

THE ZOOLOGIST

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The common eider duck (*Somateria mollissima*) is one of several species that could be disastrously affected by climate change

ON A WING AND A PRAYER

ZSL report advises innovative seabird protections in the face of climate change

By 2100, the UK's coastline could be a lot quieter. That's according to a new report from ZSL, which predicts that climate change could lead to the disappearance of seabirds like the puffin, Arctic tern and razorbill from their breeding grounds in the UK and much of Western Europe. The region is currently home to globally important breeding populations of these, and many other, seabird species.

Of 47 seabird species found in the North-East Atlantic, the report predicts that 45 species will see a minimum of 60% of their breeding sites reduce in suitability due to climate change. For 21 species, including the horned grebe, that figure rises to over 90%.

The report, led by Henry Häkkinen, Postdoctoral Researcher at ZSL's Institute of Zoology, points to reduced access to food and prolonged periods of stormy weather as two of the biggest threats for Europe's seabirds from climate change. "Seabirds are reliant on both land and sea – exposing them to a greater array of threats than purely marine or terrestrial species. Climate change is often an underlying issue that can intensify those existing problems, like a shortage of prey or the spread of disease."

The good news is that the report also sets out practical conservation actions for all 47 species. "We began with a clear mission – to create something useful for the conservationists working with these species," says Henry. "There is sometimes a disconnect between pure science and conservation. So, right at the beginning of the project, we surveyed 80 practitioners on what kind of guidance they wanted."

"One of the most simple but valuable aspects of the report is how much time it could save others. Field conservationists don't always have the time, funds or staff to conduct a review of current best practice. At ZSL we specialise in bringing together that expertise and bridging the gap between science and conservation."

The report outlines potential actions in response to each threat facing each seabird group and scores the effectiveness of those solutions based on evidence from previous interventions. For example, decoy puffins rank highly; significant research has shown that puffins can be successfully encouraged to inhabit suitable breeding areas by placing model birds at potential nesting sites. However, manually relocating nests, while cited by some practitioners as effective, has not been proven to be effective for puffins or other species in the Alcidae family.

By taking a 77-year projection to 2100, the report also emphasises a strategic approach to conservation. The insidious nature of climate change requires a proactive, long-term attitude, says Henry. "Limited funding often drives reactive conservation actions," says Henry. "We spot a problem and seek to tackle it. But climate change requires us to be strategic – if we wait for the problem to be upon us, it will be too late for many species."

Take the common eider duck (*Somateria mollissima*), for example, says Henry. Currently considered Near Threatened by the IUCN Red List, eider ducks are low down the priority list for conservation action. "In fact, they even appear to

be benefitting from the milder winter weather." However, looking ahead to 2100, 80% of the eider duck's breeding range is predicted to drop in suitability.

"The first factor is storms. Eider ducks gather in their thousands during winter, forming huge rafts on the ocean surface. The predicted increase in severity and frequency of storms could be disastrous for eider ducks," explains Henry. "The second factor is their diet. Eider ducks in Europe feast almost exclusively on blue mussels, which we know are sensitive to water temperature change. And exacerbating both of those issues is that eider ducks have high site-fidelity – they love going back to the same place each year!" The lesson? We need to start thinking about eider ducks ahead of time.

The next step for the project, Henry hopes, is to establish a global report for all seabirds.

"We've already built a network of engaged seabird conservationists – it's time to leverage that globally," says Henry. "Seabirds are international animals; many species will migrate enormous distances to and from breeding sites. Conservation has traditionally focussed on national or regional issues but, to make real a difference we need to foster international cooperation and planning to protect seabirds all over the world."



Henry Häkkinen,
Postdoctoral Researcher, ZSL



Guy Cowlishaw,
Acting Director of Science, ZSL

DEAR FELLOWS

Running through this issue of *The Zoologist* are the two major challenges that humanity faces in the 21st century: halting climate change and reversing biodiversity loss. Both are interlinked, contributing to and exacerbating each other, both are being driven by human activity, and both require enormous innovation if we are to successfully tackle them.

ZSL is uniquely diverse among conservation organisations, bringing together a broad range of disciplines – from ecologists to epidemiologists; from field conservationists to zoologists and

veterinarians. This makes us incredibly good at innovation and, in this issue, you will read about some of the innovations ZSL has developed in the fight against climate change and biodiversity loss.

Our cover article outlines the work of Postdoctoral Researcher Henry Hakkinen, who has not only assessed the climate change risk to all 47 species of seabird found in the North-East Atlantic, but assessed the efficiency of climate change mitigation strategies for each species too. A highly practical piece of research that could have a major impact on struggling seabird populations.

Our two conservation Zoos are at the heart of our efforts to reverse biodiversity loss. At London Zoo, we are working to understand and protect the diversity of coral reefs before it is too late. Aquarists from Whipsnade Zoo are involved in urgent efforts to protect a Critically Endangered species of killifish in Turkey and, as Tyrone Capel explains on page 8, a team of passionate zookeepers and volunteers are also working to help Whipsnade achieve its potential as a haven for British wildlife.

I'm also delighted that this issue features a guest article written by one of our Fellows, Dr Ross Jeffree, who offers an Australasian perspective on climate change and the importance of protected areas in light of the commitments made at COP15. Bethan Laughlin's report from the conference highlights two of the major successes – commitments to protect 30% of our land and aquascapes by 2030, and to reduce extinction risk tenfold by 2050 – as well as the big job we have ahead of us. With your support, we continue to be at the forefront of that work.

DIARY DATES

9 May

Urban hedgehog conservation:
Connecting wildlife and people through a flagship species
Science and Conservation Event; In-person

6 June

Lynx recovery in Europe:
Lessons for the UK?
Science and Conservation Event; In-person

In-person events take place at London Zoo's Huxley Lecture Theatre from 6pm-7:30pm. Online talks are streamed via zsl.org/loZYouTube. For more info, visit zsl.org/zsl-fellows-events



Until recently considered to belong to the *Aphanius* species group, the Acigöl killifish is in the process of being reclassified by the IUCN as *Anatolichthys transgrediens*

THE RACE TO SAVE THE ACIGÖL KILLIFISH

Whipsnade Zoo acts to avert extinction of rare freshwater species

In 2022, the team leader of Whipsnade's Ectotherms department, Alex Cliffe, received a message from partners in Turkey: the Acigöl killifish (*Anatolichthys transgrediens*) could be on the brink of extinction. Already restricted to a few small springs that feed into a hypersaline lake in southern Turkey, and considered Critically Endangered by the IUCN, the Acigöl killifish has come under increased pressure from water abstraction for agriculture and invasive mosquitofish (*Gambusia holbrooki*); and could disappear entirely.

As studbook holder for the Acigöl killifish, one of several extremely rare killifish and pupfish species held at Whipsnade Zoo, Alex organised an immediate visit to Turkey's Lake Acigöl to assess the situation. "Our first priority was to do an updated survey and establish a picture of the population," explains Alex. "It confirmed our fears – the killifish had disappeared from all but two springs alongside Lake Acigöl."

The killifish urgently needed a safe haven and, working alongside Dr Baran Yoğurtçuoğlu from Hacettepe University, Ankara, the team were able to identify two unlikely sources. "The university campus incorporates a huge ornamental lake. With agreement from the university, and in collaboration with The Freshwater Life Project, and after studies of the lake and its water chemistry,

we determined that the lake would be a suitable home for a backup population of killifish," says Alex. The second source, the General Directorate of Fisheries, agreed to breed the killifish in one of their facilities at Antalya. "Their support could be immeasurable," says Alex. "With them on board, we have the capacity to breed killifish on a scale that would otherwise be impossible. And with the killifish's short-term future secured, we can turn our attention to improving their habitat for reintroduction."

Alex will be returning to Turkey this May for the next stage of the project. "Our next focus is on controlling the invasive mosquito fish from other small springs that border the lake." Mosquito fish were introduced worldwide in the early 1900s to combat malaria, but their introduction has proved devastating to several freshwater species who compete for food and space.

"Our end goal is to get these habitats viable again, get more Turkish zoos and aquariums involved with the killifish and build on our relationships with the Ministry of Fisheries and Aquaculture and the IUCN to encourage government support," says Alex. In the meantime, by establishing backup populations and starting the process of removing the mosquito fish, the team may just have bought the Acigöl killifish some valuable time.



Image © UN Biodiversity, Flickr, CC BY 2.0

THE NEW 2022 GLOBAL BIODIVERSITY FRAMEWORK

Can governments deliver on their promises?

By Bethan Laughlin, ZSL's Senior Policy Specialist

On 19 December 2022, at 3.33am in a snow-spattered Montreal, the gavel came down on the passage of a new global agreement for the protection, restoration and management of global biodiversity – the Kunming-Montreal Global Biodiversity Framework (GBF). The passage of this agreement is a highly significant moment for the future of international action on biodiversity. With time to reflect in the months since, is it possible to hail the GBF a success?

The scale of the crisis

The Living Planet Report (LPR) – published in collaboration with WWF – makes clear the scale of the biodiversity crisis. Leading the science behind the LPR is ZSL's Living Planet Index (LPI), an indicator of global biodiversity – tracking trends in the abundance of mammals, birds, fish, reptiles, and amphibians. The most recent LPI reports an average 69% decline in species abundance across monitored global wildlife populations between 1970 and 2018. The scale of biodiversity loss is vast, as is the responsibility on the shoulders of the 188 member states who gathered in Montreal for the United Nations Biodiversity Conference (COP15).

Unpicking the Framework

The central mission of the GBF aims to halt and reverse the loss of biodiversity by 2030. This aim is underpinned by four goals and 23 targets that span protected areas, species protection, sustainable consumption, indigenous rights, gender and many more.

The focus of the ZSL delegation during negotiations were the species and ecosystems elements. Goal A of the GBF commits countries to halting human-induced extinctions of threatened species from now and, by 2050, a tenfold reduction in the extinction rate and risk of all species, as well as increasing the abundance of native wild species “to healthy and resilient levels”. The much hoped for ‘30 by 30’ target was also included, committing countries to protecting 30% of terrestrial, inland water, coastal and marine areas for nature by 2030.

Other positives steps were made: the recognition of the rights of indigenous and local communities; promotion of sustainable consumption; and the creation of a strong monitoring framework, which included ZSL's LPI as a component indicator for measuring progress. However, it is also important to acknowledge that, after three weeks of difficult negotiations, the level of ambition in the final text of the GBF does not match the original vision.

Where did we fall short?

At the COP15 negotiations, consensus was king – with all parties having to reach agreement on every part of the drafted text. Square brackets are placed around any words or phrases that have not been agreed to by all parties; at the opening of COP15, the draft GBF contained over 1,400 square brackets.

Attempts were made to reach agreement on contested language and streamline the text before the conference kicked off. But, after these failed to make progress, COP negotiators were tasked with facilitating not only high-level political discussions on the big-ticket items (such as the question of funding) but also completing the vast task of reaching agreement on the 1,400+ disputed brackets in the draft text.

This was no simple task and, sadly, the job proved too colossal. Conflict over finance led to walk outs, with developed and developing countries seemingly unable to reach agreement on how low- and middle-income countries should be supported with the implementation of the GBF. On the penultimate day of COP15, delegates were still grappling with 311 brackets. It was in this state of deadlock that the Chinese Presidency of the COP15 took the decision to publish a Presidency Text – a ‘clean’ text that aimed to enable compromise by removing some of the most contentious language. However, this also saw the removal of much of the ambition that had been hoped for.

Following its publication, participants spent a frantic 24 hours trying to strengthen some of the most weakened elements. For ZSL, our focus was pushing for the inclusion of measurable outcomes for species’ recovery by 2030 (not just 2050) in

the text, which had been completely removed. Alongside a coalition of NGOs, we were able to ensure the insertion of language for both 2030 and 2050 targets for extinction risk and recovery of species abundance. A small but mighty win.

The reality remains: the diplomatic impasse on key areas of contention saw goals diluted, metrics cut and interim 2030 targets removed in the final text. As such, the four goals and 23 targets that make up the GBF may struggle with some of the same factors that plagued its predecessor, the Aichi targets, none of which were met at a global level. Yet, without the cuts, changes and compromises made to the final text of the GBF, it is highly likely we would not have reached an agreement at all.

Now the hard work begins

Despite the weaknesses of the GBF, the global community coming together in the passage of this agreement means we now have a foundation of ambition to tackle global biodiversity loss. We also have a funding mechanism that, although not large enough to fill the \$700 billion funding gap needed to tackle the biodiversity crisis, will help low- and middle-income countries make the GBF a reality.

As with all policy, it is implementation of the GBF that will be the true test of success. For the countries signed up to the GBF, the hard work of domestic delivery begins now. The task of halting and reversing biodiversity loss by 2030 will require political, social and economic dedication and action on a scale rarely seen. ZSL will be working closely with governments and partner organisations around the world, providing science and expertise to aid domestic delivery of the GBF and the vital task of maintaining political momentum.

Bethan Laughlin,
Senior Policy Specialist, ZSL





TAKING THE LEAD

ZSL establishes African leadership programme

The Africa Range-Wide Cheetah Conservation Initiative (CCI), a programme led by ZSL, has established a new leadership programme for African postgraduate students. Partnering with universities in South Africa, the programme will initially support one PhD student and three MSc students studying cheetahs and other large carnivores, thanks to new funding from the Howard G. Buffett Foundation.

ZSL's range-wide work with cheetahs and African wild dogs began in 2007, and CCI is now collaborating with 17 countries. The programme is focussed on wildlife conservation and promoting coexistence with people – two issues that particularly affect cheetahs because they tend to operate over a larger range, outside of protected areas, and frequently come into contact with humans and livestock.

“One of the areas that we want to address through the programme is a lack of research capacity for Africa’s large carnivore conservation. There just aren’t enough African scientists being given the opportunity to study these animals – cheetahs in particular,” explains ZSL’s Audrey Ipavec, the project’s North, West and Central Africa Regional Coordinator. “Funding is often scarce for African scientists, hindering their careers. And what funding is available tends to come from English-speaking countries, effectively blocking French-speaking scientists who come from West and Central Africa.”

As part of the programme, students will also visit ZSL’s Regent’s Park site to study alongside ZSL’s other scientists. “When you’re working on cheetah, it’s not about one national park. It’s about huge transboundary landscapes. And that means working with multiple governments, monitoring and wildlife agencies. So, developing international networking skills and establishing relationships will be key to the long-term success of our students,” says Audrey.

As well as mentoring a new generation of scientists, CCI also supports national coordinators in 14 countries. Each coordinator is nominated by the country’s government to implement their National Conservation Action Plan for Cheetah and African Wild Dogs and receives training and mentorship through the CCI programme. Training events have been held in Tanzania, Niger, Zimbabwe and Ethiopia, and cover specific, technical skills in wildlife monitoring, as well as more general support such as English language lessons.

“Ultimately, we want to establish a network of field conservationists and researchers across Africa, all working towards the survival of cheetah and other large carnivores,” adds Audrey. To find out more about the CCI, visit cheetahconservationinitiative.com



London Zoo celebrated the hatching of four Socorro doves (*Zenaida graysoni*) in 2021, taking the global population to 162. The species was last seen in the wild in 1972

EXTINCT IN THE WILD SPECIES RISK SLIPPING INTO EXTINCTION

New research calls for greater attention for world’s rarest species

There exists in conservation an unlikely group of 72 species, connected solely by their status as exiles. These 33 animals and 39 plants are considered Extinct in the Wild (EW) by the IUCN Red List and survive only in zoos, aquariums, botanical garden or seed banks. For many, their situation is a tragedy, but it’s also an opportunity – and one we must be making much more of before it’s too late – says Donal Smith, Postdoctoral Research Assistant at ZSL’s Institute of Zoology.

In a recently published paper in *Science*, Donal examines these species – such as the Socorro dove, held at London Zoo – and finds that the conservation community must do more. “One crucial problem is that the tool we use to identify and assess these species, the Red List, is failing,” says Donal. The paper highlights just how varied the situations of species categorised as EW actually are, and the fragility of some. For example, while just 135 sihek (Guam kingfishers) exist in 24 zoos, there are around 9,000 milu (Pere David’s deer), many of them already introduced to semi-wild areas across China. “By grouping together these species, we risk concealing the plight of the those in most need.”

Numbers are crucial for EW species. Small populations risk losing genetic diversity, a factor in how well that population might adapt to changes in the environment were they to be reintroduced. A larger population size, held at multiple zoos, also reduces the risk of accidents, such as fire or disease, impacting the species. “In this regard, we are failing many species,” says Donal. The majority of EW species are held in far too few numbers, and cared for by too few zoos.

"The Red List is failing [EW species]. We risk concealing the plight of those in most need."

Two numbers highlight the fragility of EW status: 11 and 12. The former, the number of species lost forever while solely under human care since 1950. The latter, the number of species once restricted to human care now surviving in the wild due to reintroduction programmes (or thriving, in the case of the European bison). “We already have such incredible successes to draw on. However, it comes down to resources – we need coordinated funding backing species recovery programmes. We also need to motivate other institutions who don’t hold these species to make space for them.” London and Whipsnade Zoos are currently home to 17 EW species – the largest collections of EW animal species in the world – and have played important roles in the recent reintroductions of scimitar-horned oryx and Polynesian tree snails.

Donal points out that many reintroduction programmes, which often begin by restoring the target species’ habitat, benefit other species in the wider ecosystem. Successful reintroduction programmes also create compelling stories that allow us to get more people excited about conservation. “Their brush with extinction and survival against the odds, down to the hard work of some very passionate people, is verging on miraculous. It’s an extremely powerful story – and one we must be shouting about even more.”



The Atlantic sturgeon (*Acipenser oxyrinchus*) is one of two species that disappeared from UK rivers during the last century

RETURNING LOST GIANT TO UK WATERS

UK Sturgeon Alliance takes first steps towards restoring ‘dinosaur fish’

The sturgeon’s armour plating speaks to its prehistoric past; sturgeon fossils date back to the Early Jurassic, 200 million years ago. Traits that include long life, late maturity and potentially huge size – some sturgeon species can live into their 100s, don’t reach sexual maturity until their 20s, and can grow to five metres long – proved a winning strategy. That is, until sturgeon encountered modern humans. Hunted for their meat and their eggs (which become caviar) and impacted by habitat reduction, the species group Acipenseridae, comprised of 27 species of sturgeon, is widely considered the world’s most threatened animal group.

Though they spend much of their lives in coastal and marine waters, several species of sturgeon are reliant on access to river systems to spawn. This, and their unusually long road to maturity, makes them particularly vulnerable to overfishing and river barriers, two of the main issues credited with their decline. Sturgeon are still occasionally spotted in the UK’s coastal waters, but our two native species

– the Atlantic and European sturgeon (*Acipenser oxyrinchus* and *Acipenser sturio*) – disappeared from UK rivers in the latter half of the 20th century. However, with sturgeon now protected by law, and successful reintroduction projects already established in mainland Europe, there is opportunity to change that, says Hannah McCormick, ZSL Project Officer.

Enter the UK Sturgeon Alliance, set up by ZSL and several other partner charities passionate about returning sturgeon to the UK. “The first step was to bring together all interested parties,” explains Hannah. “We held a workshop in October with representatives from government, charities and experts.” From this meeting, the Alliance has developed a UK-wide conservation action plan for the two native sturgeon species, due to be published this spring.

Following that, the Alliance is laying the groundwork for any potential intervention. ZSL’s veterinarians are undertaking an analysis of the

disease risks of introducing sturgeon to UK waters, and the Alliance is working closely with the IUCN SSC Conservation Translocation Specialist Group to determine the viability of reintroductions.

Establishing relationships with the people who could be impacted by these decisions, such as anglers, local communities and government, is crucial, says Hannah. “We want to determine the best route forward for the UK. Reintroductions have worked elsewhere, but it could be determined that habitat restoration and the removal of waterway barriers is enough to see sturgeon return to our rivers.”

Ultimately, there is real hope for the sturgeon now, adds Hannah. “We are one of a number of European countries championing sturgeon conservation. People are starting to realise how charismatic they are and, beyond that, what an incredible symbol they are of both marine and freshwater conservation, and the interconnectedness of both habitats. Many species with similar life cycles could benefit from the return of the sturgeon.”

UNDERPINNING REWILDING WITH SCIENCE

Research uncovers unexpected ungulate behaviour at rewilding site

The concept of rewilding, which offers an idyllic vision of landscapes and wildlife unencumbered by human interference, has captured the public imagination over the last decade. Rewilding projects have sprung up across the UK and Europe and, this year, the movement has brought bison to UK. But do we know how different species will behave once introduced to a rewilding project? And how could those species impact a key proposed benefit of rewilding: carbon sequestration? Connor Lovell, PhD Researcher at ZSL’s Institute of Zoology, is on a mission to find out.

The Bunloit Estate in the Scottish Highlands, a rewilding site purchased in 2020, is home to native red and roe deer, non-native sika deer and wild boar – the latter of which are thought to have escaped from

local farms. “Because of their similar feeding habits, and the resulting competition over food, it had been expected that roe deer would avoid the other species,” explains Connor. However, the early indications of Connor’s research at Bunloit are that the ungulates present are not behaving as anticipated. “In fact, what we’re seeing is that when a sika deer is detected in an area, we’re four or five times more likely to spot a wild boar or roe deer in the area.”

Why the different species are associating so closely isn’t yet understood, says Connor, but their unusual behaviour indicates how much more we have to learn about rewilding. “There are two main hypotheses why this might be happening. The first is grazing facilitation: grazing by one species might be making food more accessible for another. The second is that the regular culling of deer on the estate has caused one or more of the species to change their behaviour.”

The next stage of Connor’s research will involve quadrat surveys of plants on the estate, to see if there are any plants that are being overgrazed by the ungulates, or plant species that are thriving despite their presence. “Rewilding is often presented as a solution to climate change through increased plant life and the resulting carbon sequestration. With this

research, I hope to be able to understand the trade-offs between biodiversity and carbon storage, and the potential role ungulate grazing plays.

“So far, rewilding projects in the UK have often occurred through landowners choosing parcels of land, sometimes at random and not always backed by science. There’s often an assumption that ungulates will be helpful to the health of the landscape, but there is still little understanding of how they interact. This research will help to plug that gap, and strengthen the science behind rewilding.”

Red deer (*Cervus elaphus*) have played an important role in rewilding parts of Scotland





Macro images of *Acropora* sp. (left) and *Favia* sp. (right) taken at London Zoo

NEW ID TOOL SUPPORTS CORAL CONSERVATION

Improving coral species identification a vital step in their conservation

Without effective climate change mitigation, coral reef ecosystems as we know them today could be lost by 2050. Conservationists are in a race against time to bring as many coral species as possible into aquariums before it's too late, and a new tool developed by ZSL and its collaborators could help this urgent rescue effort.

"It's difficult to contemplate the loss of these wonderful ecosystems," says Paul Pearce-Kelly, Senior Curator of Invertebrates and Fish at ZSL's two conservation Zoos, "but the threat to warm

water coral reefs is now so great that, in addition to doing all we can to protect corals in the wild, we must ensure all these species are in aquarium care and cryopreservation banks. This rescue initiative is a key remit of the recently opened marine aquarium at London Zoo's Tiny Giants.

"However, this ambitious task is further complicated by the fact that many coral species are very difficult to identify. So there's a pressing need to improve identification ability across the conservation community."

London Zoo's invertebrate team and ZSL's Institute of Zoology have been working hard to identify the species of all corals in our care – many of which were rescued by the UK's border security – as well as samples collected by ZSL's marine conservation team in the Chagos Archipelago. In collaboration with the aquarium community, the Natural History Museum and coral taxonomic specialist Charlie Veron, the team have developed a tool – ID Helper – that catalogues coral specimens, along with their morphological imaging, genetic data and expert assessments, to provide the highest possible identification confidence level.

As well as helping to inform species identification in the field, the high-confidence species images generated through the project will also feed into plans to develop a machine learning programme for automated, rapid image analysis. The same tool is also being used to help identify reef cryptofauna – the shrimps, molluscs, starfish, anemones and countless other animal groups that comprise the vast bulk of coral reef biodiversity and which, along with reef fish, are reliant on coral.

"With this improved identification ability we can maximise conservation impact across the aquarium and zoo community," says Paul. "Crucially, it also helps us ensure that as many species as possible are represented in cryopreservation banks to preserve genetic diversity and assist the breeding of more climate change-resilient corals."

The next step, says Paul, is for London Zoo's aquarium to start breeding corals via sexual reproduction – a technique pioneered by colleagues at the Horniman Museum. "The new facility has the capability to mimic the environmental conditions corals require to spawn, which will further our ability to improve both the size and genetic diversity of our support populations."

FROM BEAR TO BADGER

New paper calls for rethink on Asian badger farming in wake of bear farming ban

In 2022 South Korea's conservation community won a landmark victory – an agreement to end bear farming. By 2026, the practice of farming bears for trade in their body parts will be illegal in South Korea. The time is right, says Joshua Elves-Powell, PhD Researcher at ZSL's Institute of Zoology, to consider an end to the farming of another of the country's carnivores – the badger.

Badgers have been hunted for their meat and for use in traditional medicine by a variety of cultures across the globe for centuries. However, their trade took on a different nature in the 1990s in South Korea, when badgers started to be farmed. Josh's research, published in the *Journal of Asia-Pacific Biodiversity* earlier this year, points to several factors as possible catalysts for the introduction of badger farming in the country. One surprising factor may have been South Korea's accession to CITES in 1993, as badgers were actively promoted as an alternative in traditional medicine for Asiatic black bears (*Ursus thibetanus*), a CITES Appendix I species.



Little is known about South Korea's Asian badger population – Josh hopes his research will lead to more interest in their ecology

The native Asian badger (*Meles leucurus*) and the non-native hog badger (*Arctonyx* spp.) do not receive the same protection as their distant, larger relative and the number of badgers on Korean badger farms is estimated at 4,000 – over 10 times the country's number of farmed bears. Badger body parts are used in a diverse range of products, from anti-aging creams to nutritional supplements. Regulation of the industry for biosecurity and animal welfare on farms is almost non-existent.

While still only a niche market, Josh believes there is a risk to wild badgers if the trade expands.

"Badger poaching is known to occur in South Korea and there are accounts of wild badgers being illegally caught to stock the farms. Were the demand for badger products to increase, it would likely put a greater strain on wild populations."

Badger farming should also command greater attention because of the potential disease risk, says Josh. Mustelids, the animal group that badgers belong to, are known to pose a particularly high risk of zoonotic diseases – diseases that can jump to humans – as shown by outbreaks of Covid-19 on farms of mink (a close relative of the badger) in Denmark and the US, resulting in culls of millions of mink. "Animals that are kept in large numbers in close confines, particularly in cases of greater stress which can result from poor welfare conditions, could pose an even higher disease risk."

"Conservation and animal welfare has attracted far greater interest in South Korea in the last decade. It's now a political issue that even featured in last year's presidential election," adds Josh. "However, the focus is largely on well-known species, like bears and tigers, or domestic pets. I hope we can draw attention to a less well-known species and an industry where many of the same risks associated with bear farming are present. There is certainly sufficient evidence to justify South Korea's legislators to align their approach on bears and badgers."

AUSTRALIA INCREASES ITS COMMITMENTS TO BIODIVERSITY CONSERVATION

ZSL Fellow *Dr Ross Jeffree* reflects on Australia's '30 by 30' pledge

Dr Ross Jeffree is a representative of the IUCN's World Commission on Protected Areas and the Orangutan Project. He has a PhD in zoology and was previously Head of the UN's Marine Radioecology Lab in Monaco and a diplomat at the Australian High Commission in London. In 2022 he was made a Member of the Order of Australia for significant contributions to conservation and environment.

Australia has some of the world's richest and most diverse biodiversity. In fact, we come a close second to our nearby neighbour Indonesia in having the largest number of endemic species of plants and animals. However, since colonisation, Australia has lost 34 mammals, which is comparable to the world's combined losses over the past 200 years. Not only do we lead the world in mammal extinctions, but 19 of our most important ecosystems, including the Great Barrier Reef, are also collapsing.

The key threats to Australia's biodiversity are habitat loss and degradation, invasive species and particularly climate change. Australia has warmed by about 1.6°C, compared to a global value of 1.1°C, which suggests a future warming in Australia of 2.1°C for a world average increase of 1.5°C.

"If governments take their commitments to 30 by 30 seriously there will be an urgent demand for more zoologists and wildlife management professionals."

Against the backdrop of this unfolding biodiversity catastrophe, it was heartening that our new Government, elected in 2022, championed many critical inclusions at the recent COP15 UN Biodiversity Conference, including the commitment to protect 30% of land, freshwater and oceans by 2030 (30 by 30).

The role and rights of indigenous peoples and local communities were highlighted in the agreement. Despite representing only 5% of the world's human population, indigenous land contains around 80% of global biodiversity. In Australia, this issue is of great importance to achieving biodiversity goals, given the integral role of indigenous protected areas in the matrix of Australia's protected areas. Adequate resources and support for these places and communities will be critical.

Now the urgent question is: *how to actually achieve 30 by 30 in the next eight years?* The National Parks Association of New South Wales (NPA), for example, note that it has taken decades of hard work to expand the NSW reserve system to its current position of just 10% of the state.



The planned creation of a Great Koala National Park will be vital to the survival of the dwindling koala population

Governmental acceptance of 30 by 30 has been an opportunity for NPA to aspire to 30% by identifying further major reserves; including a Great Koala National Park, which is of great importance given that koalas are projected to become extinct in the next 40 years at the current rates of state-sanctioned logging of native forests.

The IUCN advises that 30 by 30 can be achieved by improvements to existing protected areas and their further creation, but most likely by the recognition of other area-based effective conservation measures (OECMs) that are already in effect. In fact, this type of conservation model is akin to that which has been evolving over more than 30 years at the Australian Wildlife Conservancy (AWC). The AWC has a stake in 12.9 million hectares across sanctuaries and partnership

sites in iconic regions of Australia, making it Australia's premier owner, manager and influencer of conservation on private land. AWC's mission is centred on creating feral-predator-free safe havens for reintroduced species, innovative and practical management of ecosystems, and working alongside traditional owners and indigenous ranger groups.

AWC's activities to date have resulted in threatened species persisting or increasing in abundance. Their ex-situ conservation and translocations are rescuing some species from extinction or providing insurance against extinction in the wild. Predator-free refuges and safe havens are crucial in securing populations of some of our most threatened mammal species – such as northern bettong, northern hairy-nosed wombat and black-footed tree-rat. AWC is a beacon of hope in the face of extreme conservation challenges.

Australian zoologists' concern for biodiversity also extends to our nearest mega-biodiverse neighbour, Indonesia. One Australian NGO example is The Orangutan Project (TOP), which

has worked over the past 25 years to protect the three Critically Endangered orangutan species from extinction in the wild. Its conservation model is founded on five pillars: i) change the legal status of rainforest to protect their habitat in Sumatra and Borneo; ii) resource local wildlife protection units to patrol these rainforests to protect them from poaching, encroachment and clearing by fire; iii) assist local communities to replant and restore logged forests; iv) rescue orphaned orangutans, rehabilitate and educate them in jungle school for staged release in protected rainforest; and v) empower local communities with practical education in sustainable agriculture and access to forest-friendly employment, as an alternative to illegal logging and poaching.

Through this holistic approach to protecting habitat, first and foremost for orangutans, it has also protected Critically Endangered Sumatran tigers and elephants. The metrics speak for themselves: for orangutans, more than 1.6 million acres of rainforest and 11,000 wild individuals protected; for tigers, over 900,000 acres of habitat and 109 wild individuals protected; for elephants, over 900,000 acres of habitat and 515 wild individuals protected; and over 270 wildlife protection rangers employed.

If governments do take their commitments to 30 by 30 seriously there will clearly be an urgent demand for more zoologists and other wildlife management professionals. ZSL, with its expertise in scientific research and field conservation, is well placed to help meet that demand in the UK.

Both AWC and TOP have established clear, science-led missions and flexible operational processes to achieve their conservation goals. Funding is predominantly from private supporters and volunteer fundraisers, who are continually informed of successes and challenges through quantitative, quality reports. Perpetual grass roots advocacy and media presence is also part of the success stories. Their successful conservation business models are worthy of further investigation by other countries and NGOs. With less than eight years till 2030, there is no time to waste!

Are you interested in writing about your work for *The Zoologist*? Please contact us at fellowship@zsl.org.



SCIENTISTS' CORNER

Q&A with Tyrone Capel

TZ: What is Whipsnade's involvement with native species?

TC: When ZSL's Secretary and long-time Fellow Sir Peter Chalmers founded Whipsnade Zoo in 1931, he was clear that the Zoo should be not just home to exotic species, but a haven to native British species too. We've tried to stay true to that mission, and I'm pleased to say that Whipsnade is teeming with life – as anyone who visits in spring and summer will see! At ZSL we have a biodiversity policy, which ensures British wildlife are considered ahead of any building work

and mitigation plans are put in place to minimise disturbance to our native species. Of course, there's always more we can do. My mission, besides caring for the thousands of ectotherms at our Zoo, is to turn Whipsnade into a bastion of British wildlife and to integrate native species into everything we do at the Zoo.

TZ: How does Whipsnade keep track of its native species?

TC: Some very passionate staff currently dedicate time outside their zookeeping duties to the monitoring of species across the Zoo. We do bat surveys throughout the year, and we've

***Tyrone Capel**, Senior Ectotherm Keeper at Whipsnade Zoo, cares for the Zoo's fish, reptiles, amphibians and invertebrates. He is an expert on the UK's native bat species and leads Whipsnade Zoo's native species plan.*

"British wildlife is coming under increasing pressure, from urban development and climate change. Whipsnade's unique position in the Chilterns means it can be a safe haven for species."

shown that we are home to several rare species, such as Leisler's bat and the barbastelle. We do invertebrate surveys twice a year, and know that the Duke of Burgundy, one of the UK's rarest butterflies, is found here. Earlier this year we began a new project with a local mammal recording group, who offered training to staff on how to spot some rarer mammals. And, also this year, volunteers and staff have set up bird surveys across the site, with plans to create walks and talks about birds for the public. Most recently, we got funding to purchase reptile and amphibian tins across the site. We already know we have a resident slow worm population, but we want to know if we have any other important species on site. The tins are as high tech as they sound – they heat up during the day, attracting cold-blooded reptiles and amphibians who like to sit under them.

TZ: Is there a way Fellows can get involved?

TC: For those green-fingered Fellows who fancy getting their hands dirty, we are always looking for volunteers for our wildlife gardening project. We recently set up a native species gardening group, aimed at transforming unused areas of the Zoo into havens for British wildlife, and we need all the gardeners we can get! One easy way to help us is to tell us what native animals you spot on your

next visit. Download the iNaturalist app and record photos of any animals you find while here. The app uses AI to analyse the photo and identify the species, and then it goes to a specialist to double check. This helps us identify hotspots of animal activity, informs the areas we choose for habitat restoration and feeds into any building work going on at the Zoo. And finally, Fellows can also donate to our Amazon wish list. Supporters have already bought us 40 bird boxes and 25 bat boxes, which have gone up around site!

TZ: What will success look like?

TC: British wildlife is coming under increasing pressure, from urban development and climate change, and Whipsnade's unique position in the Chilterns means it can be a safe haven for species that are under threat elsewhere. We're particularly keen to see the three B's thrive here: migratory birds, butterflies and bats. Not only are these three groups declining in other areas of the British mainland, but all three animal groups are excellent indicator species for ecosystem health. Lots of butterflies indicate a strong floral ecosystem; a healthy population of bats means that the area supports lots of insects; and migratory birds means that wildlife recognise Whipsnade Zoo as a safe pitstop for food and shelter during their long journey.

Clockwise from top: Whipsnade Zoo is already home to the slow worm (*Anguis fragilis*), the Duke of Burgundy butterfly (*Hamearis lucina*) and the barbastelle bat (*Barbastella barbastellus*)