



## **INSIDE:** Nepal's tigers increase European species bouncing back Critical moment for marine science

Freshwater-reliant species, from fish to amphibians, reptiles and birds, are under extreme pressure from human-driven threats

## **FRESHWATER SPECIES SOME OF HARDEST HIT, REVEALS NEW LIVING PLANET REPORT**

### **Living Planet Index shows 69% average decline in world's monitored wildlife populations**

**T**HIS month, WWF and ZSL published the latest *Living Planet Report*, revealing an average 69% decline in relative population abundance since the baseline set in 1970.

The Report highlights hard-hit species groups, regions and habitats. It identifies freshwater species, particularly fish, as under extreme pressure. The region of Latin America and the Caribbean, which has seen a 94% decline in average population size since 1970, is the geographical area most impacted in the last fifty years.

"Human-driven land-use change remains the key driver of population decline, followed by overexploitation, and we see this impact evident in the trends in freshwater species," says Louise McRae, Research Associate at ZSL and project manager of the Living Planet Index (LPI). "Freshwater ecosystems, especially rivers, have lost much of their natural connectivity due to the construction of dams and barrages. This impacts species such as migratory fish and freshwater cetaceans which rely on connected habitats throughout their life cycle."

Europe and Central Asia are presenting a shallower decline – 18% since 1970 – but Louise suggests that this is partly down to the exploitation of nature, particularly in Europe, prior to the baseline. "Where we see a potential sign of recovery is in North America," says Louise, citing a 20% decline since the baseline but a recent uptick since 2014. "North America's reptiles, amphibians and freshwater fish are doing

better on average recently, and bird populations are steady – but we need to see a more sustained trend before drawing any firm conclusions."

Louise and a team of scientists at ZSL produce the Index, which forms the backbone of the Report, by inputting species monitoring data from around the world into what is now the world's largest and most comprehensive dataset of wildlife population trends. "All of the data is interrogated for bias and we use an approach that tries to account for under-representation in some groups," explains Louise. For example, data for reptiles and amphibians is harder to acquire, so the team apply weighting techniques that ensure the Index isn't dominated by birds and mammals. They also apply a series of sensitivity tests to ensure the results are robust and not driven by extreme trends.

Since the publication of the last Report in 2020, the database has grown considerably, with the inclusion of an additional 838 species and 11,011 populations. The team have also worked to increase representation of non-English language research. "For this year's report, collaborators from WWF-Brazil and the University of São Paulo have searched through journals and environmental impact reports in Portuguese to find data. In the future, we plan to expand our collaboration network to add monitoring data in many other languages to the database," says Valentina Marconi, Postgraduate Research Assistant and lead on this aspect of the project.

Climate change is increasingly becoming a factor in species decline, and is predicted to become the key driver of species loss in a few years. Species living at the poles, who are reliant on sea ice for habitat and prey – such as penguins, seals and polar bears – are already feeling the effects. "Closer to home are species like the capercaillie, who are thought to be vulnerable to climate change in the UK," says Louise. With climate change, places that are dry tend to become even drier, and areas with high rainfall – such as Scottish forests – get wetter. For the capercaillie, wetter summers mean a higher number of chicks dying.

On the face of it, there may seem few opportunities for optimism, but Louise cautions against a completely negative view. "While some populations have shrunk dramatically, and there's no denying that populations are declining on average, around half of animal populations are stable or increasing." Examples include the European bison, where concerted conservation attention has seen a growth of a handful of individuals to over 2,500 – as shown by the recently published *Wildlife Comeback Report* (see page 7).

**The Living Planet Index, the backbone of the Living Planet Report, is an internationally recognised indicator used to measure progress towards the Convention on Biological Diversity targets. ZSL will be advocating for its adoption in the new framework set out by the Convention on Biological Diversity at COP15 in December. TZ**





Andrew Terry, Director of Conservation and Policy, ZSL

## DEAR FELLOWS

**T**HIS autumn, we mourn the loss of a lifelong supporter of conservation in ZSL's Royal Patron, Queen Elizabeth II. The Queen's 70-year patronage was a privilege, as was the opportunity to share our work with her, a famous animal lover, on her many visits – and I know that Queen Elizabeth II's passing has been felt deeply by many ZSL staff and colleagues.

During her lifetime, the fight for the natural world has intensified. Global climate change continues to create extreme weather events with increasing frequency and severity, and it is imperative that policymakers understand the important role that the protection and restoration of diverse ecosystems can play in mitigating the impacts of climate change.

This autumn we will engage with the busy period of major global conventions: the 27th Convention

of Parties (COP) of the UN Framework Convention on Climate Change, the 19th COP for the Convention on International Trade in Endangered Species (CITES) and the 15th COP of the Convention on Biological Diversity (CBD). Our call to action is clear: nature must be placed at the heart of decision-making if we are to successfully address the major existential crises we face.

At the CBD, we are asking the global community to set specific and measurable targets, backed by credible indicators. We have worked hard to ensure that key tools used to track changes in biodiversity, including the Living Planet Index and the Red List Index, are maintained as headline indicators. We want to see an approach that involves all levels of governance, with government departments held accountable for what they deliver, and financing that reaches those who are going to bring these commitments to life. We support increasing the coverage of protected areas and we want to see major investments in nature-based solutions to climate change that are fully integrated with biodiversity recovery and support local communities.

In this issue of *The Zoologist* you will see the outputs of our global biodiversity monitoring tool, the Living Planet Index, that underpins the *Living Planet Report*. This highlights the continuing decline of natural systems, and in particular freshwater. These systems are vital to human life and we cannot survive without access to water, and yet freshwater habitats are some of the least funded and most overlooked by global donors.

However, we can't lose hope, and you will also see optimism in this issue. We are incredibly proud of the latest tiger counts in Nepal, which show that the country has exceeded its target to double tiger numbers. We also highlight the wonderful expansion of wildlife in mainland Europe, shown in the latest *Wildlife Comeback Report*. While the

## DIARY DATES

**8 November** 6pm

**Science and Conservation Event**  
Through the eye of the tiger: A future-focused vision for the next 12 years  
*Online*

**22-23 November** 2-day event

**Symposium**  
Ecological connectivity across temperate coastal habitats: Moving towards seascape scale restoration  
*In-person*

**24 November** 7pm

**Annual General Meeting**

**10 January** 6pm

**Science and Conservation Event**  
Saving coral reefs one species at a time  
*In-person*

In-person events take place at London Zoo's Huxley Lecture Theatre. Online talks are streamed via [zsl.org/lozYouTube](https://zsl.org/lozYouTube). For more info, visit [zsl.org/science/whats-on](https://zsl.org/science/whats-on).

UK's natural spaces remain heavily degraded, across the continent species are returning in numbers. This provides many opportunities for the recovery of ecosystems and the development of local economies. It is models and results such as these that, collectively, we will bring to global negotiations to constantly demonstrate that positive change is not only possible, but absolutely vital. **TZ**

# SNIFFING OUT SMUGGLED PANGOLINS

**Detector dogs being deployed in the fight against global wildlife crime**

**T**HE latest highly trained operatives in the fight against illegal wildlife trade (IWT) walk on four legs, not two. This autumn, ZSL is sending two detector dogs – Bess the Labrador and Arthur the cocker spaniel – to Thailand in order to help sniff out pangolins that are being trafficked for their meat and body parts.

"Intelligence was telling us that live pangolins are being trafficked across Thailand by road," says ZSL's Law Enforcement Specialist, Grant Miller MBE. "Some vehicles even have purpose-built concealed areas to transport pangolins. The question was, how do we tackle this?"

Thanks to funding from the Critical Ecosystem Partnership Fund, ZSL is working with Thailand's Department of National Parks, Wildlife and Plant Conservation to increase enforcement action on the country's road network. The department already has a dog unit, but when ZSL visited this facility with a dog handler from Avon and Somerset Police, they found that its current canines tend to come from pet stock rather than a line of working sniffer dogs. Having had little opportunity to practise their detection skills during the disruption of Covid-19, many animals were ready to be retired from active service.

It's an ideal time, then, to train up some new dogs. "Before joining ZSL, I worked at UK Border Force, and I know how effective these dogs can be in helping to deter and detect smuggling," says Grant. "They're as highly trained as Olympic athletes."

With additional funding from Dubai port operator DP World, these first two ZSL dogs have been trained in the UK by the Metropolitan Police's dog unit. "They're initially taught to seek out a dog toy by scent," explains Grant. "They'll be completing their training in Thailand this autumn, where the scent will be mixed with pangolin scales until they come to associate the two, and then learn to sniff out pangolin alone. Once they're trained, it's easy to retrain these dogs to detect different types of wildlife."

The dogs are taught to keep their distance from any suspicious scents and simply alert their handlers, to avoid further stressing any trafficked live animals. Once fully trained and acclimatised to their new home, the dogs will be deployed in the field by Thai handlers. As Grant notes, it's rather satisfying to be employing animal intelligence and skills against the very criminals who are decimating endangered animals in the



Detector dogs from the UK will help to detect trafficked pangolins in Thailand

wild – and the potential to scale up the project is huge. "We're now seeking further funding to train more dogs, so that we can deploy them in maritime ports, airports, road networks, potentially national parks. This is just the beginning." **TZ**



# TIGERS ON THE RISE

Nepal's big cats continue to bounce back



Nepal's tiger population has almost tripled since 2009

**B**ACK in 2010, heads of state at the Global Tiger Summit signed a pledge to double tiger numbers by 2022. The latest wildlife survey by Nepal's Department of National Parks and Wildlife Conservation (DNPWC) revealed that the country has more than achieved this.

"Nepal is the first country in the world to not just double its tiger numbers, but increase them nearly threefold – from 121 adults in the 2009 census, to 355 in 2022, with encouraging numbers of mothers and cubs," says Bhagawan Raj Dahal, Deputy Country Director of ZSL Nepal, who

was part of the technical committee supporting the survey.

The recovery of Bengal tigers (*Panthera tigris tigris*) is a testament to the conservation partnership between the Government of Nepal, the DNPWC and the ZSL Nepal team, who have long been working together to restore degraded habitat and engage local communities with tiger conservation. "Our activities are focused on five tiger-bearing protected areas," says Bhagawan. "Parsa National Park, for example, is the flagship site for ZSL Nepal, and when the Government

gave us permission to work there, there were only seven tigers present. Now, we have 41."

This resurgence brings its own challenges. "With an increased number of tigers, there's the increased threat of human-wildlife conflicts with communities living on the fringes of national parks," explains Bhagawan. "Our research into the ecological carrying capacity of Chitwan and Parsa National Parks found that those areas could support even more tigers than they do currently, suggesting that there is still space for more tigers in Nepal. The issue is, how to manage tigers living in protected areas, and make sure those areas are connected by wildlife corridors, so that growing tiger populations can disperse safely into different areas."

ZSL is continuing to work with the DNPWC to restore these corridors, as well as – crucially – supporting communities dealing with human-wildlife conflict. The team is providing fencing and predator-proof corrals to protect livestock from tiger attacks, educating people about tiger behaviour, and providing communities with early-warning systems to alert them to tigers entering the area.

As Bhagawan points out, it's relatively rare for tigers to stray into villages or attack people. "Most encounters with tigers occur inside national parks, where people may be going to collect resources. We're working with communities to reduce their dependency on forest resources and provide them with alternative income-generation activities to improve their livelihoods. We're also working to improve habitat quality, so that tigers don't have to stray out of forest areas to find sustenance. We need to support not just tigers, but the communities living near them, for both to thrive." **TZ**

# UNCOVERING VIETNAM'S CROCODILE LIZARDS

Environmental DNA reveals presence of elusive lizard at two new locations

**T**HE crocodile lizard (*Shinisaurus crocodilurus*) gets its name for two rows of spines that run along its tail, resembling that of a miniature crocodile tail. Sadly, this feature – and its fiery colouring – has made it a target of the illegal pet trade, and there are thought to be less than 1,000 individuals left in the wild.

Working to understand how many lizards reside in Vietnam is EDGE Fellow Hanh Ngo. Much like their much larger namesake, crocodile lizards spend most of their time in or around water and, using environmental DNA (eDNA), Hanh's research has uncovered two new streams in north-east Vietnam where crocodile lizards appear to reside – expanding the distribution of the species.

"Now that we know the area is home to crocodile lizards, we can make a plan with the local land management to protect the site," says Hanh. "And having proved that eDNA techniques can work for the species, we can now use this survey method at other sites."

"This method also saves time and money compared to the traditional way of field monitoring," says Hanh. "A normal field survey would assess one stream a night. Using eDNA techniques we can sample two or three streams in the same time."



The crocodile lizard's distinctive appearance has made it a target for wildlife traffickers

Crocodile lizards are the only living species in the family Shinisauridae and sit sixth on the EDGE list of Evolutionarily Distinct and Globally Endangered species, making them one of the most important species for conservation in the world. However, their uniqueness has also been their undoing.

"In interviews with local villages we found that the species had been abundant until around 11

years ago," says Hanh. "Most interviewees were unaware of the laws that protect crocodile lizards and numerous villagers admitted to hunting the lizards to sell to traders. The price earned per night of collecting exceeded three months' wages for the average person in these remote mountains, so it's easy to see why some would hunt the lizard."

Hanh is one of a number of EDGE Fellows, supported by ZSL, working to improve conservation and raise awareness for underrepresented species around the world. During her fellowship, Hanh worked closely with ZSL's Curator of Herpetology Ben Tapley on the development of the field surveys and the eDNA protocol.

"It was a huge honour to work with Hanh in the development and delivery of her project," said Ben. "Thanks to Hanh's dedication we know much more about the crocodile lizard, the threats posed to remaining populations and the steps we can take to conserve them. Alongside her research, we will be working to learn as much as we can about them at London Zoo, and collaborating with other zoos to maintain a breeding population."

**Crocodile lizards will be on display in *The Secret Life of Reptiles and Amphibians*, opening at London Zoo in Spring 2023. **TZ****



# THE RACE TO PROTECT CROCODILIAN DIVERSITY

New paper sheds light on the varied and important roles of crocs within their ecosystems

**T**HE world's crocodilians (a group that includes alligators, crocodiles, caimans and gharials) are sometimes assumed to all be quite similar – but the latest ZSL research has shown otherwise. Moreover, when the findings were looked at in combination with the projected risks of species extinction, it suggested that 38% of the diverse ecological functions being performed by crocodilians are at immediate risk of being lost; particularly in Asia, where many species are highly threatened.

“We’ve been studying crocodilians’ functional diversity, an area of science that looks at measurable traits of different species, from things like skull shape and body size to reproductive output and habitat use,” explains Phoebe Griffith, PhD Researcher at ZSL’s Institute of Zoology. “We modelled these characteristics to look at the diversity of roles crocodilians are playing within their ecosystems, and how much they all differ from each other – and we’ve found them to be surprisingly diverse. Not all crocodilians are waiting at the side of rivers to catch their prey. There’s a huge variety of different types of crocodile, doing very different things.”

The research identified some of the most functionally distinctive croc species, such as the tiny Chinese alligator (*Alligator sinensis*), which lives primarily on hard-shelled molluscs like snails, and the gharial (*Gavialis gangeticus*), which ZSL is working to conserve in Nepal. Many distinctive species were found to be playing significant roles in their ecosystems. The Philippine crocodile (*Crocodylus mindorensis*), for example, is another prolific snail eater and plays a useful role on



The critically endangered gharial, the only living member of the *Gavialis* genus, is one of the most functionally distinctive crocodilian species

behalf of humans by preying on agricultural pests in rice paddies. Or the African dwarf crocodile (*Osteolaemus tetraspis*), the species found at Whipsnade Zoo, which digs burrows that provide many other species with access to groundwater during the dry season.

“We also looked at measures of distinctiveness in combination with measures of endangerment, to identify which species conservation efforts should be focused on,” continues Phoebe. “Interestingly, many of the most distinct and threatened species were also high on ZSL’s list of EDGE reptiles, including the gharial and Chinese alligator. So, although EDGE was not designed to assess the functional diversity of species,

we found that it was a good proxy for functional diversity in the absence of other data – and functional diversity is often hard to measure.”

What’s also clear is that crocodilians need more support. All of the species mentioned above are considered Critically Endangered by the IUCN, with the exception of the African dwarf crocodile (Vulnerable). “We need greater conservation protections, particularly for these species which are likely to be performing these important ecological roles that scientists are only just beginning to understand,” says Phoebe. Crucially, the importance of protecting crocodilians for the health of wider ecosystems should not be underestimated. **TZ**

# SATELLITE MONITORING OFFERS INSIGHT INTO SUCCESSFUL REWILDING

Images from space reveal extent of recovery in West Sussex and underline importance of satellite imagery for conservation

**E**ARLIER this year, ZSL’s scientists revealed the extent of landscape recovery at the Knepp Estate, a 20-year rewilding project in West Sussex. Using open-access satellite data available through Google Earth and the US Geological Society to evaluate vegetation change, the research showed that rewilding efforts have led to a 40% increase in areas with trees, and six times more shrubs, compared to when the project began in 2001.

The analysed imagery also showed that nature bounced back particularly successfully in the south side of the Estate, where fields were left for several years before the introduction of wild herbivores like Exmoor ponies and fallow deer. The area was quickly taken over by shrubs, woody vegetation and trees, which has proved to be the preferred habitat of the area’s recovering nightingale population.

These kinds of insights, and the availability and accessibility of satellite data, mean that satellite imagery analysis (also called ‘remote sensing’) is vital

for assessing other rewilding projects and helping conservationists make the right decisions in the future, says Honorary Research Associate Henrike Schulte to Bühne, lead author of the research.

“The process of rewilding doesn’t have a preset trajectory,” says Henrike. “Conservationists may introduce animals to kickstart the project, as Knepp did by introducing longhorn cattle, but long term it’s about minimal interference and letting the ecosystem do what it wants.”

“Studying satellite imagery gives us a better picture of how these projects develop on a large scale, and how they might coexist or compete with the urban or agricultural habitats they sit alongside. Rewilding is increasingly seen as an important tool for restoring ecosystems and combatting climate change, and it’s crucial that we learn more about how ecosystems develop under rewilding.”

“With more information about the risks and rewards of rewilding, we can communicate better

to local stakeholders and landowners, and help to bring outside the communities who live alongside rewilding projects.”

One of the key benefits of satellite monitoring is also the availability of imagery. Studies like Henrike’s don’t always require researchers to collect data on the ground – they use imagery that is freely available and apply techniques that are transferrable to different landscapes. For conservation projects that operate on tight budgets, satellite monitoring is an essential tool that could be used more closely with other monitoring techniques.

“Remote sensing won’t replace ground truthing, but it’s not being used as much as it can,” says Henrike. “We can identify areas of change – such as flooding, wild fires or the development of trees in ways that we wouldn’t expect – and help to focus research, saving researchers time and resources.” **TZ**



# CHAMPIONING FUTURE OCEAN LEADERS AT UN OCEAN CONFERENCE

Reducing barriers to marine science for conservationists from developing countries is key to fighting global crisis



ZSL leads a project in the Indian Ocean, assessing the health of coral reefs and the impact of protected areas on marine species. Images © Marleen Stuhr

**I**T'S critical that we get ocean policy back on track – and one of the ways to do that is to open up marine science to more people. That's the message from Heather Koldewey, ZSL's Senior Marine Technical Specialist, delivered at the recent UN Ocean Conference.

"In the face of the multitude of human-driven pressures on our ocean, we must increase and upscale our efforts to drive policy change and expand the capacity for research," she says. "And one of the most important ways we can do this is by helping marine scientists and conservationists around the world reach their potential."

At the first major UN summit of marine science experts, policymakers and businesses since the Covid-19 pandemic, ZSL championed the importance of building capacity in developing countries and empowering the next generation of ocean leaders at an event co-hosted alongside the Bertarelli Foundation and UNESCO.

Scientists and conservationists from developing nations face several barriers, says Heather, from the lack of available funding or issues with visas, to ingrained stereotypes about gender and race. "A key discussion point at our event was eloquently articulated by Dr Asha de Vos from Sri Lanka: 'talent is equally distributed, but opportunities are not. Seventy percent of the world's coastlines are in the developing world – these countries are truly on the frontline of marine conservation – and yet the majority of research comes from western sources.'"

"Empowering the voices of experts from island states is one of the ways we can really affect policy," says Heather. "Climate change isn't a future scenario for many communities in the Indian Ocean, Pacific, or the Caribbean, it's a lived experience that threatens their survival now. Many communities don't know if they'll survive the next typhoon season, and ensuring those powerful voices are heard is imperative."

Through the Bertarelli Foundation's Marine Science programme, ZSL is supporting early career researchers from the Indian Ocean region in postdoctoral training, but also providing opportunities to participate in and contribute

to global policy events, such as the UN Ocean Summit. Another of the ways ZSL supports early-career conservationists is through its EDGE Fellowship programme, which provides funding, training and logistical support to researchers around the world working with Evolutionarily Distinct and Globally Endangered species, including several species of aquatic reptiles, amphibians, sharks, rays and guitarfish.

## Science drives policy change

Another key takeout at the summit was the need for more data gathering, and the importance of sound science for driving policy change, says Heather. "Policymakers want data, they want science," says Heather. "Without it, they can't make decisions backed by evidence, and with increasing scrutiny on every policy it's vital that they have the science that help them make commitments."

In a second event at the Conference, ZSL was able to showcase #OneLess, a ZSL-led initiative that successfully overcame a number of barriers to removing single-use plastic water bottles from London's supply chain. The event was also an opportunity to emphasise ZSL's role as a science-based organisation and the importance of science in decision making.

In the Indian Ocean, ZSL leads a programme of 70 scientists from 40 global institutions working to understand how large marine protected areas benefit marine wildlife – such as sharks, seabirds and cetaceans – and build resilience for key habitats, such as coral reefs. "The more we can understand about the roles of different species and the risks they face, the more accurately we can affect policy change," says Heather.

Recent research led by ZSL's Research Fellow Tom Letessier indicates the importance of dolphins to the resilience of coral reefs through their role as nutrient cyclers – bringing nutrients from the open ocean and depositing their faecal matter on coral reefs. David Curnick, Research Fellow at ZSL, has shown for the first time how

sharks and rays use vertical space in the ocean, with implications for how we tackle the human-driven pressures affecting them.

In addition to building our understanding of species, ZSL is also working to fill knowledge gaps and find novel solutions to issues. "Banks, insurance providers and investment companies are moving into the ocean space and looking for solutions to problems that are now affecting their businesses or clients, and opportunities to make change. It's exciting, but we need to now see the transfer of our science to the market," says Heather.

Clare Duncan, a Leverhulme Research Fellow at ZSL, published research in January about the most efficient ways to use blue carbon – the storage of carbon in aquatic environments such as mangrove forests – as a financial mechanism to fund habitat restoration. Meanwhile, offering a low-cost way to monitor coral health on a global scale, Postdoctoral Research Associate Mike Williamson has developed a method that uses freely available Google Earth Engine satellite data to monitor the different stressors that affect coral reefs. It will enable much wider monitoring of coral reef stressors in remote areas and could become a crucial and inexpensive tool for conservation scientists and policymakers.

Looking ahead, a landmark at the Conference was the declaration that over 100 countries are signed up to the '30x30' initiative, a commitment from each country to protect 30% of their land and sea by 2030. A number of countries made specific commitments: São Tomé and Príncipe announced a series of marine protected areas at the Conference; Portugal committed to improving the health of all of its ocean; Kenya is developing a blue economy strategic plan; and the UK made further financial commitments to protecting the marine environment. The 14<sup>th</sup> Sustainable Development Goal, 'Life below water', remains the most poorly funded of the United Nations' 17 goals, but efforts are being made to rectify that.

"There is a lot of recognition of how serious the issues facing our ocean have become," adds Heather. "Now is the time to translate that talk into action." **TZ**



# TICKLED PINK

## Improving breeding capacity for Mauritius' pink pigeon

**T**HIS August, London Zoo Bird Keeper Tom Lawrence journeyed to Mauritius to support the pink pigeon conservation breeding and recovery programme. His six-week stay followed the successful rearing of a pink pigeon chick at London Zoo in early 2022 – only the third parent-reared chick at any zoo in the last 15 years.

Pink pigeons (*Nesoenas mayeri*) are extremely territorial, which makes them difficult to breed in zoos, but their precarious position makes it vital that we increase their numbers through conservation breeding programmes, explains Gary Ward, ZSL's Curator of Birds. "Just 550 wild birds remain on the island in five sub populations, and regular supplementary feeding and pest control is still required to deal with the lack of food and invasive species of plant and predators.

"Tom's role in Mauritius was to share his extensive knowledge of caring for and breeding pigeon species with bird keeping staff working at the Gerald Durrell Endemic Wildlife Sanctuary,



Pink pigeons are the only surviving pigeon species on Mauritius

and help the team there improve the breeding capacity of the birds already at the sanctuary," says Gary. "We're always looking for opportunities to apply the expertise we have at the Zoos for the benefit of conservation and, given our history on the island working with the Mauritius kestrel, it was an obvious species to work with."

Pink pigeons tend to be raised in zoos using domesticated foster doves, who sit on the egg

and incubate them as their own. Pink pigeon's territorial behaviour means they often damage their own eggs, so the successful raising of a pink pigeon by its biological parents at London Zoo in June 2022 was cause for celebration. Improving the breeding successes of pink pigeons at the sanctuary in Mauritius will mean that reintroductions of additional birds can begin to boost the population.

"Zoos provide a unique opportunity to observe animals closely, allowing us to learn a lot about the animal's behaviour. These kind of insights are especially useful for breeding and release programmes," says Tom. "It was incredible working with so many pink pigeons at once, both in the wild and in the Mauritian Wildlife Foundation's breeding aviaries, and passing on some of my own knowledge. Together we built aviaries, created pest-proof pigeon feeders, and I was able to show the team an alternative method of feeding pink pigeon chicks."

Meanwhile, conservationists from the Mauritius Wildlife Foundation are also working to restore the habitat and remove invasive plants, such as guava, that affect the growth of the native plants the pink pigeons rely on for food. As plans for the release of more pink pigeons on Mauritius ramp up, it's ZSL's hope that birds from London Zoo will one day journey to Mauritius to join the breeding efforts. **TZ**

# BIG CAT SCAN AT LONDON ZOO

## CAT scanner reveals reason behind earache

**A**SIATIC lion Bhanu became the first big cat at London Zoo to use a mobile CAT scanner earlier this year, when the Zoo's veterinary team hired the diagnostic equipment to investigate the big cat's recurrent ear infections.

After repeated attempts to solve his ear infections, including administering ear drops, specialist ear examinations and cleaning under anaesthetic, it was decided that a CAT scan was needed. The equipment, normally used for human patients, was transported by truck by Burgess Diagnostics and gave the veterinary team an opportunity to examine the ear canal without having to move him out of the Zoo.

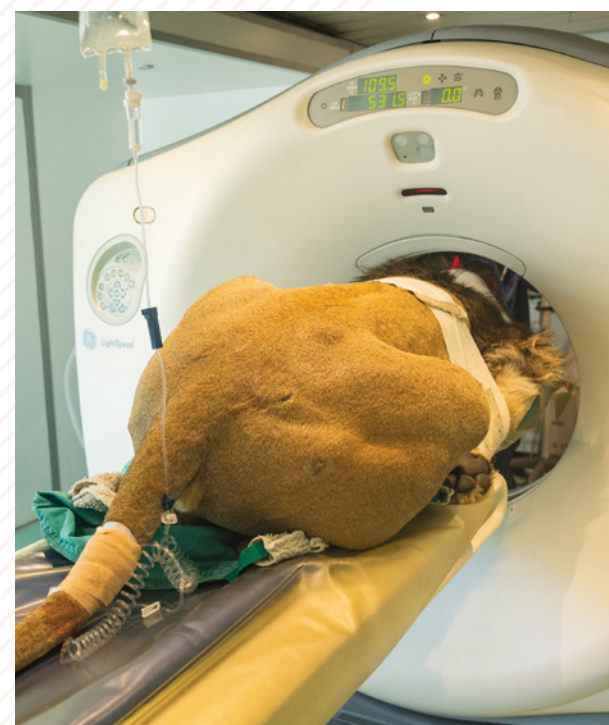
"We were delighted that the CAT scan helped us to rule out worst-case scenarios like a tumour or a major infection," said Senior Vet Taina Strike. "What the scan did show is that Bhanu has a very narrow left ear canal, which is more prone to blockages and infections."

Alongside the London team, VetCT's veterinary radiologist David Reese, who has experience imaging big cats, was also analysing the scans in real time from his office in Western Australia. "Our main concern was disease involving the middle ear, an area of the ear normally filled with gas, surrounded by bone and separated from the ear canal by the ear drum," says David. "With the scan, we can detect fluid or abnormal soft tissue material in the middle ear, as well as changes in the bone structure, but thankfully we were able to give Bhanu the all clear."

"Now we know what was causing the infections, we've been able to devise a new, long-term treatment plan for Bhanu," says Taina. "Instead of ear drops, he'll receive regular oral medication to reduce inflammation in the ear canal and anti-fungal medicine to manage any infection, as well as a comprehensive ear clean during his annual health check." Thanks to the zookeepers' regular training sessions with Bhanu, the veterinary team can administer medical care with the male lion conscious – from taking oral medications to allowing injections and blood samples.

"Bhanu is an endangered Asiatic lion, of which there are thought to be only 600 remaining in the wild, restricted to a small area of Gujarat, India," adds Taina. "He is incredibly important to the European-wide breeding programme and it's our responsibility to ensure he's in the best possible health so that he can contribute to future generations of Asiatic lions."

CAT scans (Computed Axial Tomography, also known as CT scans) use similar technology to x-rays. High energy electromagnetic radiation passes through the body from different angles, producing images of bones and muscle tissue, and computer processing translates these images into a cross section of the body. The technology is regularly used to diagnose muscle and bone disorders, and to pinpoint the location of internal injuries, tumours, infections and blood clots. **TZ**



Bhanu the Asiatic lion (*Panthera leo persica*) underwent a CAT scan to understand his persistent earache



# EUROPE'S WILDLIFE RESURGENT

## New report charts recovery of 50 species across the continent

**M**ANY of Europe's most iconic species are bouncing back, according to the latest *Wildlife Comeback Report*, published by ZSL, BirdLife and the European Bird Census Council, this autumn.

The Report, commissioned by Rewilding Europe, seeks to unravel the patterns of successful species recoveries being seen across Europe and analyses data for 50 vertebrate species – 25 mammals, 24 birds and one reptile. The data is clear: all 50 species have increased in abundance since the baselines set in the 1960s for mammals and 1980s for birds.

Leading the recovery are Europe's bison (*Bison bonasus*) and beavers (*Castor fiber*), which have increased by over 10,000% in relative abundance, and the barnacle geese (*Branta leucopsis*) and Spanish imperial eagle (*Aquila adalberti*) – which have increased by over 1,000% in population sizes. More modest increases have been recorded for peregrine falcons (*Falco peregrinus* – 261%), European elk (*Alces alces* – 17%) and loggerhead turtles (*Caretta caretta* – 68%).

While these increases are also in part an indication of how much European wildlife suffered prior to the mid-20th century, it also makes clear that conservation action can work. "In the Report, we show how conservation management strategies have led to these recoveries but also, in some cases, how wildlife can adapt and recuperate

on its own," says Sophie Ledger, Conservation Scientist and Researcher, and lead on ZSL's involvement. "Bison, as an example, went from being extinct in the wild in the 1920s, to several thousand free ranging individuals in the wild now, as a result of concerted protection, breeding and reintroduction programmes.

"Species facing the fewest pressures and with the greatest conservation attention have recovered at a greater rate, which may be an indication of why the bison has done so well. Almost all of the free ranging European bison population exists in protected areas in Eastern Europe, such as national parks and Natura 2000 sites. In protected areas, their populations face fewer human pressures than the pine marten, or the brown bear – two species that are spread across Europe outside of protected areas, and more at risk of illegal hunting and habitat loss."

Exploitation and habitat loss are highlighted in the Report as two of the key pressures impacting the recovery of mammals, while the most frequent threat facing birds is agriculture and associated pollution. However, climate change and how it will impact species and their habitats hangs over everything, says Sophie. "Though all 50 species are growing in abundance, some are already facing a changing or shrinking range," says Sophie. "There are several bird species which have declined in range size, and Europe's four sub-species of ringed



The European bison is an example of the continent's conservation successes

seal – all ice-dependent for much of their life cycle – are likely to be impacted in the near future as sea ice melts with increasing temperatures."

The Report points out that this is only one part of the picture for European biodiversity. "We simply don't have quality long-term population monitoring data for many species groups, and we know that others are not doing so well," says Sophie. "However, through rewilding approaches – such as reintroducing keystone species – which aim to restore and regenerate ecosystem functions, many species, not just the flagship ones, also benefit. If these approaches are facilitated by European policies, they can be applied at scale throughout the continent's landscapes." **TZ**

# CONSERVING THE FRÉGATE ISLAND BEETLE

## London Zoo's programme to increase breeding populations of endemic beetle species

**T**HIS autumn will see the opening of a new home for the Frigate Island beetle (*Polposipus herculeanus*) at London Zoo, providing an important additional breeding population for this vulnerable island endemic species. The genetic composition of the group will also be enhanced by the addition of the colony from Whipsnade Zoo.

"The aim is to create a large, robust population from which we can help other Zoos to establish or expand their own breeding populations," explains Paul Pearce-Kelly, Senior Curator of Invertebrates and Fish at London Zoo.

The beetles, a species of giant tenebrionid, come from Frigate Island, a tiny island (just 2km<sup>2</sup>) that forms part of the Seychelles Archipelago, although they are thought to have once had a far greater geographic range. They require high humidity and temperature to match their island home, where they are predominately found in coastal woodland habitat and feed on fungi, algae and lichen on tree trunks. Rotting wood is also where the beetles lay their eggs, and the larvae are reliant on decomposing wood for their food and shelter.

The Frigate Island beetle first arrived at London Zoo in unusual circumstances in 1996, explains Paul. "After the accidental introduction of brown rats to Frigate in 1995, we were approached to set up a conservation breeding population to guard against the loss of the entire species. There was a real concern that this unique beetle would go extinct."

In collaboration with Frigate Island Private, Nature Protection Trust of Seychelles and Birdlife International, 47 beetles were collected and transferred from the small Indian Ocean island to London Zoo's invertebrate house to form an insurance population. Paul's team were able to establish a protocol for breeding and managing the species, as well as setting up a European breeding programme, and the beetles have since thrived in the Zoo.

Meanwhile, island authorities undertook rat control measures on Frigate Island that proved successful. As a result, the beetles were downgraded on the IUCN's Red List from Critically Endangered to Vulnerable.



Frigate Island beetles first arrived at London Zoo in 1996 to protect their survival

However, like many endemic island species that are limited to a very small habitat or island, the species remains vulnerable to any direct or indirect impacts on their population, such as climate change. Now, London Zoo is working with other zoos across the UK and Europe, including Jersey Zoo, to establish additional breeding colonies to ensure that the conservation breeding programme can continue to provide a strong insurance population. **TZ**





Whipsnade's Asian elephant (*Elephas maximus*) herd plays a vital role in the development of conservation strategies and the education of visitors

## SCIENTISTS' CORNER

### Q&A with Fiona Sach and Simon Hedges: The importance of elephants in zoos

**Fiona Sach**, Institutional Fundraising Manager and animal nutrition researcher, worked closely with Whipsnade's elephant herd to develop diet protocols. Following a PhD on African elephants in South Africa, she works with ZSL and other European zoos on elephant care and drives fundraising for ZSL's conservation science.

**Simon Hedges**, Conservation Planning and Design Manager, joined ZSL last year with over 30 years' experience in conservation. An expert in human-elephant conflict mitigation, Simon is a member of the IUCN's Human-Wildlife Conflict Specialist Group and advises on ZSL's programmes across Africa and Asia.

#### What is the situation facing elephants?

There are three species of elephant – Asian, African savannah and African forest elephants. ZSL is one of the few conservation organisations working around the world to protect all three species. Asian and African savannah elephants are considered Endangered by the IUCN, while African forest elephants are classified Critically Endangered – a reflection of how sharply forest elephant numbers have dropped.

Despite this, we are especially concerned about the future of Asian elephants. Official estimates are that there are 30-40,000 Asian elephants left, though it could be far fewer. Moreover, Asian elephants are now restricted to small pockets of habitat, very susceptible to poaching and further habitat loss, and are at risk of inbreeding. Larger populations exist in India and Thailand, but some countries – Laos, Vietnam, China – have fewer than 1,000 elephants left between them, and there

is little opportunity for the populations to grow or connect. It's possible that Asian elephants could disappear entirely from these countries.

What all three elephant species share is an increasing pressure on their habitat due to the growing human population and associated intensification of agriculture. The conversion of land for agriculture regularly forces elephants to search for food and water near human communities – communities who themselves face a lot of hardship and often live on the fringes of society. The resulting conflict leads to human and elephant injury, and can lead to the death of both humans and elephants, as well as extensive property loss.

#### What role do Whipsnade's elephants play in the conservation of their species?

One of the most important roles our elephants play is education – many people will never get the opportunity to see elephants in Asia or Africa, but we can build a lifelong passion for their conservation through experiences at Whipsnade Zoo. Almost half of visitors to our Zoos say they will do something to help animals after their visit.

Zoo elephants also allow us to develop techniques for the conservation of their species that would be impossible without them, and that role will only grow in significance as the situation facing the world's elephants becomes more severe. In 2020, Whipsnade's elephants helped to develop the world's first thermal imaging early-warning system. We captured over 30,000 thermal images of our herd, as well as elephants at other UK zoos, and used them to develop software that can recognise approaching elephants at night and alert rapid response teams – technology that could save both human and elephant lives.

Meanwhile, a new study is underway at Whipsnade to test the most effective ways of storing elephant faecal samples. Faecal DNA monitoring methods are increasingly used to estimate the sizes of elephant populations in forest areas and to learn about inbreeding in isolated populations. However, genetic data contained

within faecal samples can become damaged if not collected and transported correctly, so elephants and their zookeepers at Whipsnade are part of a study to find the best chemical solution for preserving elephant faecal DNA. The project will support our work in Cameroon, where we are trying to understand the genetic health of forest elephants, and will benefit wider elephant conservation projects across Asia and Africa.

#### How is ZSL responding to the UK Government's plans to reform Zoo Standards?

At ZSL, we are continuously working to develop our animal care. We welcome the opportunity to enshrine animal care best practice in law and are collaborating with Defra and BIAZA (British and Irish Association of Zoos and Aquariums) on several legislative changes to zoo regulations. These regulations will also solidify commitments to conservation and education that ZSL already exceeds through its work in countries like Nepal and Cameroon and in the classroom sessions we run for schoolchildren at our Zoos.

The UK is a world leader in animal care – we have the strongest zoo license procedure in the world, and at ZSL we set very high standards for elephants that far exceed the regulations in mainland Europe, the US and the wider world. We also monitor our elephants daily and continuously look for ways to innovate their care based on the evidence collected; an attitude of constant improvement that is borne out by research currently being conducted by Species360 that indicates that elephants in UK zoos are now living far longer.

These are all things that we can be proud of, and it also puts us in a strong position to lead others in the development of elephant care and elephant conservation programmes. It's something ZSL already does through the sharing of expertise with other zoos around the world, the training of veterinarians who go on to work in other zoos or protected areas and sharing knowledge with our own teams working with wild elephants. **TZ**

ZSL's impact on the future of wildlife is transformative. Help us continue our vital work at [zsl.org/donate](https://zsl.org/donate)

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**ZSL** | **LET'S WORK FOR WILDLIFE**

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