ZSL

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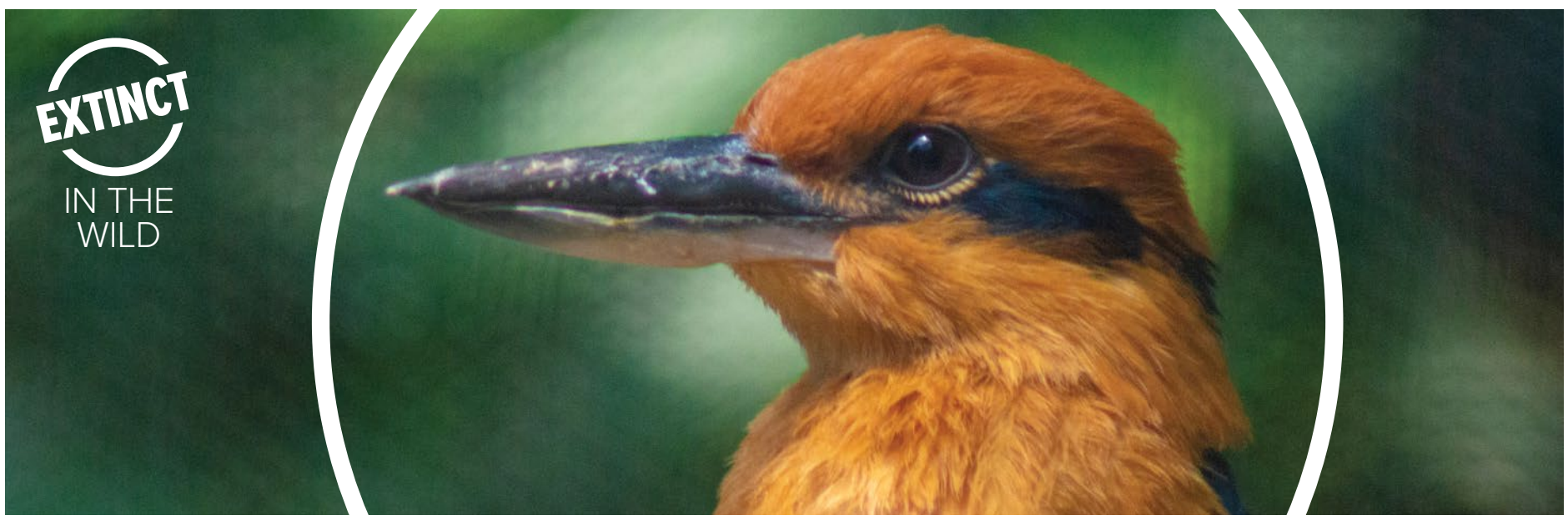

Nine sihek (*Todiramphus cinnamominus*) have been released on the remote Pacific island, Palmyra Atoll

SIHEK SPREADS WINGS ON PALMYRA ATOLL

Kingfisher introduced to remote Pacific island 40 years after disappearing from Guam

Earlier this year, nine sihek journeyed to their new home on Palmyra Atoll, where they will establish the first wild, breeding population since they disappeared from Guam in the 1980s.

The five males and four females arrived in Palmyra on 28 August on a private flight from Wichita Kansas, where they had been hand-reared by a team that included bird experts from London and Whipsnade Zoos. Following several weeks' adaptation to the island in soft-release aviaries, they have been released into the wild.

Further introductions will take place, until a founder population of 20 breeding birds has been established.

Palmyra: A home from home

Siheks, also known as Guam kingfishers, were wiped out on their native island home of Guam following the accidental introduction of brown tree snakes. Having evolved on an island with few arboreal predators, the kingfishers and their eggs proved easy prey for the adaptable tree snakes – who continue to impact the Guam ecosystem today.

The plan to introduce the sihek to Palmyra was hatched by an international partnership including the Guam and US governments, conservation organisations and zoos. It followed the publication of research that indicated the zoo population of sihek was slowly declining towards extinction.

"With just 135 adult sihek in human care in the US and Guam, it was clear more radical action was needed to escape that danger zone," explains ZSL's Professor John Ewen, Chair of the Sihek Recovery Program. "The brown tree snake is still present on Guam, making it currently not possible to reintroduce them to their indigenous home, so we assessed several islands as possible sites for the introduction of a trial population."

Palmyra Atoll, which has a similar climate to Guam, was identified as the perfect site. "Palmyra contains ideal forest for the sihek, and assessments of the island indicate that the food web will be able to support the introduction of a predator like a kingfisher," says John. Despite being kingfishers, sihek are coastal forest specialists that feed on invertebrates and small reptiles, which are both abundant on the island.

"Importantly, Palmyra is small and flat – making it possible for us to closely monitor the siheks' progress," says John. "We wanted to chose a location small enough that, should the sihek have a negative impact on the ecosystem, we would be able to remove them.

"There are no threatened species on the island, making it a low conservation risk, and no other kingfishers, so no risk of hybridisation. And, by hand-raising the chicks in a specially built, bio-secure facility in Kansas, we've been able to mitigate the risk of introducing a disease to the island," adds John.

A future for the species

The siheks have been fitted with GPS collars, allowing a small field team on the island to monitor the nine birds daily. The team will also retrieve the birds periodically to perform health checks. Importantly, this is a chance to learn about the siheks' wild behaviour, says John.

"We haven't observed siheks in the wild since the 1980s, and there's lots we need to learn. The species has spent 40 years being cared for in zoos, so the birds will also need our support to re-adapt to life in the wild. We'll be looking especially at their pairing and reproductive success, how they hunt and what habitats they prefer.

"We've also been monitoring the existing prey populations on the island for the last year, and will continue to do so, to make sure the sihek don't have a disproportionate impact on the native wildlife."

Modelling of Palmyra Atoll suggests that the island could support 31 breeding pairs, growing the worldwide population size by almost 50%, to over 200 mature individuals.

"Our hope is that, one day, we can move wild birds from Palmyra onto Guam," says John. "The Guam Government and several NGOs are working on the major challenge of removing the invasive snakes. And, if Palmyra proves successful, another option is establishing a second population on a similar island, where the population of sihek could continue to grow.

"This is a special moment for the species and for everyone who has been working towards it for several years," says John. "It's also a major moment for conservation as a whole. It's not often you get to return a species to the wild. Though it's an event that will increase in frequency as we focus more attention on Extinct in the Wild species."

To read more about our Extinct in the Wild programme, and to learn about how we're returning other species to the wild, visit zsl.org/extinctinthewild

Professor John Ewen, ZSL

Andrew Terry,
Director of Conservation and Policy, ZSL

DEAR FELLOWS

This time last year, countries agreed a new global framework for biodiversity. Setting new targets for urgent action to not only halt the loss of species and their habitats, it also put in motion key enabling mechanisms to drive restoration at scale. But these targets are only valuable if countries implement them with sufficient resources and track their progress. The urgency is clear; in this issue you will read about the latest Living Planet Index, which highlights the continuing decline of wildlife populations worldwide.

At the end of October, we will travel to Cali, Colombia for COP16 of the Convention on Biological Diversity. We will bring together Colombian Fellows from our EDGE of Existence Programme to share their experience of conservation at the grassroots. During the negotiations, we will push for four core commitments: 1) scale up ambitions and actions for species recovery, 2) close the data gaps and finalise an effective monitoring framework to track progress, 3) mobilise the $20bn of resources committed at COP15 as fast as possible, and 4) embrace joint action for nature and climate together.

This issue of *The Zoologist* celebrates the translocation of the sihek, or Guam kingfisher, to Palmyra Atoll in the Pacific Ocean. The pressures on Guam remain too much and so, with a global partnership, we are bringing birds to the ecologically similar island of Palmyra. This represents a key milestone for our Extinct in the Wild (EW) initiative, which aims to return all EW species to the wild.

Closer to home, we also showcase continued success for bovine TB vaccination trials. Delivered in collaboration with farmers and Cornwall Wildlife Trust, these trials demonstrated the effectiveness of vaccines on badgers and highlighted increasingly positive attitudes to vaccines within the farming community.

The importance of developing conservation with communities was further highlighted by a three-year, UK-Government-funded programme across Kenya and Nepal, that tackled some of the root causes of conflict with wildlife. The programme achieved impressive reductions in conflict and boosted wellbeing among the communities. The route to achieving global conservation commitments will be through people-centred approaches like these.

DIARY DATES

31 October
Careers Conference
Student Fellows only
Huxley Lecture Theatre

12 November, 6pm
Restoring Nepal's roar: Discussing contemporary tiger conservation approaches in the Nepalese Terai
Science and Conservation Event
Online

19 November, 6pm
Bringing back our rare animals: Lessons for recovery in Malaysia
Science and Conservation Event
Huxley Lecture Theatre

21 November
Annual General Meeting
Huxley Lecture Theatre

21 January, 6pm
Learning to adapt: Is animal behaviour an overlooked tool in conservation?
Science and Conservation Event
Huxley Lecture Theatre

Online talks are streamed via **zsl.org/loZYouTube**. For more info, visit **zsl.org/zsl-fellows-events**

BOVINE TB IN BADGERS FALLS FOLLOWING VACCINE STUDY

Four-year, farmer-led pilot in Cornwall sees badger infections fall to zero

The study has shown that vaccines are not only effective, but practical, says Kelly Astley (pictured, above left)

A farmer-led badger vaccination trial in Cornwall led to a total fall of bovine tuberculosis (bTB) among badgers, according to results published by ZSL's Institute of Zoology this year.

The four-year, small-scale study – initiated and paid for by a group of Cornish farmers – was run in collaboration with ZSL and Cornwall Wildlife Trust. During the study, badgers testing positive for bTB in the study area fell from 16% to zero. While bTB among cattle herds in the area did not disappear, the average number of days that herds spent under restriction per calendar year also declined.

"We hope this will be major turning point in the uptake of vaccines," says Kelly Astley, ZSL's Cornwall Badger Vaccination Coordinator. "Our prior research has already shown that badger culling could exacerbate, not alleviate, the spread of bTB by encouraging surviving badgers to range wider. This is the first study to show the a decline of bTB infections in a badger population."

Badger culls are currently used to control the spread of bTB but, in 2022, the UK Government announced the phase out of culling in favour of vaccinations. In August 2024, the Government confirmed that culling would end by 2029.

"Importantly, we were able to show how practical badger vaccines are. Badger culls typically take at least six weeks to run, but these vaccinations can be completed at a farm in a third of the time," says Kelly. "The project vaccinated double the number of badgers per kilometre squared, compared to the number of badgers culled on nearby land during the same timeframe."

The causative agent behind bTB, *Mycobacterium bovis*, is primarily spread cattle-to-cattle but can also be spread by wild badgers. The disease leads to pneumonia, weight loss and death in cattle. Cattle that test positive are slaughtered to prevent the spread of the disease and movement restrictions are placed on the whole herd. The disease leads to the death of over 30,000 cattle in the UK each year, costs the UK economy around £150 million annually and inflicts devastation on the livelihoods of farming communities.

"The success of badger vaccinations as a tool for managing bTB doesn't just depend on its technical effectiveness, it also requires addressing practical and social concerns," says Kelly. "Our study shows how practical, effective and value-for-money vaccines can be, and how enthusiastic participating farmers became upon seeing the results."

Kelly and the team behind the study are calling for government support on further assessments into the effectiveness of community-led vaccination, and hope that more farmers will be inspired to get involved.

Primates and toucans play a major role in seed dispersion, making them integral to the Amazon Rainforest's ability to store carbon.

AMAZON RAINFOREST APPROACHING TIPPING POINT, REVEALS LATEST LIVING PLANET REPORT

Living Planet Index estimates a 73% decline in wildlife population abundance in last 50 years, with Latin America and Caribbean in sharpest decline

The latest Living Planet Index, published in the *Living Planet Report* by ZSL and WWF this October, has estimated an average decline of 73% in the abundance of monitored wildlife populations globally since 1970.

The hardest hit region is Latin America and the Caribbean, where the average decline is 95% – equivalent to 5.7% year-on-year.

The Report is the most comprehensive to date, based on almost 35,000 populations of 5,495 species of amphibians, birds, fish, mammals and reptiles. It highlights the hardest-hit species groups, identifying freshwater species as most under pressure, with a global trend of 85% decline.

Declines are also steep across Africa (76%), suggesting that some of the most biodiverse regions in the world are facing staggering decreases in wildlife populations. The predominant cause appears to be habitat loss and degradation, often driven by over-consumption of natural resources.

Less dramatic are the downward trends in Europe and Central Asia (35%) and North America (39%), though they reflect the large-scale impacts on nature that were already apparent before 1970 (the baseline year) in these regions.

Dangerous tipping points

While environmental change is often small and gradual, the *Living Planet Report* draws attention to several approaching, dangerous tipping points that could trigger larger and faster change.

“One example is the Amazon Rainforest, where deforestation and climate change are leading to reduced rainfall,” explains Louise McRae, Research Fellow at ZSL's Institute of Zoology. “A tipping point could be reached where rainfall reduces so much that environmental conditions become unsuitable for tropical rainforest.”

Despite reports in 2024 that deforestation of the Amazon has slowed, it is thought that up to 17% of the Amazon Rainforest has already been deforested. A tipping point could be reached if just 20-25% of the Amazon is lost; triggering the release of tonnes of carbon into the atmosphere – further accelerating climate change and disrupting weather patterns around the world.

“We also know, from research conducted by scientists in Brazil’s Atlantic Forest, how large fruit-eating animals contribute to a forest’s ability to store carbon,” adds Louise. “Losing the seed dispersal function played by the likes of tapirs, toucans, primates and deer, relied upon by so many hardwood trees, shifts the composition of tropical tree species towards smaller, softwood trees that store less carbon.”

Time for governments to commit

Despite the stark outlook, the Report does offer some hope. The restoration of European bison to almost 7,000 wild individuals – after their disappearance from the wild in 1927 – is proof of the impact that conservation breeding, reintroductions and legal protection can have.

The success of mountain gorilla conservation is proof of the gains that can be made.

On the Virunga Massif, in central Africa, mountain gorilla abundance increased by three percent every year between 2010 and 2016, thanks to dedicated protection, engagement with local communities and veterinary interventions to mitigate the spread of disease between humans and gorillas.

“Declines are also high across Africa (76%), suggesting that some of the most biodiverse regions in the world are facing declines in wildlife populations at a staggering rate.”

“Many individual populations or species have stabilised or increased as a result of conservation,” says Louise. “We know how to do it, but we urgently need governments to make commitments that match the scale of the problem.

“In 2022, the world celebrated the passage of the new Global Biodiversity Framework (GBF), committing signatory countries to legally binding targets to halt biodiversity decline by 2030.

"Global leaders gather later this month at the Convention on Biological Diversity (COP16), in Columbia. They will need to present their national strategies and action plans showing how we will meet these commitments. These national strategies are vital for moving from ambitious promises to reality.”

ZSL will be attending COP16 to hold world leaders to account and to help drive wildlife-friendly policy. Read more about the *Living Planet Report* at zsl.org/livingplanetreport

Dennis Minja, supported by veterinarians and rangers, at the fitting of a cheetah collar

SERENGETI CHEETAHS AVOIDING HUMANS

Research into behaviour of Serengeti cheetahs indicates that iconic cats choose human-free habitats

The Serengeti's cheetahs are highly aware of humans, and will take steps to avoid them. That's according to research being conducted by Dennis Minja, PhD Researcher at ZSL's Institute of Zoology.

Using GPS collars fitted to 10 wild cheetahs living on the border of Tanzania's Serengeti National Park, Dennis has been able to track the movement and behaviour of the cheetahs most regularly coming into contact with humans.

"What the collars tell us is that these cheetahs are avoiding tourist lodges during wet season. This is calving season for wildebeests, a time when Africa's iconic predators are highly active, and consequently peak tourist season.

"During dry season, when the lodges are quieter, cheetahs change their behaviour – showing a slight preference for the areas near lodges. The lodges are built in areas of tree cover and near water holes, representing important hunting opportunities for the cheetah."

Conversely, when crossing outside of the park boundaries, cheetahs are choosing to avoid cattle enclosures (known as 'bomas') during dry season, when they are being used by indigenous livestock farmers. However, they know to ignore the bomas during the wet season, when they aren't being used.

The cheetahs are also choosing to do their hunting in woodland, according to the data – unusual for a species traditionally viewed as a grassland specialist. While it's possible that the woodland offers benefits for the cheetahs, including cover from other predators, Dennis suspects that the behaviour is primarily a response to avoid humans.

His research paints a picture of wild cheetahs that are highly attuned to human activities, avoiding us as they would other large predators. And impacting their movement in this way could have an impact on their ability to survive in the long term, says Dennis.

"Cheetahs rely on movement," he says. "They don't have a territory like other big cats – moving across vast distances to find food is essential to their survival, allowing them to avoid larger carnivores, like lions, who will kill cheetah."

For the next stage of his research, Dennis will be looking at specific times of day, analysing whether cheetahs are varying their behaviour in response to the coming and going of tour vehicles. "We can already see that cheetahs are choosing not to hunt when vehicles are nearby, and we know that they also avoid roads."

Tourism is a vital part of conservation, and brings much-needed cash and jobs to Tanzania's economy, but Dennis hopes that his research will help to develop a more sustainable approach to land management and the country's booming ecotourism.

BIG BRANDS IMPACT SMALL ISLANDS

Research lifts lid on role of food and drink multinationals in marine plastic pollution

Two major brands are behind the majority of plastic pollution in the Chagos Archipelago, according to research by ZSL researcher Jessica Savage (pictured, far right and above)

New research from the remote Chagos Archipelago has highlighted the scale of plastic pollution in the Indian Ocean. Surveys of 3.8km of beach on two atolls recorded over 6,000 plastic bottles and loose lids.

Analysis of the bottles and drinks lids has shown that 99.9% of plastic waste is coming from outside the archipelago, and that 72% of items were manufactured by two major multinationals: The Coca-Cola Company and Danone.

"Small chunks of plastic, and the chemicals they contain, have been linked with digestive, fitness and fertility problems in other species."

Water samples from Chagos suggest microplastics are equally pervasive. It is thought that the large plastic items washing up on beaches are broken down into microplastics (any piece of plastic under 0.5cm) and disperse throughout the ocean ecosystem.

ZSL is involved in the creation of the United Nation's (UN) Global Plastic Treaty, and hopes this research will help the UN hold large brands accountable, explains PhD Researcher Jessica Savage. "We are calling for the Treaty to recognise extended producer responsibility, making producers responsible for their products across their entire lifecycle," says Jessica. "This will shift the onus of pollution prevention and clear ups off small island nations onto the large multinationals producing and benefiting financially from plastic.

"With just a small number of brands responsible for the majority of plastic pollution, action from a few could have a huge impact on this global problem."

Jessica's research is also investigating the impacts of plastic on filter-feeding megafauna, like the reef manta ray. "Manta rays face twin risks from plastic pollution. They can become entangled in plastic fishing gear, but they can also ingest microplastics while they feed," says Jessica. "These small chunks of plastic, and the chemicals they contain, have been linked with digestive, fitness and fertility problems in other species.

"My research aims to assess the global exposure of reef manta rays to plastic pollution by overlapping their range, movement patterns and feeding grounds with plastic distribution maps. This will help us identify risk hotspots and priorities for plastic pollution removal or prevention schemes," she explains.

"Plastic pollution might feel insurmountable but it really is in our gift to solve, by changing our own behaviours and putting pressure on the right organisations," she adds. "I hope that, by demonstrating the risks to such a charismatic species like the manta ray, we can move the needle in the right direction."

To read more about ZSL's position on the UN Global Plastic Treaty, and our work to support it, visit zsl.org/plasticstreaty

For People, For Wildlife has developed a model for alleviating human-wildlife conflict that will inform ZSL's future work with communities in Nepal and Kenya

FOR PEOPLE, FOR WILDLIFE: ON THE FRONT LINES OF HUMAN-WILDLIFE CONFLICT

Three-year project in Kenya and Nepal drives falls in human-wildlife conflict and the illegal use of natural resources; while incomes, wellbeing and attitudes towards conservation all rise

This year, one of ZSL's flagship projects in Nepal and Kenya, For People, For Wildlife, came to an end. Funded by donations from ZSL's supporters and the wider general public, and match-funded by the UK Government, the project sought to improve coexistence with wildlife for four communities living on the edges of national parks in Kenya and Nepal – by tackling the root causes of conflict.

The four communities sit on the edge of Tsavo National Park in Kenya, and Chitwan National Park and Doodhpani Community Forest in Nepal. These are important biodiversity hotspots, home to iconic wildlife – elephants, rhino, big cats – but sharing a landscape with wildlife can be challenging and dangerous. For people, conflict with wildlife can result in the loss of property and even life; for wildlife, it can lead to the destruction of their habitat or retaliatory killings.

The conflict often falls heaviest on the shoulders of people who have few resources to manage the situation, explains Maheshwor Basnet, ZSL's project lead in Nepal. "Frontier communities living on the edges of national parks tend to face challenges like high poverty, reduced economic opportunities and limited access to development aid."

Few economic prospects can also make communities more vulnerable to exploitation by the illegal wildlife trade, says Maheshwor. For communities where the average wage might be less than £10 per day, illegally collecting a kilo of pangolin scales that will eventually earn thousands on the black market is an understandably appealing prospect.

Solving these issues, then, is of primary concern for conservation.

Financial security for the long term

The most common forms of human-wildlife conflict are farming related: the loss of livestock to big cats and snakes, and the loss of crops to hungry herbivores – from elephants to macaques. "Before the project began, the Kenyan villages were losing over half their livestock to predators, and in Nepal it was over a quarter," explains Fridah Mutili, ZSL's project lead in Kenya.

The project team helped and trained community members in both countries to build predator-proof livestock enclosures, or transition towards crops that don't appeal to wildlife. The enclosures proved incredibly effective: from all the households in Nepal with enclosures, just two livestock were lost to predators; in Kenya, not a single animal was lost. "This is the difference between having enough livestock to sell to cover education, health and other daily needs, or falling further into poverty," explains Fridah.

Alongside improving their short-term finances, each community set up community banks to develop their long-term financial security. Rural communities in Nepal and Kenya have little access to financial services – interest rates of 20-30% from commercial banks effectively bar them from making investment in their livelihoods. "Community members save a little a money each month, and the community votes on who to lend funds to each month, so that people can improve their businesses or homes," explains Fridah.

Monica Musyoki, from Kitheini village in Kenya, described the difference the enclosure (known as 'kraal' in Kenya) and the community bank made to her own life: "Having a kraal motivated me to take out a loan to buy more goats, knowing they would be safe. I finally feel financially secure – I can easily access funds to meet my basic needs, as well as cater for emergencies for my family."

Community members also undertook training in more sustainable, wildlife-friendly livelihoods. These included goat and chicken farming, which have a smaller environmental footprint and require fewer resources to raise than large cattle, or diversifying into shopkeeping.

As well as providing additional income, the shift to alternative livelihoods had another consequence: a reduced reliance on natural resources like firewood or grazing land. Illegal use of natural resources in the nearby protected areas fell by 75% in Nepal and 56% in Kenya – improving available habitat for wildlife and reducing opportunities for wildlife and people to come into conflict.

Growing social capital for marginalised communities

Historically, national parks have often been created without consideration given to the communities that also call these areas home. These exclusionary practices are outdated and can leave residual feelings of mistrust and disengagement with conservation.

For People, For Wildlife sought to build relationships between the communities, local government and the protected area authorities through regular community meetings, drop-in sessions and, in the case of Kenya, bus trips into Tsavo National Park. The success of these activities is measured by a social capital index – which scores the health of a society's social networks, cohesion and participation. In Nepal, the social capital index rose by 30%; in Kenya, by 17%.

"The support from local government and the opportunities to interact with landscape managers has created avenues for discussion and raising issues that did not exist before," says Maheshwor. "These interactions not only facilitated better communication and cooperation but empowered local people, giving them a platform to voice their needs and contribute to decision-making processes."

Maheshwor also points to this empowerment as a significant contributor to the boost in wellbeing of community members: wellbeing rose by over 40%, on average, among people in both Kenya and Nepal.

As the project ended, 95% of people in the four communities reported that human-wildlife conflict had decreased, while 99.5% said they felt positively towards wildlife conservation. While research is still needed to understand the impact of the project on wildlife populations, ZSL and its partners now have a proven model for improving coexistence between people and wildlife that will be scaled up and replicated at other locations, with other communities ZSL works with, across Nepal and Kenya.

Learn more about the project and read the full impact report at zsl.org/peopleandwildlife

New research shows that the Chinese giant salamander is at least seven distinct species

THE MAGNIFICENT SEVEN

Research concludes Chinese giant salamander in fact seven distinct species

New genetic analysis carried out by ZSL scientists and partners has identified that Chinese giant salamanders constitute at least seven different species – all of which are likely to be Critically Endangered.

Previously considered just a single, widespread species, molecular genetic analysis of wild and farmed salamanders, and museum specimens, now indicates that Chinese giant salamanders are in fact a group of at least seven separate species, potentially rising to nine.

Two of the species of Chinese giant salamander are already assessed as Critically Endangered by the IUCN Red List – assessments that ZSL's scientists contributed significantly to – and the remaining five species are considered highly threatened and in need of urgent action.

"It's imperative the seven different species are officially recognised and built into China's conservation network," explains Sam Turvey, lead author and Professor at ZSL's Institute of Zoology. Four of the species are already named, but the remaining three are unnamed and currently not the target of species-specific conservation.

Chinese giant salamanders, which can grow up to 1.8m long and are the world's largest amphibian, were once widespread across central and southern China but have undergone catastrophic population declines and exist in fragmented populations.

"This is largely due to the emergence of massive-scale, commercial farming of salamanders – which drove the illegal harvesting of wild salamanders to supply breeding stock," explains Sam. Salamanders are considered a luxury food item in China.

"It is imperative that the different species are recognised. Hybridisation, through the mixing of salamanders on farms and well-intentioned releases of farmed salamanders, has already done huge damage, and continues to pose a severe threat to their long-term survival."

London Zoo is home to four Chinese giant salamanders, rescued by UK Border Force from the illegal wildlife trade in 2016, while smugglers attempted to bring them into the country.

Zookeepers and scientists at ZSL are developing an environmental DNA (eDNA) method that will help field conservationists in China locate salamanders in rivers where they reside. Chinese giant salamanders are extremely difficult to find, making it difficult to understand their present distributions. Using eDNA, collected from water samples, conservationists will be able to pinpoint the rivers in which the salamanders still reside.

Operation Pangolin will pair on-the-ground data, about pangolin behaviour and threats, with machine learning to develop a tool for predicting wildlife crime hotspots

OPERATION PANGOLIN

Major project deploys artificial intelligence to fight wildlife crime

ZSL has joined a global initiative, led by Florida International University, designed to halt the international, illegal trade of pangolins. At the heart of the project lies artificial intelligence, and the hope that machine learning could turn the tide against poachers and traffickers.

As an implementing partner, ZSL's conservation team in Cameroon will be collecting the data needed to inform a machine learning programme. "Pangolins are extremely hard to study and so little is known about their populations and density, so the first step is to develop the technology that will allow us a better insight into their world," explains Andrew Fowler, ZSL's Regional Director for Central and West Africa. Already underway are plans for treetop camera traps, thermal imaging camera traps and acoustic sensors.

"Alongside trying to establish the first baseline for pangolin populations, we will also be working closely with local communities in and around protected areas to understand their attitudes towards pangolins, what activities they do that might affect pangolins and their awareness of criminal activity. This is a deeply sensitive topic, and one of the reasons ZSL was chosen to oversee the Cameroon aspect of the project was our long standing in the country and reputation for working responsibly with communities," says Andrew.

Another aspect of the project involves using conservation criminology tools to identifying how and where traffickers move pangolins across borders, understand the drivers of crime and collect data from law enforcement organisations on seizures. "By combining these diverse data streams, and using artificial intelligence and machine learning, we will be able to look for patterns in the poaching and trade of pangolins," explains Andrew. "It will help to predict future wildlife crime and inform sustainable and cost-effective solutions, allowing countries to focus their resources on pangolin crime hotspots."

There are eight species of pangolins, three of which – the Chinese, Sunda and Philippine pangolin – are already Critically Endangered. The Indian pangolin, the fourth Asian species, is considered Endangered, with its population declining.

While Africa's four species of pangolin (three of which – the white-bellied, black-bellied and giant pangolin – are found in Cameroon) are considered less threatened, it is thought that the increasing scarcity of Asian pangolins is driving international trafficking of African pangolins to meet demand in East and Southeast Asia. It is estimated that one million pangolins were trafficked in the last decade, based on seizures.

"Operation Pangolin is a $9m global initiative, one of the largest projects ever funded for pangolins, and is a sign of the growing attention pangolins are receiving," adds Andrew. "For several years pangolins have been suffering in silence, but this project is an opportunity to develop a worldwide pattern of pangolin trafficking and help law enforcement across the globe intercede effectively."

PEOPLE POWER

Decade-long citizen-science programme has lifted the lid on the health risks facing our garden wildlife

The Garden Wildlife Health (GWH) programme recently celebrated it's 10-year anniversary. Set up to identify the diseases and other health risks facing Britain's wildlife, GWH has detected the arrival of Usutu virus and discovered snake fungal disease in Britain, and shed light on the impact of finch trichomonosis on our greenfinches. The programme brings together partners from the British Trust for Ornithology (BTO), Royal Society for Protection of Birds (RSPB) and Froglife. At its heart is people power, says Katharina Seilern-Macpherson, Senior GWH Wildlife Veterinarian at ZSL.

"The biggest lesson from the last 10 years has been the power of citizen science to help us monitor the health of British wildlife," explains Katharina. "As vets, we can't be everywhere – but by working with the public, we've been able to cover the whole of Britain."

Katharina and the team of veterinarians and technicians at ZSL's Institute of Zoology are reliant on the public submitting disease incident reports – over 36,000 in 10 years. These also come in via partners at BTO, RSPB and Froglife, and have led to nearly 3,000 post-mortem examinations of garden birds, reptiles, amphibians and hedgehogs.

Importantly, it's a give-and-take relationship, says Katharina. "Research has shown that participants in citizen science are strongly motivated by a desire to help, but also to learn. For each sample we receive, we provide a full report, with an explanation of the tests we've performed and what we've learned," she adds. "We have published around 60 research papers since the programme began, with the majority freely available online for the public to access."

"Research has shown that participants in citizen science are strongly motivated by a desire to help, but also to learn."

From the specimens submitted by the public, the GWH team are able to investigate the emergence of health risks for our garden wildlife. In 2017, GWH published the first evidence of snake fungal disease in Europe and in 2020 the programme detected the arrival of Usutu virus in Britain. Usutu virus, which can infect many birds but most commonly affects blackbirds, was first discovered in South Africa but in recent decades has moved steadily northwards across Europe.

A changing world, growing disease risk

A common assumption once held among biologists was that diseases were not a threat to species survival. It was thought that pathogens and animals evolved to coexist alongside each other, and it would not be in the interest of a pathogen to destroy its host. However, international travel and trade have changed the rules of the game, says Katharina.

"The prime example is chytrid fungus, likely spread by the international trade in amphibians, which has been linked to the extinction of almost 100 species and the decline over 500 amphibian species around the world," she says. "Vectors of disease – such as mosquitos – are also able to spread to new areas by piggy-backing human transport like air travel, or trade products."

One of the major diseases affecting Britain's garden birds is finch trichmonosis. Data collated through GWH, paired with data collected by BTO's Garden Birdwatch population monitoring study, has uncovered the extent of damage inflicted on Britain's greenfinch population.

"Greenfinches have declined by almost 70%," says Katharina. "They jumped straight from the Birds of Conservation Concern's green list – indicating a healthy population – to the red list of Britain's most threatened birds, and are the first British bird to be added to the red list due to the impact of an infectious disease." And chaffinches are on a similar trajectory; their numbers have dropped by 40%, but their decline began several years later.

Mobilising a nation of wildlife lovers

Our urbanised, interconnected world has altered the environment in which humans, livestock, and wildlife mix, increasing the chances for pathogens to spread to new and more vulnerable hosts with the potential to cause more severe diseases.

As wildlife lovers, we must be aware of this – even in our own gardens, says Katharina. "Half of UK households feed birds in their garden. Garden bird feeding has lots of benefits, particularly during winter, but it can also aid the spread of disease by encouraging birds to gather in unnaturally high densities and bringing together species that would not otherwise mix closely.

"We've developed guidance on the steps the public can take to interrupt that cycle, like regularly cleaning bird feeders and baths."

The team are also sharing expertise with vets from several countries who are setting up their own garden wildlife health surveillance programmes using citizen science. "Sweden have already created their own successful programme, using GWH as a model, and we'd love to be able to compare and track data with other European countries."

Katharina says that, if the last 10 years have been about learning what problems British garden wildlife face, the next 10 years will be about driving change. "Each year, more people get in touch with GWH to share their observations," she says. "It's time to capitalise on that growing interest and awareness." Time to leverage Garden Wildlife Health's people power.

To find out more about Garden Wildlife Health, wildlife-friendly gardening and bird feeding, and what to do if you come across a sick or dead wild animal, visit gardenwildlifehealth.org

Clockwise from top left: The UK's greenfinch population has declined by almost 70%; Katharina examines a hedgehog; ZSL published the first evidence of snake fungal disease in Europe, a threat to species like the adder.

SCIENTISTS'
CORNER

Nathalie is calling for a systematic change to land management in the UK, and a government-wide recognition of the value of natural capital

"UK LAND HAS BEEN MISMANAGED – WE NEED CHANGE URGENTLY"

By Prof Nathalie Pettorelli

***Nathalie Pettorelli** is a Professor at ZSL's Institute of Zoology. Nathalie's research aims to inform nature recovery in the face rapid global environmental changes. In 2024 she published* Prioritising land use in the midst of a climate and nature emergency, *outlining the system-level change the UK must take to secure a sustainable future for nature, climate and people.*

UK land has been used as if it's an infinite resource, it's as simple as that.

In fact, a 2023 report by the Royal Society added up the Government's commitments and found that we would require a country 1.5 times the size of the UK to deliver on all of them. Continuing with fantasy policymaking like this contributes to an erosion of public trust in politics and will ensure the UK doesn't meet the climate and biodiversity targets it has committed to.

We urgently need a land-use framework – a decision-making process that oversees the needs and opportunities of land across the country.

Those opportunities might be house-building, biodiversity restoration, transport or food production, and they must be linked up. The good news is that the newly elected UK Government acknowledges the problem and committed to developing just this in their election manifesto. But creating the framework is the easy bit – making the choices of what to do and where is the hard bit.

There are three step the UK Government must take.

The first is to create a forecasting infrastructure and a national observatory. We have a huge amount of data in the UK, some of which sits across different government departments or in the hands of the private sector. With this data we can create the models to identify how to best use our land amid rapid environmental change.

Second, the Government must tackle demand, as well as supply. Until now the Government has found ways to deliver more food, more energy and water to meet a growing population. Too often this has come at a cost to other countries, creating pollution and destroying biodiversity. Learning to live within our means as a society will require an honest conversation with the public about our lifestyles.

Third, nature must be embedded in social and economic policies. The environment has traditionally been the focus of just one government department and considered independent to business, energy and health. Natural capital – the value we get from nature – aren't considered in forecasts by the Treasury, nor are how activities might decrease our natural capital. We must recognise that environmental processes – such as air quality, the pollination of crops and the availability of water – are fundamental to our economy, and that conservation can't work within a silo.

"The environment has traditionally been the focus of just one government department. We must recognise that environmental process are fundamental to our economy."

The UK is an extremely complex and pressurised environment, but we have an opportunity to be a leader in Europe.

We are a relatively small country with a large population and economy, where inequality is relatively high and biodiversity is heavily depleted. Ensuring a fair transition to more sustainable land use is a major challenge – but if we can make it work here, it will provide a model for land use across Europe.

Ineffective land use is forcing us towards a binary decision: nature vs people.

It's pushing us into a situation where the choice will be between building more homes for people, or protecting wildlife. We must never be in a situation where the environment is presented as opposed to people. The environment is fundamental to our way of life and will be crucial to solving issues like food security and climate change. Should nature fall, so will we.