a decade ago, Ukraine has increasingly oriented itself towards the West. Recognising this shift, EAZA granted CfM status to all three zoos, facilitating mutual support to elevate their standards to EAZA levels. Douglas Richardson (supported by Peak Wildlife Park, UK) mentors Mykolaiv Zoo, Marjo Hoedemaker (Amersfoort Zoo, the Netherlands) mentors Kharkiv Zoo, and I am the mentor for Kyiv Zoo. Regular visits and communication are integral to this mentoring process; however, visits were interrupted after 2022. In July 2024, I was finally able to visit Kyiv Zoo again.

LIFE IN KYIV

My first thought was that the resilience of normal life is striking. People go to work, children attend school and the streets bustle with activity. Shops and bars remain open and supermarkets are well stocked, including imported goods. This semblance of normality is bolstered by swift repairs being made to damaged infrastructure, minimising the visible reminders of war.

When you look more closely, you also see that the Ukrainian people are united, supporting families of internally displaced persons and donating to social and rehabilitation projects. Similarly, Kyiv Zoo serves a therapeutic purpose beyond recreation. Wounded and traumatised soldiers and families of individuals on the front lines visit the zoo as part of their recovery and coping mechanisms.

Zoos are popular destinations, providing a refuge and a sense of

continuity. This is not unique to Ukraine; during World War II, zoos in western Europe, including those in occupied areas, experienced high visitor numbers. In Kyiv Zoo, a large aquarium that was under construction before the war has been repurposed as a massive bomb shelter, to cope with the daily air-raid alarms.

CHALLENGES AND ADAPTATIONS

Large-scale construction projects in Kyiv Zoo, such as the new primate house or the aquarium, have been put on hold. Workers from external companies are either deployed to the front or redirected to repair war damage elsewhere. However, zoo staff continue to make small-scale improvements, such as building new aviaries to house animals brought in by citizens. Municipal zoos, with relatively stable power supplies and generators, are entrusted with many exotic animals, such as tropical birds and reptiles, that private owners can



CLOCKWISE FROM TOP LEFT: AVIARY UNDER CONSTRUCTION FOR BIRDS BROUGHT IN BY THE PUBLIC; AVIARY IN USE; QUARANTINE CAGES IN THE CLOSED BIRD HOUSE; KYIV ZOO THANKS ITS DONORS © MARC DAMEN

no longer care for. While these species do not align with the zoos' collection plans, refusal is not an option in these extraordinary times.

The zoos have also taken in animals from other zoos. For instance, Kyiv Zoo took the group of baboons from Feldman Ecopark, which was completely destroyed. This deviates from the zoo's original collection plan, which aimed to reduce its primate collection before introducing species from the EAZA Regional Species Plan.

Despite these obstacles, routine activities at the zoo continue wherever possible, including conservation projects. Notable efforts include research in the Chernobyl area and reintroducing the common hamster (*Cricetus cricetus*).

THE ROLE OF UKRAINIAN ZOOS

A frequently asked question is why Ukrainian zoos do not transfer their animals to other EAZA zoos. Animals that are being relocated are

predominantly from rescue centres, which, due to heightened attention, now have more opportunities to place animals such as lions, tigers and bears in western European zoos.

Ukrainian zoos are committed to retaining their animals for as long as possible. They provide an essential asset for the public, helping to maintain a sense of normality and continuing their educational and conservation missions. Understandably, western European zoos are hesitant to send animals to war-affected areas. Yet such gestures of solidarity would significantly impact Ukrainian zoos, which have not been targeted as strategic sites. Crucially, not one of the animals in the three CfMs has perished due to the war.

SUPPORT FROM THE EAZA COMMUNITY

Ukrainian zoos continue to receive vital support from EAZA as a community and from individual EAZA Members.

Recently, Berlin Zoo and Tierpark Berlin (both Germany) and Vienna Zoo and Alpenzoo Innsbruck (both Austria) sent a substantial shipment of dry food. While Ukraine has no shortages of grain, specialised feeds such as flamingo pellets or primate biscuits are no longer produced locally. Thanks to a contribution from the Rotterdam Zoo Friends (the Netherlands), the Ukrainian zoos received implants to prevent pregnancies in various species of carnivores and primates.

There are numerous ways to support Ukrainian zoos. The EAZA Ukraine Fund (<https://www.eaza.net/emergency-fund>) is a primary channel, but simple acts of encouragement, such as reaching out to colleagues, can also make a difference. If you wish to assist, consider asking how you can help directly – whether by contacting the zoo or its mentors. Such gestures remind us all of the value of freedom, a precious commodity often taken for granted.

Embrace your superpower!

HOW THE ANNUAL EU STUDY VISIT AMPLIFIES OUR COLLECTIVE VOICE AND CAN HELP YOU TO OPTIMISE YOUR NETWORKING AND LOBBY WORK

Sandrine Camus, Communications Coordinator, EAZA Executive Office

On 14–15 January, 22 participants from 12 nationalities, representing 11 EAZA zoos, six national zoo associations and the World Association of Zoos and Aquaria, gathered in the EAZA office in Brussels (Belgium). Organised yearly by the EAZA Advocacy team, the EU study visit provides knowledge about the legislative decision-making processes at the European level, networking opportunities and tips to start or strengthen your lobby work.

After an introduction to the EU legislative landscape, its main actors and their priorities for 2024–2029, Tomasz Rusek and Alice Albertini (EEO) reminded the participants about their power – their unique expertise, their strong relationships with partner organisations and the huge impact they can have on public perception – and explained what they can do to influence decision-makers.

In the afternoon, we headed to the European Commission to meet officials from the Directorate-General for the Environment (DG ENV). Ute Goerres spoke about the implementation of the EU Zoos Directive. Agata Sobiech presented the EU's revised action plan against illegal wildlife trade. Daniel Nuijten talked about the European regulation on Invasive Alien Species (IAS) and the process to add or remove species from the IAS list, which should get another update this summer. Nicolas Manthe introduced the priorities for the European initiative dedicated to pollinators. All highlighted various collaboration opportunities with the zoo community.

With a new parliament in place since June 2024, it is important to build relationships with the new Members of the European Parliament (MEPs) representing you and your country. Meeting them is the best opportunity to highlight the priorities and concerns of modern zoos and aquariums, so that they can make informed decisions when voting on legislation that impacts our work. Delegates then met



STUDY VISIT 2025 PARTICIPANTS IN FRONT OF THE EUROPEAN PARLIAMENT © EAZA

with their national representatives and MEPs before debriefing the day casually around a delicious Malagasy dinner.

Day two started at the European Parliament, where Tom, our enthusiastic tour guide, was as eager to learn about the work of zoos as he was to share his knowledge about the European Union. With an interactive presentation, he reminded us why the EU started, how it evolved and what keeps the Member States glued together, despite their cultural differences. Just like in the EAZA community, individual countries within the EU can do a lot alone, but it is only together that they are a superpower! Sharing similar values and making decisions together, EU Member States (and EAZA Members) have a much bigger impact and a higher chance of achieving their common goals.

After a peek at the plenary hall and more meetings with their MEPs, the participants went back to the EAZA office for discussions with several Brussels-based nature organisations. Nick Clark, Wildlife Programme Leader at Eurogroup for Animals, talked about their work on positive lists and against wildlife trafficking, two areas in which he sees room for collaboration with zoos and aquariums. Similarly, Anastasiya Timoshyna, Director of TRAFFIC Europe, recognised our awareness-raising strength and urged

us to keep European wildlife trade in Europe and sustainable use of wild species among our priorities. Marion Bessol and Erica Gentili presented Birdlife Europe's policy priorities for the next five years and invited EAZA to support their current campaign to ban lead, which kills one million birds every year (see page 13). Finally, Boris Erg, Director of the IUCN Europe Regional Office at whose premises our Brussels team is also based, was pleased to see that many participants were also IUCN members. He reminded them how they can impact policy-making by submitting motions for the next IUCN World Conservation Congress.

Through EAZA Members' local contacts, our network of affiliated national zoo and aquarium associations and EAZA's own advocacy team, our community contributes to the legislative process across the EAZA region. Focusing on effective zoo legislation, global and European biodiversity frameworks, animal health and welfare, these integrated efforts aim for legislation and policies that enable EAZA Members to fulfil their potential as key contributors to biodiversity conservation. So join us and lobby to promote the progressiveness of EAZA Members and our potential in species conservation and outreach. Check out the EAZA Manifesto (www.eaza.net/manifesto) for more information.

Preserving our future

HOW THE EAZA COMMUNITY IS ADDRESSING THE ETHICAL AND PRACTICAL CHALLENGES OF USING CRYOPRESERVATION AND BIOTECHNOLOGY IN THE MISSION TO SAVE SPECIES

Christina Hvilsom, EAZA Biobank Working Group Chair, Copenhagen Zoo; Zjef Pereboom, EAZA Research Committee Chair, Royal Zoological Society of Antwerp; Anna Mekarska, Biobank Coordinator, EAZA Executive Office

Position statements outline the current position of an organisation on a key issue. During our Annual Conference 2024, the EAZA Position Statement on the Use of Cryopreserved Materials and Biotechnology – such as gene editing and cloning in a (zoo) conservation setting, using cryopreserved cells from zoo-housed individuals – was approved by the EAZA Council.

Due to a growing need to preserve living cells for future conservation and research efforts within our community, the EAZA Biobank Working Group has recently been working on providing support on the cryopreservation of live cells, such as gametes and cell lines, to EAZA Members. First, a Cryopreservation Interest Group (CIG) was established as part of the EAZA Biobank (see *Zooquaria* 123). Secondly,

a Cryopreservation Network is being built to initiate close collaborations with institutions and organisations that are able to provide appropriate and dedicated resources, expertise and long-term storage of live cells. The CIG will provide EAZA Members with the required background information on the potential use of such materials for expanding our conservation toolkit and for helping to achieve our joint conservation goals.

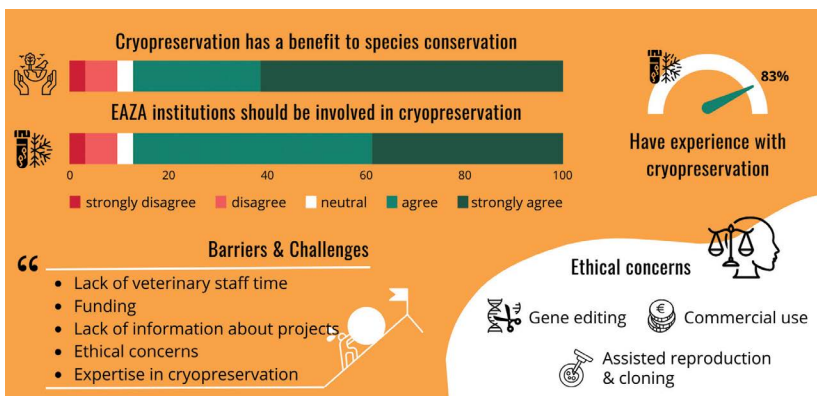
Although biotechnological tools offer a huge potential for improving *ex situ* programmes, wildlife conservation, restoring endangered species and managing ecosystems, there are several ethical issues that must be carefully addressed to ensure their responsible application. It is therefore essential for EAZA Members to have a guiding

statement that promotes transparency and ensures that participation in these activities is conducted in an ethically responsible and ecologically sustainable way. Our position statement first aims to generate improved understanding of the ethical and regulatory considerations of biotechnological applications to conservation practices, and to help EAZA Members to make informed decisions and engage with relevant national, regional and international stakeholders. It also aims to highlight the importance of making sure that the potential benefits of cryopreservation and biotechnologies are balanced against any concerns over possible harmful consequences of its use. Finally, it provides guidance on the types of application that EAZA does and does not endorse.

CRYOPRESERVATION SURVEY RESULTS

In autumn 2024, EAZA Members were invited to complete a survey on their views and use of cryopreservation. The results indicate that cryopreservation is viewed as beneficial for species conservation and as an activity in which the EAZA community should be involved. Several respondents indicated that they have ethical concerns linked to assisted reproduction technologies, commercial use of the samples, and cloning and gene editing. It is noteworthy that 83% of respondents represented institutions that already had experience with cryopreservation. The majority of Members don't have cryopreservation facilities on site and rely on other institutions to cryopreserve their tissues, gametes and reproductive tracks. The main barriers to participating in cryopreservation are the lack of veterinary staff time, funding, information about the projects or expertise as well as ethical concerns.

The results of the survey clearly show the need for expert support and guidance – for example, through the Cryopreservation Network and the CIG – as well as demonstrating the relevance and timeliness of the new EAZA Position Statement on the Use of Cryopreserved Materials and Biotechnology as a guiding document.



Key highlights from our Position Statement

- EAZA supports cryopreservation and use of cryopreserved materials **as a conservation tool for safeguarding biodiversity and ensuring species survival.**
- More species-specific research needs to be done** to further develop methods and tools – and as such, EAZA supports responsible use of biotechnology to meet these goals. At the same time, we also wish to raise awareness of complex **ethical and legal concerns** regarding its application.
- EAZA believes that current resources should be **prioritised for solving current conservation challenges**, rather than be directed towards reviving de-facto extinct species – as such, EAZA does not support use of zoo and aquarium held animals or their samples to assist in **de-extinction efforts, or gene-editing, or cloning efforts which may hinder conservation efforts.**

The power of shared data

HOW SPECIES360 AND EAZA MEMBERS ARE COMBINING THEIR DATA TO SUPPORT SPECIES CONSERVATION

Gabrielle Kirk-Cohen and Mary Ellen Amodeo, Marketing and Communications Specialists, Species360

In 2024, the non-profit organisation Species360 celebrated its 50th anniversary. What began as Professor Ulysses Seal's vision to create a network for shared zoological information is now a global initiative that bridges data, science and conservation action.

There is surely no better way to celebrate that vision and legacy than with the integration of Species360 *ex situ* animal data into the IUCN Red List of Threatened Species.

After years of work, global species holding data from the Species360 Zoological Information Management System (ZIMS) was added to the Red List in 2024. Taken as a whole, the ZIMS data referenced in the Red List provides a single, comprehensive picture of species population numbers in the wild and in human care.

This addition of data is a significant advancement in supporting the One Plan Approach, which emphasises the importance of aligning conservation efforts across *in situ* and *ex situ* domains to safeguard threatened species. This achievement would not be possible without the members of Species360 and EAZA curating data in ZIMS on a daily basis.

This combined information reveals many fascinating stories of how zoos, aquariums and wildlife organisations are using data to drive their animal welfare and conservation efforts. Here are some fantastic recent examples of how EAZA Members are using the data to make evidence-based decisions. We are so thankful to our Members and what they are able to achieve with this invaluable resource.

Cologne Zoo: exemplifying a data-driven, holistic approach to conservation

A ZIMS analysis carried out by conservationists at Cologne Zoo (Germany) in 2017 helped to inform the EAZA Reptile Regional Species Plan and prioritise conservation efforts for Critically Endangered species such as the Philippine crocodile, which was



PHILIPPINE CROCODILES (*CROCODYLUS MINDORENSIS*) ON THEIR WAY TO BE REINTRODUCED INTO THE WILD © COLOGNE ZOO, THOMAS ZIEGLER

underrepresented in zoos compared to the Nile crocodile (*Crocodylus niloticus*), classified as Least Concern on the Red List.

As part of a coordinated approach, zoo-bred Philippine crocodiles have since been successfully reintroduced to bolster wild populations. This initiative illustrates how ZIMS data can be used to help optimise resource allocation, coordinate breeding programmes and strengthen global conservation efforts, ensuring that *ex situ* populations contribute to species recovery in their natural habitats.

Prague Zoo: Przewalski's horses reintroductions

The Return of the Wild Horses project, led by Prague Zoo (Czechia), reached a major milestone last summer when Przewalski's horses (*Equus przewalskii*) were released into a natural habitat in Kazakhstan after decades of work by leading EAZA zoos.

Formed in 1986, the EEP maintains an insurance population of Przewalski's horses within *ex situ* zoos. ZIMS and the PMx software from Species360 were critical in ensuring the genetic management of more than 800 individuals across 80 institutions, allowing conservationists to maintain a healthy and genetically diverse population. All transfers, reproduction and selection of

founder animals for reintroduction or rewilding projects are based on pedigree records in the International Studbook, which is managed by Prague Zoo, ensuring long-term sustainability.

ZSL London Zoo: using ZIMS to improve welfare

The Zoological Society of London (ZSL, UK) is among nearly 300 institutions worldwide currently using Species360 ZIMS for Care and Welfare to record key welfare indicators for individual animals and groups.

When ZSL aquatics teams noticed that a particular population of corals wasn't thriving as well as others, they looked at historical water quality reports in ZIMS. The graphs revealed critical changes, prompting adjustments to restore optimal conditions. Similarly, when a fish population failed to thrive, ZIMS data helped to pinpoint temperature inconsistencies, enabling the team to tailor environmental parameters to the species' needs.

ZSL also uses ZIMS for many taxa, gathering information such as body condition scores, foot health, fecal scores and fish spawning. The team is currently in the process of evaluating how else they can use Care and Welfare to help complete their Animal Welfare Audits.

Lead – the silent killer

WITH MILLIONS OF ANIMALS AT RISK FROM ITS TOXIC EFFECTS, A BAN ON LEAD IS URGENTLY NEEDED

Erica Gentili, Communications Officer and Honey Kohan, Communications Manager, BirdLife Europe and Central Asia

Yes, we're still talking about lead. Even though it has long been banned from petrol, paint and pipes, a staggering 44,000 tonnes of lead still flood into the EU environment every year through hunting, sports shooting and fishing. This in turn silently poisons Europe's wildlife, nature and citizens. Each year, a million birds die from ingesting lead gunshot and fishing tackle, while 135 million remain at risk.

Lead poisoning is a silent killer in the wild. When animals consume lead fragments from ammunition or fishing gear, it disrupts their neurological functions. They lose coordination, become exhausted and display behavioural changes that reduce their chance of survival. Over time, entire populations weaken, reducing their ability to reproduce and contributing to long-term declines.

Birds are among the hardest hit. Waterfowl, for example, often mistake lead shot for seeds or grit – just one pellet can prove fatal. Raptors such as the golden eagle (*Aquila chrysaetos*) and white-tailed eagle (*Haliaeetus albicilla*) are especially vulnerable. These scavengers consume carcasses containing lead fragments or prey on animals that are embedded with lead, leading to severe poisoning.

Studies estimate that since 1983, 55,000 adult birds across 10 raptor species have been lost in Europe due to lead exposure*. Without this contamination, the white-tailed eagle population could be 14% larger, and golden eagles could increase by 13%. Significant progress has been made in the conservation of the latter across several European regions, often involving complex and costly reintroduction programmes in countries such as the UK, Ireland and Spain. Banning lead would bolster the populations across their entire range in Europe and support these more targeted conservation efforts.

A TOXIC ENVIRONMENT

But it's not just wildlife that suffers. An estimated one million children in Europe are exposed to the toxic

effects of lead through eating game. For them, lead contamination can lead to developmental problems, heart disease and kidney damage. Meanwhile, lead ammunition and fishing weights pollute our soil and water, contaminating entire food chains – including ours – and leaving a toxic legacy for generations to come. Domestic livestock, such as cattle and poultry, can ingest lead from grazing on contaminated land, putting their health and the quality of our food supply at risk. Even pets aren't safe. Some pet foods made from wild-shot game exceed safe lead limits, threatening young animals whose nervous systems are still developing.

A SIMPLE SOLUTION

Despite these grim statistics, the solution is clear: we must transition to lead-free ammunition and fishing weights. Non-toxic alternatives are widely available, effective and affordable. It is worth noting that Denmark has already enacted a total ban on lead ammunition, with the support of the hunting community; other countries can surely follow.

The EU has the power to act by banning lead use, and the European Commission is currently preparing a draft restriction that will be discussed and reviewed by Member States and the European Parliament. We need to make sure that all EU institutions know that this issue is of great importance to citizens across the Member States and beyond. Last November, BirdLife Europe launched the #BanLeadNow campaign, and were joined by the RSPB

and the Wildfowl and Wetlands Trust in the UK.

STRENGTH IN NUMBERS

EAZA and its extensive network of Members across the EU can help this campaign to really soar. Join us in calling for a toxic-free future by encouraging your visitors and staff to sign our petition at <https://banleadnow.com/get-involved>:

- Place opportunities to sign the electronic petition in your zoos and aquariums so that everyone can act (e.g. through a QR code).
- Highlight the #BanLeadNow campaign in your own publications, linking to the petition site, to share the campaign as widely as possible.
- Talk about this threat in your public bird talks, further encouraging the signing of the petition.
- Contact your local MEPs and highlight this issue of importance – ask how they will be supporting this important topic when it comes to the European Parliament.

MAXIMUM IMPACT

Banning lead is a 'simple' action that will have a profound conservation impact. A million birds saved in our ecosystems; a million birds flying, singing and bringing wild nature back across Europe. We need your help. Please join our flock of supporters for birds. The time to act is now.

* Green, R. E. et al. (2022). *The impact of lead poisoning from ammunition sources on raptor populations in Europe*. Science of the Total Environment, 823: 154017



Vietnamazing progress!



HOW EAZA'S CAMPAIGN IS MAKING GREAT STRIDES IN VIETNAM – AND BEYOND

Lucia Schröder, Educator, Cologne Zoo, and Constanze Mager, Conservation, Education and Research Manager, Royal Burger's Zoo, on behalf of the Vietnamazing campaign team

The *Vietnamazing* campaign, launched in September 2023 at the EAZA Annual Conference in Helsinki (Finland), has rapidly emerged as a beacon of hope for biodiversity conservation in Vietnam. With an ambitious goal of protecting the country's unique and endangered species, the campaign combines research, breeding programmes, public outreach and international cooperation, following the IUCN One Plan Approach. Despite initial funding challenges, the progress achieved in the first year is a testament to its innovative approach of relying on collaboration between the EAZA community and Vietnamese institutions.

RAISING AWARENESS AND EXPANDING NETWORKS

The campaign's message has reached an extensive audience through diverse communication channels, including *Zooquaria*, social media platforms and international conferences. Branded materials, such as posters and merchandise, have been adopted by zoos across Europe to raise awareness and funds.

High-profile events such as the 'Zoo Species of the Year' launch, featuring the Vietnamese geckos, grabbed the attention of key figures, including the President of the German Federal Agency for Nature Conservation, Sabine Riewenherm, who became the patroness of the Zoo Species of the Year campaign. Presentations at global conferences and collaborations with international institutions have further amplified the campaign's visibility, ensuring that its message travels far beyond Vietnam.

BREEDING SUCCESS AND SPECIES-SPECIFIC MILESTONES

The campaign has prioritised flagship species, focusing on habitat conservation, breeding programmes and genetic research.

Some key achievements so far include:



- **Vietnamese giant magnolia snail** (*Bertia cambojiensis*)
Conservation breeding facilities have been established in both Europe and Vietnam, and genetic population studies are underway to identify distinct conservation units. Chester Zoo (UK) has advanced the release of Best Practice Guidelines and provides European institutions with its numerous offspring to extend the conservation breeding network.
- **Nui Chua stick insect** (*Nui Chua rabaeyae*)
A European breeding network has been highly successful and efforts are now underway to establish similar facilities in Vietnam. Field surveys will determine its endemic status to Nuichua Hill.
- **Tiger hillstream loach** (*Sewellia lineolata*)
Conservation breeding units have been established at Wildlife at Risk's Dau Tieng Wildlife Conservation Station and at the Melinh Station (Vietnam), and research into the population and genetic diversity is ongoing.
- **Vietnamese crocodile newt** (*Tylototriton vietnamensis*)
Breeding efforts in Vietnam and Europe have flourished, with plans to expand conservation networks. Field research and monitoring is ongoing.
- **Vietnamese crocodile lizard** (*Shinisaurus crocodilurus vietnamensis*)
Field and genetic studies have assessed populations and threats, while successful breeding at Cologne Zoo (Germany) and other European zoos has laid the groundwork for future reintroduction efforts in Vietnam. More than 50 offspring have now been born.
- **Vietnamese pheasant** (*Lophura edwardsi*)
With the completion of the reintroduction infrastructure – particularly the construction of aviaries at Khe Nuoc Trong, Phong Dien and Ke – and with more than 1,000 birds in *ex situ* populations, preparations for reintroduction are well advanced. Release sites are being prepared alongside community engagement and threat mitigation measures.
- **Northern yellow-cheeked gibbon** (*Nomascus leucogenys*)
Conservation efforts in Vietnam and Laos focused mainly on habitat preservation in two protected areas (Kon Ka Kinh National Park and Kon Chu Rang Nature Reserve), population monitoring and community education. Plans are underway to convert a connecting buffer zone to a protected area. A collaboration with Lao Conservation Trust for Wildlife aims to collar gibbons in Lao as preparatory steps for potential future population reinforcement and reintroduction efforts.

FIELD RESEARCH AND CONSERVATION ACHIEVEMENTS

- **Annam pond turtle** (*Mauremys annamensis*): Extensive fieldwork has supported the campaign's conservation goals. Studies on species such as the Annam pond turtle have led to critical discoveries, including new localities and genetically distinct populations. Genetic screening is guiding plans for reintroductions into protected habitats.
- **Mossy frogs:** The discovery of a new mossy frog species (*Theloderma woltersi*) highlights Vietnam's untapped biodiversity. Conservation breeding facilities for amphibians and reptiles, including Vietnamese crocodile lizards, are strengthening local populations and laying foundations for future repatriation.

LOOKING FORWARD

The *Vietnamazing* campaign exemplifies the power of international cooperation and integrated conservation strategies. From the monitoring excursions in the rainforests of Nui Chua Hill reserve to the breeding facilities in EAZA institutions, this initiative is ensuring a better future for Vietnam's wildlife.

Vietnamazing will start distributing the €200,000 raised during the first year and is looking for further funding to move beyond the initial phases of conservation efforts and sustain and expand ongoing efforts, including genetic studies, habitat assessments and public education initiatives.

We are excited to announce that the call for additional funding proposals is open! Funding applications will be considered if:

- there is a focus on threatened Vietnamese species. This includes threatened species that are not only endemic to Vietnam
- the majority of the conservation work is to be implemented by a Vietnamese conservation organisation and in Vietnam
- the conservation work is partially managed by, partnered with or vouched for by an EAZA Member, Taxon Advisory Group or EEP

Please contact merel.zimmermann@eaza.net for more information.



SING ALONG TO SAVE SPECIES

Last summer, Royal Burgers' Zoo (the Netherlands) hosted the musical *Sing Along for the Pangolins* engaging more than 40,000 live viewers. This initiative supported the EAZA Vietnamazing Campaign by raising awareness about endangered species such as pangolins through an entertaining yet educational performance. Held in the zoo's auditorium, the musical was an excellent prelude to exploring the Rimba section, home to Southeast Asian animals, enhanced with themed panels and a treasure hunt.

Burgers' Zoo has a tradition of staging musicals during summer holidays. Designed for children aged 3–7, the productions revolved around Zoë, a curious young girl, and her adventures with animal puppets. Over time, Zoë was joined by Silos, a young zookeeper linked to the zoo's conservation projects. The 2024 show focused on Vietnam's endangered wildlife, using carefully crafted puppets and a simple storyline to balance fun and education: Zoë and Silos venture into the Vietnamese rainforest to film a documentary on wildlife, aiming to spotlight the elusive pangolin. Along the way, they encounter a number of species who suggest composing a catchy song to raise awareness about pangolins. The audience is encouraged to join in, making the experience interactive and memorable.

Addressing common concerns

The authors of this article anticipate that their readers might have reservations about organising similar events, including performance skills, relevance of species and resource constraints. Here are some tips to help:

- **Expertise** – Zoo staff aren't expected to perform. Professionals manage acting, puppeteering and production.
- **Species selection** – Pangolins are not present at Burgers' Zoo, yet the campaign highlighted their plight. Iconic species such as tigers and gibbons were included to captivate audiences.
- **Educational value** – Short, engaging musicals effectively convey conservation messages. Surveys revealed that children often retain more knowledge from musicals than direct animal encounters.
- **Facilities and costs** – While Burgers' Zoo benefits from a conference centre, alternative venues can suffice. The cost of staging musicals is justified by visitor satisfaction and enhanced campaign impact.

Creative solutions

The success of the musical demonstrates the potential of creative storytelling in zoos to foster conservation awareness. Despite logistical challenges, this approach bridges education and entertainment, inspiring audiences to care about wildlife. For a glimpse of the musical, watch it on YouTube (search for 'Zoë & Silos – De Rimba' Musical).

Centres of excellence

HOW INVOLVING ZOOKEEPERS IN THE DECISION-MAKING FOR SPECIES PLANS CAN IMPROVE BOTH THE PROCESS AND THE CHANCES OF SUCCESS

Kira Mileham, SSC Director Strategic Partnerships, IUCN

A decade of collaboration between EAZA and the IUCN Species Survival Commission (SSC) has grown into a global partnership model, now effectively building capacity and driving impact for strategic species conservation across six continents.

EAZA and the SSC launched the 'Building Bridges' initiative in 2014 to actively strengthen connections between experts in the zoo and aquarium community and SSC's Species Specialist Groups. This included the creation of a Strategic Partnership Director within the IUCN SSC Chair's Office team and the subsequent development of a partnership model to drive the establishment of Centres for Species Survival (CSSs).

CSSs are partnerships between the SSC Chair's Office and leading species conservation organisations, a growing number of whom are EAZA Members. These partnerships recruit and empower dedicated partner-based staff teams of at least one full-time staff member to work closely with relevant volunteer SSC Groups in catalysing priority efforts for assessment, planning and action for species conservation at various geographic scales or taxonomic or thematic focuses.

These Centres become catalysing hubs at the global scale for taxonomic groups or species conservation themes; they also work at the national scale as connecting hubs between SSC Groups, zoo and aquarium experts, national government and civil society stakeholders to achieve National Biodiversity Strategy and Action Plans and global targets. Many CSS staff receive training in IUCN Red Listing, conservation planning and other knowledge products to support their strategic recovery efforts.

Together, the CSS partnerships work to identify priority gaps and ensure that activities, resources and experts are effectively connected to maximise species conservation impact.

The CSS partnership network has expanded rapidly and now includes 21



Centres launched across 12 countries. Seven of the CSS organisational partners are EAZA Members. A further 15 Centres are currently in development, some of which will be launched imminently. Collectively the Centres represent a dedicated team of more than 40 full-time staff and represent approximately €3 million annually of in-kind skilled capacity for conservation.

CASE STUDY 1

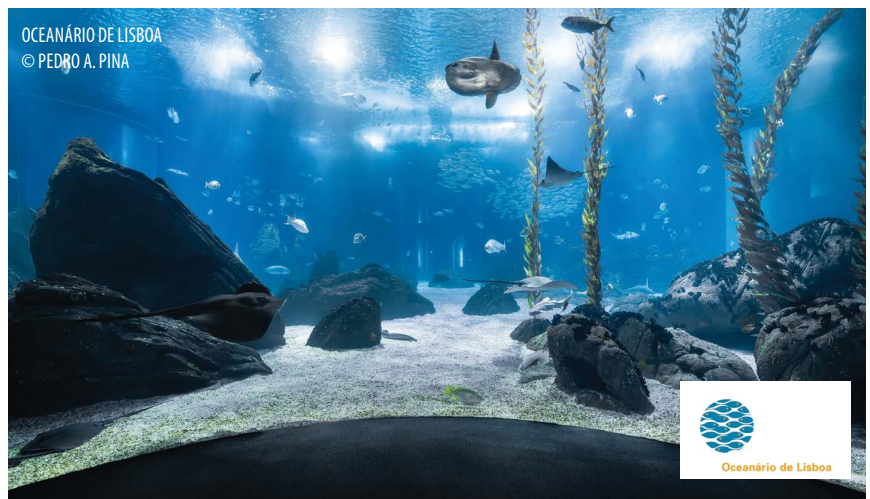
CSS MARINE AT OCEANÁRIO DE LISBOA

Núria Baylina, Curator and Head of Conservation, Oceanário de Lisboa

The partnership between Oceanário de Lisboa (Portugal) and the IUCN SSC was established in 2018 with the goal of increasing the representation of

marine species on the IUCN Red List of Threatened Species. This initiative supports the Global Marine Species Assessment and aims, as a secondary objective, to assess the species hosted at Oceanário de Lisboa that have not yet been assessed. The project seeks to better understand the conservation status of our species, informing collection management and guiding the allocation of funding to *in situ* conservation projects.

In 2021, with the expansion of the SSC's partnership network, we adopted the designation CSS Marine – Oceanário de Lisboa. By the end of that year, CSS Oceanário de Lisboa began conducting national assessments, including work on the Red Book of the Marine Fishes of Portugal. This book aims to assess the extinction risk of the 1,257 marine fish species inhabiting



Portuguese waters and to update the previous Red Book of Marine Fishes in Portugal, which dates back to 1993.

The CSS Oceanário de Lisboa team, consisting of six Species Survival Officers, is actively working on the project, with the Red Book slated for publication by the end of 2025. This effort contributes to Oceanário de Lisboa's mission, complementing the aquarium's ongoing conservation work and informing future conservation planning.

For EAZA, having its Members increasingly involved in direct conservation work – whether through assessment, planning or action – reinforces the association's collective contribution to global conservation initiatives.

CASE STUDY 2

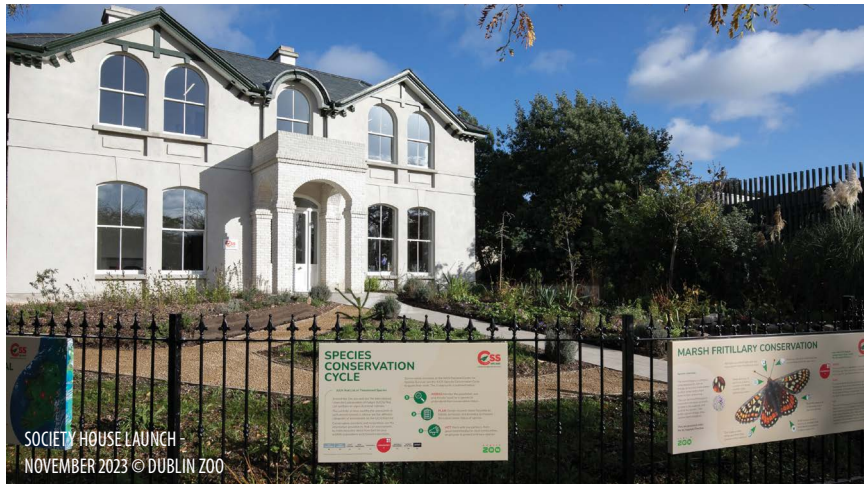
CSS IRELAND AT DUBLIN ZOO

Andrew Mooney, Senior Conservation and Science Officer, Dublin Zoo

With more than 31,000 recorded species, Ireland has a rich biodiversity that spans terrestrial, freshwater and marine environments. These species and environments provide critical ecosystem services and immeasurable economic, cultural and societal benefits. However, a significant proportion of Ireland's biodiversity is currently threatened with extinction and 91% of assessed habitats have an unfavourable conservation status.

Launched in 2023, Dublin Zoo is the proud host of the CSS Ireland. Based in the zoo's historic Society House, this centre is an official partnership with the IUCN SSC and is part of a growing global network of centres all working to catalyse conservation action for threatened species. The centre acts as a hub for Dublin Zoo's conservation and science work, and it's where our Conservation and Science team works on IUCN Red List assessments, conservation planning and conservation action for native Irish species.

The CSS Ireland helps to position Dublin Zoo as a leader in native species conservation efforts and we are already seeing a big impact. So far, the team has achieved some great successes, including working with the National Parks & Wildlife Service to incorporate the Centre and its work



into Ireland's 4th National Biodiversity Action Plan, which was published in 2024. The Centre is also key in helping to highlight the potential value of *ex situ* conservation in protecting Ireland's biodiversity. It is an integral part of the recently launched Breeding Waders European Innovation Partnership (EIP) Agri Programme, a €25 million project to help protect some of Ireland's most threatened species, such as the curlew (*Numenius arquata*) and dunlin (*Calidris alpina*).

Key to the success of the Centre has been the appointment of a dedicated Species Survival Officer, Louise Enderby, who works with colleagues from other CSSs around the world to learn from and share success stories. Although it is a new centre, and an emerging role for Dublin Zoo, the team and organisation are excited to be making a tangible impact on Ireland's biodiversity.

CASE STUDY 3

CSS FOR SMALL MAMMALS AT ALPENZOO INNSBRUCK

André Stadler, Zoo Director, Alpenzoo Innsbruck

'This goes out to the underdog' is not only a line from a song by Alicia Keys, but also a good headline for the CSS at Alpenzoo Innsbruck (Austria), which was established in 2024. Closely connected to the IUCN Small Mammals Specialist Group (SMSG), the EAZA Small Mammal TAG and local NGOs, the Centre aims to enable a better scientific understanding of the world's 3,200+ species of small mammals and to promote the conservation of the most threatened ones. This requires a lot of Red and Green listing work. From 1 February 2025, a conservation

officer will help to conduct this work and run the zoo's *in situ* programmes. Some years ago, Alpenzoo established a conservation programme for the Critically Endangered Bavarian pine vole (*Microtus bavaricus*), which now acts as an ambassador species for the whole centre, as the conservation work is being managed in the centre. As mentioned, little is still known about many of the small mammals species. They are underrepresented both in the conservation world and in zoos' species plans, meaning that the public doesn't know them well either. With the help of the Centre, Alpenzoo is proud to now act as a marketer for the small mammals and to bring these underdogs on to the main stage. Unlike Dublin's CSS, our Centre is not open to visitors, but we are planning many activities to bring its work to the public in the form of posters, social media posts, a podcast, Reverse the Red day and more. Stay tuned to learn more about the CSS for Small Mammals.



OPENING THE CSS FOR SMALL MAMMALS © ALPENZOO INNSBRUCK

Aquatic challenge

HOW THE FRESHWATER TELEOST TAG IS USING THE IUCN RED LIST 2024 UPDATE TO REVIEW AND INFORM ITS CONSERVATION PRIORITIES FOR FRESHWATER FISHES

Marketa Rejlková, Poeciliids EEP Coordinator, Ostrava Zoo, and Brian Zimmerman, EAZA Freshwater Teleost TAG Chair and Toothcarps EEP Coordinator, Bristol Zoological Society

In 2024, the IUCN Red List of Threatened Species was updated for several species of fish that we know very well from keeping them in our aquariums. Some of these are animals that we perceive as typical 'aquarium fish'; it can be easy to forget that these are species with natural histories, distributions and threats that change over time. As the zoo and aquarium community will know, the members of the Freshwater Teleost TAG are working hard to manage EEPs and address wider topics related to the conservation of these fish.

Using some examples of selected fish species whose status on the IUCN Red List was updated last year, we want to draw attention to some of the challenges we face as a community.

A SPARKLING DIAMOND

The diamond tetra (*Moenkhausia pittieri*) from Venezuela is now classified as Endangered (first assessment). It has disappeared from almost half of its original range. Deforestation and habitat modification continue to threaten the remaining populations, which are also severely fragmented. According to Species360, it is currently kept by 15 EAZA institutions with a population of approximately 600 individuals. No breeding has been reported in the last 12 months, unless institutions use databases other than ZIMS for their record-keeping. At the moment the assumption is that the diamond tetra is not bred in our institutions because the process is rather laborious.

Challenges and opportunities: The diamond tetra is a very attractive species when mature. It is suitable for display tanks, where we can also share the story of the destruction of freshwater habitats. It is a commercially bred ornamental fish species, which ensures a sufficiently



MOENKHAUSIA PITTIERI,
YOUNG FISH © SOK VIA
WIKIMEDIA COMMONS

large *ex situ* population. This is the case for many other threatened species. But we have no detailed overview of its global *ex situ* population, and the Freshwater Teleost TAG is discussing, among other things, ways to intensify global collaboration. When it comes to fish, as a community we are often dependent on external help, and indeed no EAZA institution is apparently breeding this species. And we face yet another challenge: there is no EEP Coordinator for this family (Characidae), even though it was selected for EEP management.

GOBIES

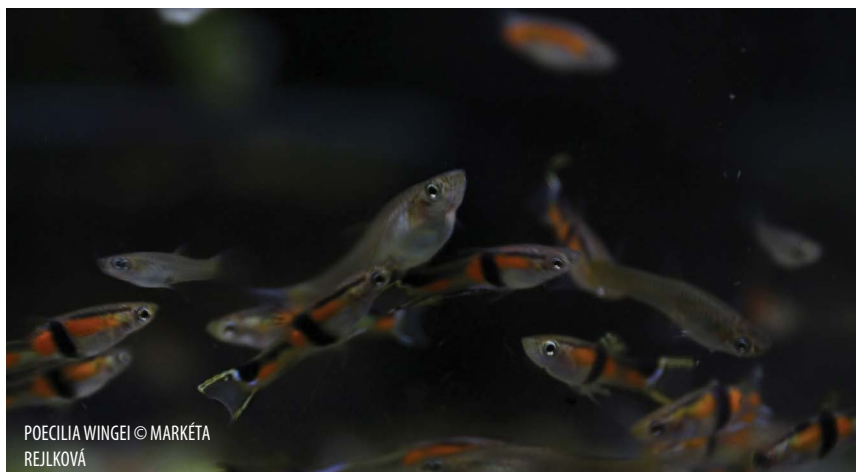
The goby (*Rhinogobius zhoui*) from the Chinese province of Guangdong was also assessed for the first time and is also Endangered. It lives in mountain streams and its population is apparently extremely small. This

is further reduced due to amateur and professional collectors; in fact, because of fish collectors, this species has disappeared from some locations and it is possible that it now occurs in only one. This species was described only in 2008 and shortly afterwards exported to Europe, the US and Asian markets. It has aroused great interest due to its attractive colouration. However, it is a sensitive fish, requiring clean, cooler water. Breeding is relatively demanding, and the species is not commercially propagated.

Gobies of the genus *Rhinogobius* have very interesting behaviour, but they are not suitable for community aquariums and only a few institutions could provide them with a suitable environment where they will thrive and develop their full colouration. According to ZIMS, the species is kept by only one institution, which is not



RHINOGOBIUS ZHOUI
© ANDREAS WAGNITZ



a member of EAZA but does actively cooperate with the Freshwater Teleost TAG. This demonstrates the value and necessity of wider collaborations inside and outside the EAZA community.

Challenges and opportunities: We generally lack breeding expertise for gobies. Among amateur aquarium enthusiasts, knowledge and skills are often great. Unfortunately, these smaller fish are on the fringes of interest of zoos and aquariums; there are not enough institutions that devote themselves to breeding freshwater fish (as opposed to mere exhibition). Yet gobies can be attractive for exhibition; they just require a higher level of care. This family is one of many families that has numerous threatened species and too few experienced and committed freshwater fish breeders in our community to ensure healthy *ex situ* populations.

ENDLER'S GUPPY

The current situation for Endler's guppy (*Poecilia wingei*) is an example of a particular challenge. According to ZIMS, it is kept by 29 institutions in Europe, numbering over 15,000 individuals without reported breeding in the last 12 months. With such an 'ordinary' fish, undemanding and viviparous, we don't even notice successful breeding. We keep them in schools of dozens or hundreds of individuals, often as a companion species in an enclosure dedicated to completely different animals. The Endler's guppy is a small, colourful fish that schools and can withstand a wide range of water-quality parameters. However, according to

the IUCN Red List, this endemic fish from Venezuela is Endangered. The causes include illegal collecting, hybridisation with the common guppy (*P. reticulata*), competition with an ever-increasing number of invasive species, pollution, habitat alteration and climate change. Hybridisation is occurring more frequently, not only in natural populations, but also among guppies kept in aquariums.

Challenges and opportunities: To what extent is it possible to identify and maintain genetically valuable lines? The integrity of any Endler's guppies obtained from unverified sources (which is probably the vast majority of those 15,000 kept individuals) are highly questionable. Even with well-known fish, we should be careful about the origin of our zoo populations and prefer the well-documented ones, because it is not uncommon for a species to find itself on the verge of extinction just a few years after its discovery.

Our *ex situ* populations can then play a key role in saving the species. In the case of this particular fish, it is an Endangered species suitable even for institutions that have only limited experience with fishkeeping. But please do not obtain any available *P. wingei* without checking their provenance. They could be hybrids that take up much-needed space from other more genetically pure animals.

IN OUR OWN BACKYARDS

Finally, we will mention representatives of the European fauna, such as species of the family Valenciidae, genus *Valencia*. This

small family contains only three species, all from Europe and all threatened. One species, the Peloponnese valencia (*Valencia robertae*), was described only in 2014 and has just been assessed by the IUCN as Critically Endangered. All species are given strict protection by national and EU laws, but this has not stopped their steady decline towards extinction in the wild. *Valencia robertae* is now living only in fragmented populations in coastal freshwater springs and marshes in mainland western Greece, and the threats are numerous and growing. The usual threats to freshwater ecosystems impact this species: pollution, pesticides, water over-abstraction, climate change and invasive alien species.

Challenges and opportunities: The Peloponnese valencia is present in human care but at a low number of institutions with only a handful of facilities focused on maintaining populations for insurance purposes. Fortunately, there is a strong partnership with the Hellenic Centre for Marine Research in Greece who are working with this species, and they are actively collaborating with EAZA zoos to learn more about the species and devise conservation strategies. Much new information is being gained from aquarium-held populations that are being actively studied. This new knowledge can benefit the species' survival in the wild. The main challenge to implementing conservation for these species is a lack of funding.

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Urgent action for wild camels

HOW EAZA MEMBERS ARE SUPPORTING THE WILD CAMEL PROTECTION FOUNDATION TO CREATE A MORE CERTAIN FUTURE FOR THIS HIGHLY ENDANGERED SPECIES

ALL IMAGES © ANNA JEMMETT

Anna Jemmett, Ecologist, and Kate Rae, Managing Trustee, both Wild Camel Protection Foundation

Despite some common confusion, the Critically Endangered wild camel (*Camelus ferus*) is a separate species to the domestic bactrian camel (*Camelus bactrianus*). In addition to a morphological similarity – both are two-humped – they overlap in range and can hybridise to produce viable offspring. However, both local knowledge and genetic research have proven that they are distinct species sharing a common ancestor approximately one million years ago. As this divergence event happened long before the domestication of the Bactrian camel, occurring only 6,000 years ago, the wild camel can be neither its progenitor nor a feral version of that species. While the bactrian is a common domestic species, the wild camel is the last remaining extant species of the Camelini tribe and its conservation is paramount.

CRITICAL SITUATION IN THE WILD

With fewer than 1,000 individuals left in the wild, *Camelus ferus* is now one of the most endangered large mammals. These camels survive

within a narrow range of specialised Gobi Desert habitats, in only four locations: in China in the Gashun Gobi, Lop Nur and the Taklamakan deserts, and in Mongolia in the Great Gobi Area of Special Protection A (GGASPA). These cold desert habitats are extreme, with very low rainfall and temperatures that range from -35°C in the winter to + 40°C in the summer. Many of the few natural springs are salt water, and vegetation is scarce, drought-adapted and at times driven by low precipitation. The wild camel shows both physiological and behavioural adaptations to surviving starvation and thirst, including migrating large distances to find food and water and an ability to withstand drinking salt water at levels that would kill most other mammals. This is a unique and evolutionarily distinct species, from which we can learn much about survival at extremes.

Unfortunately, there are many threats to its survival, combined with a low population and specialised habitat requirements. As climate change increases desertification in the Gobi, precious water points

dry up and vegetation dies, making these areas more inhospitable, and increasing competition between wild animals, domestic animals and humans for these shrinking or disappearing resources. Competition also increases opportunities for predation, disease risk and disturbance by humans and livestock. Competition for resources along with a loss of water points also increases the likelihood of both camel species coming into contact more frequently, risking an increase in hybridisation. Mining, both legal and illegal, increased by the search for natural resources, causes habitat loss and habitat disturbance thanks to the increased presence of vehicles and people in these remote desert areas, destroying water points. Finally, the building of roads, railways and fences presents a physical barrier to migration in addition to degrading the habitat.

WILD CAMEL PROTECTION FOUNDATION

The *in situ* wild camel population requires vast areas of pristine,



undisturbed desert habitat to survive and to migrate in search of limited resources. To protect the camel, we need to conserve these vast areas of the highly adapted Gobi Desert ecosystem, which also hosts many rare and endemic species. This functioning and healthy ecosystem also has one of the lowest levels of human influence in the world. This has led to a proposal to make it a UNESCO World Heritage Site.

Unfortunately, this globally important area is threatened by the creation of a new border crossing, associated road and infrastructure in 2025. The Wild Camel Protection Foundation (WCPF) is strongly opposed to the opening of the Naran Sevstei Border Port due to the serious risk it poses to the wild camel, the exceptional Gobi Desert habitat and all the unique species found there.

WCPF is the only charity in the world with the dedicated mission of saving the wild camel from extinction and its pristine desert from destruction. Established in 1996 as an environmental charitable foundation in the UK by Kate Rae and the late John Hare, the WCPF has a long history of work on wild camel conservation across the species range. They have worked in Xinjiang, China to establish the Arjin Shan Lop Nur Wild Camel National Nature Reserve and have gained in-country and trans-border protection for the species. WCPF has been active in Mongolia since the charity was established, and now has an in-country project manager, Adiya Yadamsuren, who is the Director of the Mongolian WCPF NGO.

In Mongolia, WCPF has been managing the only *ex situ* population of *Camelus ferus*, located at the

Zakhyn Us breeding centre since 2003 under an agreement with the Mongolian Ministry of Nature and Environment. With so many threats in the wild, it is essential that some animals are safeguarded in a healthy and sustainable *ex situ* population as an insurance against overall extinction. A second breeding centre was opened in 2024 at Toli Bulag to:

- *increase breeding capacity* – with two breeding herds we can increase the number of calves born every year
- *safeguard against disease* – if a disease outbreak occurred at one centre, individuals are protected at the other
- *improve population health* – the new centre is within natural habitat, further from people and livestock, decreasing the risk of disease, competition for resources and hybridisation
- *increase learning* – the new centre increases our ability to study the species

WORKING TOGETHER WITH ZOOS

Zoological institutions worldwide have been supporting the conservation work of WCPF since its beginning. Cotswold Wildlife Park (UK) led the way and is still a

strong supporter today. We also have cooperation agreements with Prague Zoo (Czechia) and Knowsley Safari Park (UK).

The veterinary and conservation team from Knowsley Safari Park provide expertise, research and training for the staff, as well as veterinary care at the two breeding centres. This includes novel veterinary work on sedation and transportation.

Prague Zoo is involved in scientific research both *in situ* and *ex situ*.

They also manage the Studbook for the population in human care. The zoo designed the second breeding centre at Toli Bulag and funded the steel construction materials required for the 65-hectare site. Copenhagen Zoo (Denmark), Dudley Zoo (UK) and Cincinnati Zoo (USA) also provided financial support for the cost of the building. Kolmården Wildlife Park (Sweden) funded some of the training programmes for the new staff. The Institute of Zoology ZSL (UK) supervised the first PhD on the wild camel, and its scientists are part of the WCPF conservation team.

WCPF warmly thanks all the zoological institutions worldwide that are helping to make our work to protect the wild camels possible. And a special thank you to the WCPF Life Patron, Jane Goodall DBE, for her encouragement and generous support from the beginning.

FURTHER RESOURCES

Read more about the species distinction:

- Jemmett, A.M., et al. (2023). *What's in a name? Common name misuse potentially confounds the conservation of the wild camel* *Camelus ferus*. *Oryx*, 57(2): 175–179





Inglorious bustards

FIFTEEN NEW EEPS FOR GRUIFORMES HAVE CLARIFIED THE CONSERVATION STRATEGY FOR THESE THREATENED SPECIES

Gary Ward, Gruiformes TAG Chair, ZSL London Zoo; Maximilian Birkendorf, Gruiformes TAG Vice Chair, Neuwied Zoo; Katie Malone, Animal Programmes and Conservation Coordinator, EAZA Executive Office

The Gruiformes TAG oversees cranes, bustards and rails, along with smaller families such as trumpeters and kagus. With such a wide remit – approximately 200 species – the preselection for a Regional Species Plan (RSP) was based on criteria including the threats facing a species, whether they can act as models for more threatened species, and whether they are present in EAZA institutions.

The RSP workshop was hosted by Neuwied Zoo (Germany) in June 2023 and the resulting document was published in November 2024. Out of the 43 species discussed, 15 EEPs were proposed, including four multi-species EEPs covering related species with similar roles and management needs. The Gruiformes TAG is fully committed to the EEPs and their roles chosen in this ambitious RSP and are eager to tackle these challenges.

Notably within this RSP, the TAG aimed to address some of the species that were previously given less attention but are also in need of management, particularly the bustards and rails. Some of the multi-species EEPs, such as the Asian

bustard and the combined Rail EEPs, represent important conservation initiatives for highly threatened species. Others, such as the trumpeters, were previously monitoring programmes (MON-T) and have now been designated as EEPs to make use of additional management and support.

Although the crane species have been well-represented in the EAZA community thus far, this does not exempt them from difficulties; successful breeding and the move towards more modern husbandry set-ups has created space challenges. The TAG is hoping that this report can help to generate interest for new holders to allow more breeding recommendations to take place and maintain the genetic and demographic health of the population.

The species in this TAG are united by a number of challenges that require special attention and collaboration to address, namely the risks posed by avian influenza, and updating enclosure design to reflect developments in husbandry such as over-netting. Additionally, many of the EEPs in this TAG include direct conservation roles,

most often as insurance populations. Some also aim to act as source populations for reintroductions; however, geopolitical factors introduce potential challenges and the feasibility of these projects is so far unclear. Those with insurance roles will require demographically and genetically healthy populations to remain stable in the long-term, so collaboration between EAZA holders will be paramount to successful breeding and population growth.

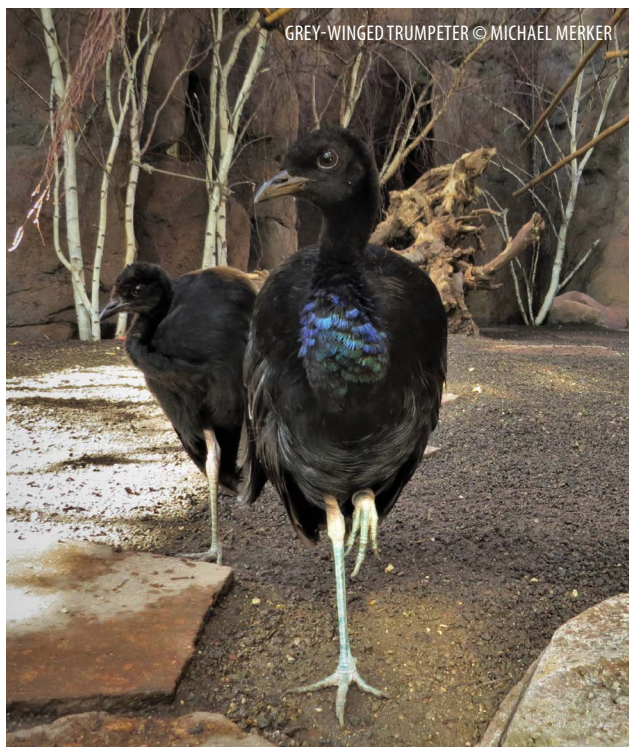
As in many RSPs, there are several species that are not threatened themselves but will act as models for their more threatened relatives which are not held by EAZA or in small numbers only. This includes the grey-winged trumpeter (*Psoplia crepitans*), a Least Concern species, which will act as a model and education opportunity for other trumpeters such as the black-winged and pale-winged trumpeters (*P. obscura* and *P. leucoptera*). In particular, trumpeters are challenging to breed successfully, so increased husbandry knowledge gained from grey-winged trumpeters can benefit the group as a whole, especially by capturing this knowledge in Best Practice Guidelines. These species are threatened by deforestation, which will be communicated using the grey-winged model.

In line with this issue of *Zooquaria's* theme of collaboration, many of the EEPs proposed by this RSP rely on holders working together to build up populations that are genetically and demographically healthy. They also rely on strong relationships with *in situ* conservation projects for threatened species. An example of these collaborations is the Sarus crane (*Grus antigone*), a large, strikingly beautiful crane which is decreasing dramatically in numbers, particularly the Southeast Asian *sharpii* subspecies. An action plan for 2020–2030 is in place that aims to research the causes of adult mortality and provide resources for conservation. The Sarus crane EEP can contribute by establishing a demographically healthy *ex situ* insurance population and by producing Best Practice Guidelines as a tool to improve breeding success in both *ex situ* and wild populations.

Effective conservation can be achieved close to home, as there are charismatic European species that will be protected by these EEPs; for example, the great bustard (*Otis tarda*). This once-familiar species is now commonly overlooked or forgotten, despite its impressive appearance and displays. Conservation activities *in situ* have been ongoing for decades, including changes to land management programmes, artificial incubation and reintroduction projects. This species is still threatened primarily by habitat degradation, human disturbance and hunting, and collision with power lines, so further *in situ* activities are necessary to mitigate some of these threats. *Ex situ* activities for this EEP include education to continue improving agricultural practices, and possible use for population restoration to support declining wild populations.

Some of the species within the remit of this TAG were discussed during the RSP and will be monitored by the TAG, usually due to very small EAZA populations that were not seen as sufficient to fulfil conservation roles.

Congratulations to everyone who contributed to the development of this RSP! If you would like to get involved or ask any questions about these projects and species, please contact the Gruiformes TAG Chair or Vice Chair.



Vacant EEP positions are marked in red

Common name	Programme decision
Kagu	EEP
Black-winged trumpeter	Combined trumpeters EEP
Olive-winged trumpeter	
Green-winged trumpeter	
Grey-winged trumpeter	
Sunbittern	EEP
Red-crowned crane	EEP
White-naped crane	EEP
Sarus crane	EEP
Siberian crane	EEP
Grey crowned-crane	EEP
Black crowned-crane	EEP
Stanley crane	Anthropoides EEP
Demoiselle crane	
Wattled crane	EEP
Black crane	Rail EEP
Purple and Grey-headed swamphen	
Red-knobbed coot	
Corncrake	
Giant wood rail	
Allen's gallinule	
Red-and-white crane	Combined Asian bustard EEP
Great bustard	
Lesser florican	
Great Indian bustard	Combined Asian bustard EEP
Bengal florican	
Little bustard	EEP

Amphibian rescue

THE COMBINED EFFORTS TO SAVE THE LEMUR LEAF FROG ARE A MODEL OF INTERNATIONAL COLLABORATION



Kristofer Försäter, Lemur leaf frog EEP Coordinator, Nordens Ark; José Andrés Salazar-Zúñiga, In-country Coordinator, Veragua Foundation; Gonçalo M. Rosa, EEP Research Adviser, CSIC-IMIB Biodiversity Research Institute

Once thriving in the humid lowland and montane forests of Costa Rica, the lemur leaf frog (*Agalychnis lemur*) is now Critically Endangered according to the IUCN Red List. Habitat loss, fragmentation and the devastating impacts of chytridiomycosis have led to catastrophic population declines and a dramatic contraction of its range (Zumbado-Ulate et al., 2021). Despite these challenges, international collaboration has been instrumental in weaving a safety net for this unique frog, offering hope for its recovery.

Traditional conservation methods such as habitat preservation have proven insufficient to halt the spread of chytrid fungus. Assurance colonies, therefore, play a pivotal role in safeguarding the species against extinction (Gagliardo et al., 2008). Populations in human care have been successfully established in Europe, Panama and the United States, with individuals being bred since 2001. These colonies represent a vital safeguard against the species' complete loss and serve as a platform for research and potential reintroductions.

The Lemur leaf frog EEP represents a cornerstone of *ex situ* conservation efforts since its first establishment as a European Studbook in 2016. This initiative oversees the only genetically informed (Petchey et al., 2014) and pedigree-managed population of lemur leaf frogs. The European population, founded on individuals from the Talamanca mountain range in Costa Rica, serves as a genetic reservoir and critical component of long-term conservation planning. Morphological and phylogenetic studies have revealed that Costa Rican and Panamanian populations may represent distinct Evolutionary Significant Units (ESUs), underscoring the importance of region-specific conservation efforts (Crook, 2007; Gray, 2011).

EAZA has recently elevated the Studbook to an EEP during its RCP for Dendrobatinae and other neotropical anurans (Garcia et al., 2022). Today, the EEP population consists of 122 individuals across five zoos. However, to fulfil its insurance role and maintain demographic stability, the population must in the next five years at least double in size. Additionally, the LTMP recommends dividing the population into quarantine and non-quarantine groups, ensuring that a subset remains viable for conservation strategies (Försäter et al., 2024).

A vital component of our conservation initiative is the seamless integration of *ex situ* and *in situ* efforts. Our research is actively evaluating the suitability of *ex situ* populations for release into the wild. This process involves evaluating genetic diversity, immune responses and parasite loads across rebounding wild populations, frogs in human care and historical specimens collected before population declines. These comparisons aim to ensure that translocated individuals are equipped to thrive in a landscape where

chytrid fungus cannot be eliminated. Meanwhile, and capitalising on the expanded protected landscape in recent years (such as the Lemur Frog Biological Corridor in Costa Rica), local partners are working on breeding habitat restoration to support natural recolonisation of carefully chosen sites. These efforts place local leadership and community engagement at the heart of the project, ensuring sustainable conservation outcomes that deliver equitable benefits across the region.

The lemur leaf frog conservation initiative exemplifies the power of international cooperation. From breeding in European zoos to habitat restoration in Central America, each stakeholder plays a critical role in the species' survival. Combining *ex situ* expertise with habitat restoration, innovative disease management and strategic population recovery, this project is a model of comprehensive amphibian conservation. Beyond safeguarding the lemur leaf frog, the initiative addresses broader challenges of biodiversity loss. By unravelling the complexities of amphibian declines and translating findings into actionable solutions, the project contributes meaningfully to global conservation efforts. With sustained collaboration and a unified vision, the lemur leaf frog's story inspires hope and progress for conservationists worldwide.

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Let's talk about toucans

HOW THE EAZA TAG IS WORKING TOWARDS A SUSTAINABLE FUTURE FOR TOUCANS

David Aparici Plaza, Coordinator Animal Programmes and Conservation, EAZA Executive Office; Koen Brouwer, EAZA Toucan & Turaco TAG Chair, Attica Zoo; Joost Lammer, EAZA Toucan & Turaco TAG Vice Chair, Avifauna Birdpark

The EAZA Toucan & Turaco (T&T) TAG covers a wide range of colourful, spectacular and diverse taxa, including not only the birds in the TAG's name, but also kingfishers, roadrunners, rollers, woodpeckers, trogons and hummingbirds. The TAG recently published an RSP and is aiming to have some 25 EEPs up and running by the end of 2025. In this article, however, we will focus on the toucans, and specifically the toco toucan (*Ramphastos toco*).

Toucans, with their vivid plumage, large bills and charismatic appeal, are undoubtedly among the most recognisable and popular avian species in zoos worldwide. Yet behind the scenes, successfully managing their populations within EAZA presents unique challenges.

The EAZA T&T TAG has championed the importance of balancing education, conservation and breeding in managing toucan populations. Central to this mission is the creation of sustainable *ex situ* populations that can serve as ambassadors for their wild counterparts while also contributing to global biodiversity conservation.

At present, the populations of the selected flagship toucan species, namely the channel-billed toucan (*Ramphastos vitellinus*), the red-billed toucan (*R. tucanus*) and the toco toucan are showing troubling and declining trends. Recent data indicate a decline in breeding success and number of birds across EAZA institutions. This reduction highlights the urgent need for a strategic shift towards improved husbandry and collaborative management practices.

POPULATION MATTERS

A sustainable *ex situ* population is the cornerstone of long-term conservation and educational initiatives. Zoos have for many years relied on imports of toucans from the wild, a trend that most EAZA institutions no longer agree with. Without consistent breeding, populations age and decline, undermining the genetic diversity



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needed to maintain these birds sustainably in the long term.

While toucans captivate visitors, their value extends beyond their visual appeal, and these birds deserve to be taken more seriously. Breeding success stories can also inspire public interest and generate support for *in situ* conservation efforts in the toucans' native habitats.

Many toucan holders across EAZA focus primarily on display, leaving breeding efforts under-prioritised. Non-breeding institutions often rely on acquisitions rather than nurturing their own populations, leading to unsustainable practices. Increased interest and cooperation between holders of toucans is urgently required, not only making birds available to each other, but also sharing husbandry expertise and addressing common challenges, including specific toucan vulnerabilities such as iron storage disease, aspergillosis, yersinia, beak breakage problems and worm infestations.

THE WAY FORWARD

To work towards securing a sustainable future for toucans in EAZA collections, a collaborative approach focused on shared expertise, cooperation and innovation is essential. Best Practice Guidelines for *Ramphastos* toucans are currently in preparation and, it is hoped, will contribute to improved toucan husbandry, nutrition, veterinary

care and pairing strategies, all of which can contribute to increased breeding success across institutions.

Equally important is recognising and supporting zoos with proven breeding success as cornerstone facilities. These institutions should serve as hubs of knowledge and breeding expertise. Additionally, establishing a Toucan Working Group under the TAG will further unify institutions and any relevant stakeholders, enabling better data sharing, training and capacity building. Finally, by celebrating breeding achievements and highlighting their links to conservation, EAZA institutions can captivate the public, creating a deeper appreciation of the ecological importance of toucans and their habitats.

The EAZA Toucan & Turaco TAG envisions a future where all EAZA Members recognise the dual role of toucans as exhibit icons and active participants in global conservation. Prioritising breeding and husbandry efforts through collaboration within the EAZA community can ensure that these extraordinary birds continue to inspire our visitors as ambassadors for biodiversity.

FURTHER READING

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Five years on: reflections on a pandemic

LOOKING BACK OVER THE EVENTS OF THE COVID-19 PANDEMIC REVEALS THE ADAPTATIONS, IMPACTS AND POSSIBLE LONG-TERM LEGACY FOR THE EAZA COMMUNITY

Tomasz Rusek, Director of Advocacy and Communication, and Catarina Santiago, EU Policy Coordinator focusing on animal health, EAZA Executive Office

The first half of March 2020 felt relatively normal in most of the EAZA region. Jardin des Plantes in Paris (France) hosted an accreditation screening, and a Bird TAG meeting began at Royal Burgers' Zoo (the Netherlands) with the usual optimistic energy. But on the second day of the meeting, TAG members woke up to the news of lockdowns in their countries – and started leaving in droves.

What followed was an avalanche of cancellations. At first, they were small-scale, such as the quarterly staff meeting in the EAZA Executive Office on 17 March, the first of many held online. Little did we know that Zoom and Teams were about to redefine the way we work and, importantly, allow the whole EAZA community to stay connected. When the inaugural EAZA Animal Welfare Forum at Apeneul Primate Park (the Netherlands) had to be cancelled at the last minute, the organisers wonderfully transformed its content into the Welfare Webinars – a series that quickly drew global interest.

The full scale of what was to come was still beyond our imagination. Who would have predicted that Paris would be the last accreditation screening for 18 months? We couldn't meet for the Conservation Forum or the Joint TAG Chairs meeting, nor for the Annual Conferences in 2020 and 2021. Their virtual versions couldn't replace face-to-face contacts, but they did allow many more colleagues to engage.

Everyone who was involved in the rescheduled EAZA events deserves massive thanks for their patience, flexibility and resilience! We also would like to commemorate all those in our community whose health, wellbeing or employment were affected by the pandemic.

LOCKDOWN CLOSURES

By mid-April 2020, 329 (96%) of the then 341 EAZA Member zoos and

SOME OF THE 1,000+ EAZA ANNUAL CONFERENCE ONLINE PARTICIPANTS



aquariums were closed. The first ones reopened in late April, while other lockdowns lasted for months. In Italy, one of the hardest-hit countries, zoos closed around 10 March, some reopened in mid-May and others remained closed until June. Many Members had to close again for several months in early 2021.

Safety measures were introduced across the membership. Keepers worked in separated subgroups to limit the risk of contagion. Visitor numbers were capped to ensure social distancing, face masks became mandatory in most EAZA countries and indoor exhibits and walk-through areas remained closed even after zoos reopened. Online ticketing soon became the norm.

Citizens helped their zoos by donating millions of euros. Government support was variable. Some countries, such as the UK and Germany, offered dedicated support funds for zoos. Others, such as Italy, launched general multi-billion relief plans for the economy but no specific aid for zoos. This meant that zoos, their national associations and EAZA had to lobby together for recognition of keepers as essential staff, for reopening, and then for financial support of the mission of progressive zoos and their importance as green

(and blue) spaces where citizens could safely relax from the stresses of the pandemic.

COVID-19 AND CONSERVATION

In the unprecedented biodiversity crisis, the role of EAZA Members is more important than ever. Thus, the joint lobbying also reminded governments that what was at stake wasn't only the survival of zoos and aquariums and the animals in their care, but also their ability to continue contributing to conservation (*in situ* and *ex situ*), education and research.

Tomasz Rusek asked Conservation Committee Chair and Vice Chair, Eric Bairrão Ruivo and Simon Bruslund, how COVID-19 affected EAZA Members' conservation work.

EBR: *I'm proud of our community for staying committed to conservation, even though almost all EAZA zoos and aquariums had to close for a long time. We kept our responsibility for protecting the jobs of the field personnel and the local communities that depended on our projects. Our conservation spending temporarily decreased but it didn't stop.*

Speaking from my own experience, at Beauval Nature (France), COVID-19 forced us to delay what is now our main programme in Congo Brazzaville, where we invest more than €600,000 a

year. But we were able to support our existing project partners in their most difficult years of 2020-22. And it was during the pandemic that Members adopted the new vision statement for EAZA: 'Progressive Zoos and Aquariums Saving Species Together with You', which puts conservation at the heart of our association. This is no coincidence!

In EAZA, we also worked on the Field Conservation Standards during COVID-19. They sparked many questions, but we were able to hold many rounds of online consultations with colleagues across EAZA. So, paradoxically, although face-to-face meetings weren't possible, these standards became one of our most democratically discussed documents.

SB: Personally, in 2019 I had just come out of the Silent Forest campaign,

focusing on songbird trade. The funds allowed us to start projects in Indonesia. Connecting with new partners was a challenge, but we managed to keep in touch with most of them despite the pandemic. In general, conservation partners are now better able to connect remotely. This leads to better understanding, but also saves money and limits the negative aspects of travel.

TR: Has the pandemic changed the focus of Members' conservation work?

SB: It made people generally more interested in the nature that surrounds them. In zoos, many colleagues realised that we could do more for our local species. At Copenhagen Zoo (Denmark), we went from one to six people working on local species

conservation, in the wake of the pandemic. This is good news for conservation in Europe as well as for our work worldwide: we will be more credible in our efforts overseas when we take care of our own backyard. This is one of the positive effects of what was otherwise a tragic global crisis.

EBR: As the Conservation Database shows, more Members are indeed investing in the conservation of local wildlife. They are hiring full-time staff to focus on local species and are joining the EAZA European Species Interest Group initiated by Zagreb Zoo (Croatia). This opens many new opportunities for the conservation of local species in the EU and in the EAZA region in general.

WHEN ZOO CLASSROOMS WENT ONLINE

As COVID-19 began to impact Members, educators were hit particularly hard, having to drastically rethink their approach to reach an audience that was unable to visit. With the urgent need to adapt, they were compelled to innovate, sparking a new way of teaching and engaging with the public.

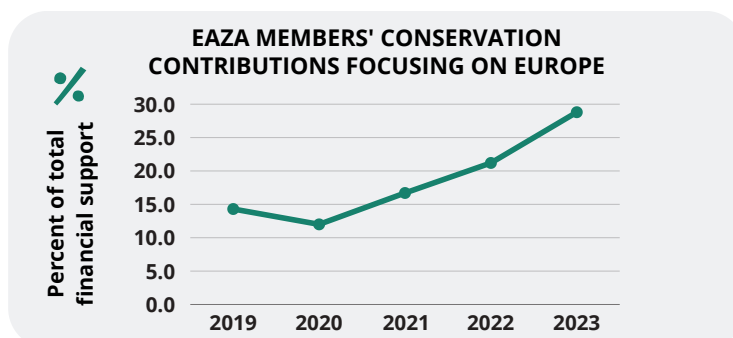
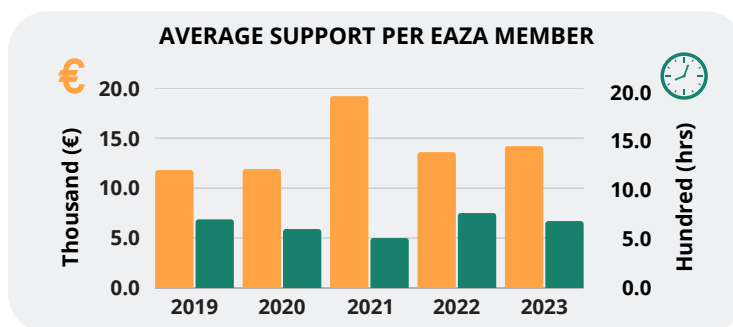
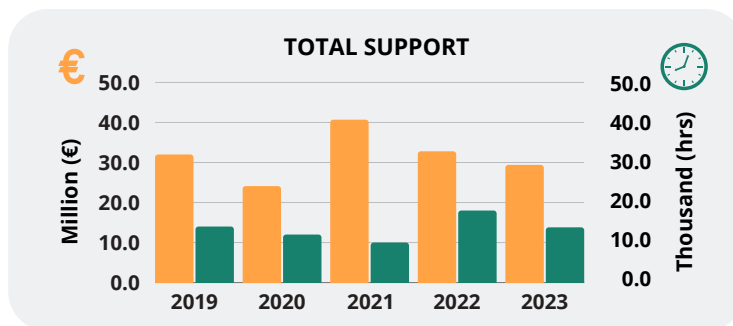
Antonieta Costa, Chair of the EAZA Conservation Education Committee, highlighted the sense of community that grew among zoos. Those already familiar with digital tools stepped up to support others, making the transition smoother for everyone. The Committee also helped EAZA Members by creating guidance on COVID-safer education, sharing online educational resources produced by Members, and showcasing examples of good practices.

By 2022, in-person contacts were warmly welcomed back, but hybrid and online meetings had become part of the 'new normal' for most. Today, digital education is an essential part of how we spread our message. 'The pandemic proved that technology can be a great ally in education, particularly in terms of inclusion,' said Antonietta.

These new tools allowed zoos to reach audiences beyond their geographical areas, as well as individuals with mobility challenges or other barriers. But it wasn't just



CONTRIBUTIONS TO CONSERVATION 2019 - 2023



i Based on information available in the EAZA Conservation Database on 15 May 2024



the public who benefited. Digital platforms also made professional development more accessible. Zoos of all sizes, big or small, could now participate in conferences, workshops and collaborations that would have previously been out of reach due to logistical or financial constraints.

Online engagement won't replace the in-person experience – human connection remains a core part of zoo education – but Antonietta believes that digital tools are here to stay: 'What I see as the future is a combination of the best of both worlds: digital and in-person.' The pandemic pushed us to accelerate our adoption of digital solutions and revealed opportunities to expand our reach and engage broader audiences. 'Inclusion is key,' says Antonietta, 'and the more we can engage people, the more we will fulfil our mission.'

CROSSING THE SPECIES BARRIER

The 2020s were already guaranteed to be a difficult decade for the management of EEP populations. The UK was leaving the EU, just as the EU itself introduced the new Animal Health Law, impacting animal transfer rules. Diseases like avian influenza were affecting bird (and other) populations. By halting travel and straining budgets, the pandemic now posed another barrier for the movement of zoo animals.

Not surprisingly, the public debate focused on human health. Where animals were mentioned, it was usually out of fear of SARS-CoV-2 spilling over

to people, e.g. from mink farms. Zoo animals, however, weren't a risk for the public: instead, the animals themselves were at risk of human-animal transmission. EAZA and the European Association of Zoo and Wildlife Veterinarians (EAZWV) soon began publishing fact sheets and guidance for Members. Several animals in the membership got infected despite all protective measures: lions, gorillas and even hippos.

The pandemic made people realise how deeply interconnected the health of people, animals and the environment actually were. Before long, the 'One Health' principle became a hot topic in global discussions as a means to reduce the risk of future pandemics through a more unified approach.

ONE HEALTH, ONE PLAN, ONE PLANET

EAZA, in partnership with EAZWV, has a lot to contribute to **One Health**, through our research into diseases, comprehensive veterinary care and proactive wildlife health initiatives. All of this helps in the search for solutions to zoonotic diseases that can spread between animals and humans. It's as essential for the animal populations in our care and in the wild as it is for human communities.

However, preventing and tackling zoonotic diseases alone won't be enough for achieving a 'healthier planet' without a broader perspective on conservation. This is where EAZA brings in years of experience with

integrated conservation planning and action under the **One Plan Approach**. It ensures that conservation efforts are not isolated initiatives, but are part of a cohesive plan that benefits multiple species and habitats, bringing all relevant actors on board.

Finally, at the heart of EAZA's mission is also the promotion of environmental sustainability. Our commitment to conservation – maintained despite the pandemic – and the practice of sustainable operations contributes to the essence of the **One Planet** principle. We have a shared responsibility to preserve the planet, not just for the present, but also for future generations. Our Members will continue bringing millions of citizens along on this journey, and in our advocacy, we will keep calling for these important concepts – One Health, One Plan and One Planet – to be taken seriously and to be addressed together, not as silos.

Looking back at the past five years, it is hard not to be amazed by our community's adaptability, resilience and solidarity, not only during COVID-19, but also in the face of the inflation and energy crisis or the cruel reality of Russia's war in Ukraine. May the lessons from these crises translate into an even stronger role for EAZA and Members at the nexus of conservation, health and sustainability. We really are uniquely placed to champion an integrated perspective, which is essential for nurturing a healthier, more resilient and more biodiverse world.



Inside the forest

HOW NUREMBERG ZOO CREATED A DRAMATIC NEW WAY TO DISCOVER AND APPRECIATE THE ECOSYSTEM OF THE FOREST

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Anna Böhm, Head of Communications, Nuremberg Zoo

Take a walk at treetop level, listen to the rustling of the beech leaves in the wind or challenge your courage at the play areas 20 metres above the ground... these are some of the things guests can now experience on the recently inaugurated Climate Forest Trail (Klimawaldpfad) at Nuremberg Zoo (Germany). The trail leads visitors 450 metres through the woods from the roots to the treetops, offering a new perspective on the different levels of the forest's ecosystem. In addition to being a zoo, Nuremberg Zoo is the municipal forestry department and therefore responsible for managing the city's forests and their adaptation to climate change. Situated in parts within the urban forest, the zoo is characterised by a unique landscape, with sandstone rocks, hills and 100-year-old trees.

Since the Climate Forest Trail's opening in July 2024, it has offered visitors a more in-depth perspective on the present and future impact of climate change on flora and fauna. The trail was made possible by the Future Foundation of the Sparkasse Nuremberg (Zukunftsstiftung der Sparkasse Nürnberg), which

contributed €4.1 million to the construction. The zoo's education team has developed specific content that is available along the trail as well as educational programmes for schools, kindergartens, private parties and other institutions, which are very well received by the public.

On the trail, the public can learn about the massive challenges due to climate change that we are already facing and about the necessity to prepare our forests for increased droughts and heat. Respective adaptive measures include, for example, planting trees that are not native but are more tolerant to these events – the so-called assisted migration of trees. For schools and guided tours, a classroom for about 30 people is integrated 20 metres above the ground with a perfect view into an old native forest with nesting places for black woodpeckers (*Dryocopus martius*) and stock doves (*Columba oenas*). To make the change of forest immediately apparent, the gardening team has planted strikingly exotic tree ferns at the entrance to the trail, providing visitors with a visual cue of the forest landscape's transformation under the

influence of climate change.

Regarding the fauna, European forest reindeers (*Rangifer tarandus fennicus*) act as symbolic ambassadors for animals being affected by climate change – for example, like their relatives in the tundra (*R. tarandus tarandus*) who are struggling with the shortage of frost periods, which slow down the animals on their migration routes or complicate their search for food. In addition, visitors have a perfect view of the polar bears (*Ursus maritimus*) from the trail – the most well-known symbols of climate change. Soon, visitors will be able to see native species of amphibians and reptiles next to the trail, with a focus on those that are endangered or threatened with extinction.

Despite all the troubling information provided throughout the trail, its overall message is optimistic, as the visitor experiences the benefits of a working forest ecosystem and the wellbeing it creates. In addition, visitors are empowered with the knowledge and tools needed for each of us to contribute to preserving biodiversity and fighting climate change.

Swimming lessons

INNOVATIVE RESEARCH AT BRISTOL ZOOLOGICAL SOCIETY HAS REVEALED THE POTENTIAL FOR MEANINGFUL IMPROVEMENTS IN FISH WELFARE

Alice Dancer, Animal Behaviour and Welfare Project Manager, Bristol Zoological Society

Striving for the highest possible standards of animal welfare and enabling our animals to thrive in their *ex situ* habitats is a key foundation of modern zoos. However, the focus on understanding the welfare needs of our animals has been skewed towards mammals. This taxonomic bias has been reflected in the published zoo welfare literature; only two papers on fish welfare have been published within an eight-year period (2008–2017), compared to 232 on mammals. This article will explain why we need to change this and why fish need robust welfare assessment like that of other taxonomic groups, and will discuss the welfare research being undertaken at Bristol Zoological Society (BZS) on the freshwater fishes.

WHAT IS ANIMAL WELFARE?

Most simply, animal welfare refers to an animal's wellbeing, as perceived by the animal itself. Thus it refers to how an animal feels, which is informed by the animal's biological and psychological state and their ability to live naturally – that is, to express their full behavioural repertoire and have autonomy within their environment.

So why is it important to consider fish welfare? Because it is extremely likely that fish are sentient and able to experience emotions. They have the neural capability to experience emotion, evidenced by having similar neural organisation to other vertebrates, and have similar neurotransmitters to mammals (such as dopamine) which perform similar functions. Additionally, fish express behaviours indicative of experiencing pain and emotion, such as zebra fish choosing to receive analgesics when exposed to pain. Many fish show complex cognitive abilities, such as complex nest construction, tool use and long-term memory storage, and have also been found to have strong preferences, such as between resource types. Finally, fish have passed the self-awareness test, with cleaner fish



MALE BREEDING PUPFISH © MICHAEL EDWARDS

able to recognise themselves in a mirror, removing a spot from their throats after seeing it in their reflection. Such tests have been used to confirm self-awareness in other species such as great apes, dolphins and humans.

If fish are sentient and can feel, how can we ensure that we are using practices and providing habitats that enables them to thrive and experience positive welfare? If we consider Mellor's five domains model of animal welfare – nutrition, environment, health, behaviour and the mental domain – we can assess input welfare indicators (what we are providing for the animal), output indicators (how the animal responds) and whether these align with the species ideal based on these five domains.

WHAT IS THE SPECIES IDEAL?

At Bristol Zoological Society (BZS), we consider the ideal nutrition and environment to be that in which the species evolved, their native diet and their native habitat. Similarly, we consider the ideal behaviour to be the full behavioural repertoire and activity budget that you would find in that species in the wild and an absence of abnormal behaviour, and for health, the ideal is for the animal to be free from any illness, injury or abnormality.

While fish aquarists likely take pride in their close attention to vital water

chemistry parameters, it may be that less attention is given to other aspects of the environment, particularly how we can replicate their native habitat. For example, have we considered the variation created by different weather events? Or considered water temperatures in the native range? Are temperatures static or is there day to night or seasonal variation? Such variation might play important roles in physiological or behavioural cues. This is an area where we suggest we have scope to make great advancements in optimising our animals' wellbeing. At BZS we have been focusing on lighting. There are many aspects of light that we need to consider, such as the brightness, UV, colour spectrum, length of dawn and dusk and the critical flicker frequency (CFF, the frequency at which a flickering light appears constant) of artificial lighting. Our lighting research has focused on the Critically Endangered Zacapu allotoca (*Allotoca zacapuensis*). Part of BZS's population of this species is housed inside exclusively under artificial lighting, and it had been raised as an area for welfare improvement in our animal welfare assessment to investigate whether the on/off lighting regime and absence of UV light was impacting behaviour.

EXPERIMENT 1

First, in a cross-over experimental



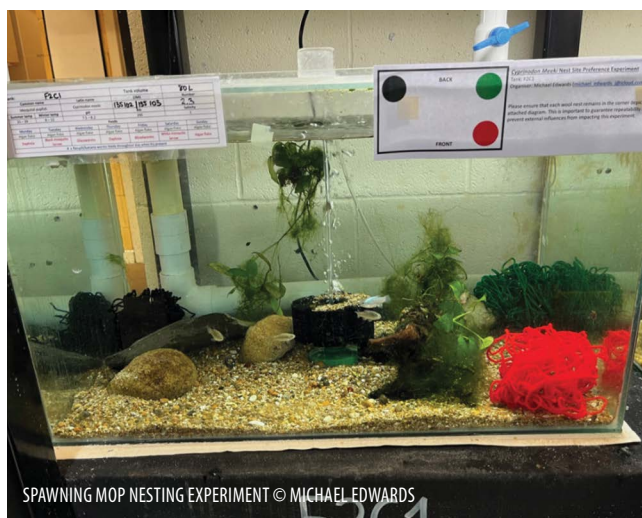
BRIGHT PHASE LIGHT



DUSK PHASE LIGHT



DARK PHASE LIGHT ALL © CHARLOTTE HAWLEY



SPAWNING MOP NESTING EXPERIMENT © MICHAEL EDWARDS

design carried out by student Charlotte Hawley, four tanks of 10 individuals were observed under two treatments, on/off LED lighting and phased LED lighting (where the lights slowly turn on to maximum brightness over a 35-minute period, replicating dawn, and slowly turn down until off over a 35-minute period, replicating dusk). Lighting treatment significantly affected behaviour, resulting in higher frequencies of aggressive behaviour, glass surfing and tank slamming behaviour in the on/off lighting treatment, and higher frequencies of sheltering behaviour with the phased lighting. The reduction in aggressive and abnormal behaviours in the phased lighting suggested this treatment was beneficial to welfare and potentially less stressful than the on/off lighting. However, the increase in sheltering behaviour may indicate that the phased lighting could still be sub-optimal. We identified that the LED lighting may have a flicker rate (~100Hz when above water level) below the species' CFF, and so have visible flicker.

EXPERIMENT 2

We compared four lighting treatments: on/off lighting T5 unit (flicker rate ~9,000Hz above water level) with and without an additional UV bulb, and phased LED lighting with and without an additional UV bulb. This was a cross-over experimental design, done by student Mary O'Malley, of the same four tanks of 10 individuals. The additional UV light had no impact on behaviour, indicating this is a safe addition if found to have other benefits. The phased LED lighting led to an increase in foraging behaviour compared to the T5 lighting, while there was more stationary swimming and sheltering with the T5 lighting. This suggests that the phased LED lighting has higher welfare benefits compared to on/off lighting, either T5 or LED, with lower aggressive or abnormal behaviours and increased substrate foraging.

EXPERIMENT 3

We have also explored nest preferences in Mezquitil pupfish (*Cyprinodon meeki*). This species lays eggs on to aquatic

vegetation or substrates such as gravel beds. We identified that we were unsure whether the pupfish had preferences for different spawning materials in human care, so student Michael Edwards explored whether the pupfish preferred to use red, green or black yarn spawn mops, an algal mat or a sponge filter on which to lay their eggs. We found a clear preference for egg-laying on green yarn spawn mops, which were used significantly more than any other nest type provided. Providing the pupfish with their preferred nest type will not only elevate their welfare by meeting their needs, but also contribute to conservation breeding by promoting egg-laying behaviour.

Fish welfare has been so little researched that there is huge potential to make a meaningful difference to the lives of our zoo- and aquarium-housed fish, even through simple experiments like those discussed here. At BZS, we are looking forward to future advancements in our fish welfare research and husbandry, and I hope this article inspires you to do the same.

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