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INSIDE:
AI game changer
Disappearing crocs
Swallowtail reassessment

Fruit bats are vital for the planet's rainforests, but the bats' shrinking habitat means there is more opportunity for diseases to spill over to humans



Rosa Jolma, Veterinarian, ZSL's Institute of Zoology

IN THE WAKE OF COVID-19

Developing new ways for
people and wildlife to coexist

CCOVID-19 is the latest in a line of deadly viruses – including Ebola, SARS and MERS – thought to have originated in bats. It may be the first to bring the world to a standstill, but an outbreak on this scale has been expected since the emergence of SARS in 2002.

Three-quarters of emerging diseases originate in wildlife, and scientists have observed a growth of diseases spilling over from wildlife into humans in the last 25 years. Bats, in particular, have an unusually high capacity for hosting diseases that have the potential jump to humans. But driving the increase of spill-overs is not the bats; it is human behaviour, and our continued expansion into wild spaces.

“The way humans and bats are interacting is changing,” says Rosa Jolma, wildlife disease veterinarian at ZSL’s Institute of Zoology. “Rainforests, the primary habitat of fruit bats, are getting smaller and smaller, and the re-purposing of forest for agriculture and palm oil plantations is likely to increase their interactions with people.”

Fruit bats are an essential cog in the evolution and maintenance of our planet’s rainforests. Without the seed dispersal and pollination they provide, many of the trees we rely on for carbon extraction and food would not exist. In the wake of COVID-19, finding ways for humans and bats to co-exist has never been more pressing.

“Our role at the Institute is to understand the risk factors for virus spill-over so they can be mitigated – protecting bats, rainforests and people,” says Rosa. “In practical terms, this means understanding how bats are secreting viruses and where the contact points exist for people – either directly or through an intermediary, like cattle –

and, ultimately, identifying ways for humans and bats to live alongside each other.”

In 2019, Rosa joined a project run by the Institute of Zoology alongside the Ghana Forestry Commission and universities of Cambridge and Ghana, that aims to improve our understanding of the diseases carried by bats in West Africa and how they could transmit to humans.

The project involves collecting blood, urine, faecal and saliva samples from a research colony of 170 straw-coloured fruit bats (*Eidolon helvum*) as well as from wild bats around the country. Straw-coloured fruit bats are common in West Africa – a colony of up to one million roost in the centre of Ghana’s capital, Accra. They are also known to carry henipaviruses, a type of virus often-fatal to humans and associated with symptoms of high fever and acute respiratory disease in people, similar to coronavirus.

“Previous studies on flying foxes have indicated that some viruses are secreted most frequently from bats during the later stage of pregnancy, or when they have young, but often these studies rely on sampling from wild bat colonies – where it is impossible to control which bats are sampled. With our group, we hope to gain more definitive answers.”

While there are no known outbreaks of viruses between bats and humans in West Africa, this preventative approach to wildlife health could be the answer to preventing another outbreak. As the COVID-19 pandemic develops, ZSL is calling for greater investment into wildlife disease to guard against future outbreaks. We need your support to continue ZSL's ground-breaking work. Visit zsl.org/support TZ



Dominic Jermey, Director General, ZSL

DEAR FELLOWS

We need your help

THIS year has certainly broken the rulebook, and we do not know how the world, or ZSL, will look when we emerge from this crisis.

Our society and governments will need to adjust to a new normal that involves planning for pandemics. The UK Government has already committed over £200 million to COVID-19 vaccine development but longer-term preventative research is also vital.

This issue's cover article highlights just one of the ways that ZSL is working to develop our collective understanding of wildlife health. Rosa's research into West African bats, the diseases they carry and the opportunities for spill-over to people, could allow us to put safety measures in place that stop another pandemic from happening, without adversely affecting wild animals or people.

Wildlife health and human health go hand in hand; their links are increasingly recognised, but they are still poorly understood and underfunded. In the past, public health research, practice and the implementation of policy has happened without consideration of how natural systems work, and the pathways through which people's health is affected by wildlife health.

That needs to change. Which is why I need to ask you for your help. With the UK and much of the world in lockdown, those

who can need to support the people, businesses and institutions they value. ZSL's science has impact on a global scale – from the detection and treatment of chytridiomycosis to the very recent ban on badger culling – and I want to ensure that we're able to continue having impact in the years to come. Support us now as we work for a world where wildlife – and humans – thrive.

In March this year, we made the difficult but absolutely necessary decision to shut both of our Zoos for the first time since the outbreak of World War Two. It is now over a month since that historic moment, but behind the closed gates of ZSL London and Whipsnade Zoos, life goes on. I've been so deeply heartened by the devotion of our teams, and everyone at ZSL has remained focused on the care of our animals and creating a world where wildlife thrives.

These are unprecedented times – for the society we live in, for ZSL and for each one of us. Our Zoos provide the majority of our income for our wider work, and we need your continued help to support that, especially while our Zoos remain closed to the public.

Please support us with a donation now if you can, be ready to celebrate with us when we can get back into the field, and keep safe and well in the meantime.

Contact fellowship@zsl.org and 0344 225 1826 if you want to support us, or visit zsl.org/support **TZ**

EVOLUTION IN ACTION

Simulating climate change in the Panama Canal

EVOLUTION is traditionally framed in terms of thousands, if not millions, of years – invisible in real time to the human eye. But humanity's impact on the planet, and the speed at which our way of life is changing the environment, is bringing into question whether evolution – and the species affected – can keep up. In Panama, ZSL is part of a project to understand just this: how quickly can evolution happen?

"When the Panama Canal was built in the early 20th century, the artificial Gatun Lake was created and existing hilltops in the newly flooded valley became islands," explains Daniel Nicholson, PhD Researcher at ZSL's Institute of Zoology. "These small islands, exposed to the sun and wind, are two degrees warmer than the mainland and mimic the changes the International Panel on Climate Change expect to see in Panama this century. They offer the perfect opportunity to understand more about how wildlife will adapt to these changes."

Daniel and a team led by Dr Michael Logan from University of Nevada, Reno translocated over 400 Panamanian slender anoles (*Anolis apletophallus*) from Soberanía National Park to six artificial islands in 2017, and have since observed their morphological, physiological and behavioural developments. While Daniel hopes the project will go on for several decades, and is cautious about drawing conclusions this early, the team have already begun to see changes in the anoles.

"Anoles only live for nine months, and after just two generations we've already noticed that

their heads appear to be getting smaller, their legs longer, and they are choosing to perch lower to the ground than we'd expect to see on the mainland," says Daniel. "This may be down to a number of factors – a change in prey, fewer predators or a change in behaviour towards other lizards – but it's exciting to see them adapt so quickly."

The Panamanian slender anole is one of the most common reptiles in the region, making the survival of their species very important for the rest of the forest. "It's one of the most prevalent vertebrates in the forest, and a prey source for almost everything else. So, if they

cannot adapt to climate change, everything above them in the trophic system will suffer."

Their abundance also makes them the perfect proxy species for other lizards, explains Daniel. "Through them we can learn about how reptile species like it, or related to it, might adapt to rapid changes in their environment. Ectotherms regulate their temperature externally, so they are potentially much more susceptible to climate change." The implication is also that, if such a successful species struggles, more specialised lizards may find adapting to climate change extremely difficult. **TZ**

Panamanian slender anole (*Anolis apletophallus*)





Blue-crowned laughingthrush (*Garrulax courtoisi*)

OUT OF THE BLUE

Using social science to understand a rare bird species

FIRST identified by science in 1923, in China's Wuyuan County, the blue-crowned laughingthrush (*Garrulax courtoisi*) has long proved a difficult species for scientists to get to grips with. In 1930 it was lumped together with India's yellow-throated laughingthrush, assumed to be a subspecies of the similar looking bird. In 1956, another population was discovered in China's western Yunnan province but, as the Communist Party of China assumed power, further study of the blue-crowned laughingthrush was cut off to the global community.

"As China relaxed its borders, the blue-crowned laughingthrush began turning up in the global pet trade in the late 1980s. But it was not until 2006 that it was redefined as its own species," says Rosa Gleave, PhD Researcher at ZSL's Institute of Zoology. "By that time, the Yunnan population had disappeared and the species had been classified as Critically Endangered." There are now thought to be only 350 individuals remaining in Wuyuan.

The species is aptly named for its loud, chattering call, and the pet trade is thought to account for its disappearance in Yunnan, where there is a tradition of keeping pet songbirds. However, there is no such bird-keeping culture in Wuyuan and nothing obvious to indicate why the species' range is so restricted.

"They have the habits, diet and physiology of a generalist," says Rosa. "Determining a baseline is at the heart of my research. Is this a relic population of a more widespread species, or have they always been restricted to a small area of China?"

Alongside researchers from Jiangxi Agricultural University and Nanchang Zoo, and local high school students, Rosa is gathering local ecological knowledge to build a picture of the blue-crowned laughingthrush's previous abundance. "In the absence of historical records, memory is a powerful tool," says Rosa. "Local people can tell us a lot about the species they've spotted in their area and, paired with habitat surveys and satellite imagery, we can start to understand why the species is limited to such a specific area, and how changes in the way the land is used might be affecting that."

Early indications are that trapping may occur on the fringes of their Wuyuan range, but their restricted range continues to be a mystery. "Identifying what their habitat requirements really are is the first important step in a journey to properly protecting this rare species," adds Rosa.

ZSL London Zoo is part of the global breeding programme, meet the colony and find out more about the blue-crowned laughingthrush at the Blackburn Pavilion. **TZ**

POOLING RESOURCES

Artificial intelligence offers camera trap game changer

CONSERVATION monitoring generates mass amounts of camera trap imagery. Our Bactrian camel project in Mongolia (see *The Zoologist* Issue 6 Autumn 2019, page 3), for example, deploys over 60 camera traps – if they all take an average of just two photographs per hour, those cameras will generate a million photographs per year. All of which would previously have required manual processing by the project team.

Advances in artificial intelligence (AI) in the last decade have changed that, and computer algorithms can now identify wildlife in camera trap images. But they need teaching – programming to spot animals correctly – and that requires specific skill sets. And once the AI has completed its job and the photos are analysed, both tend to be stored away in hard drives, the dataset and the learning inaccessible to others.

A new platform developed by ZSL, Google and six other conservation charities, aims to change this. "Wildlife Insights will break these silos down and bring camera trap data into one place," says Anthony Dancer, Head of ZSL's Conservation Technology Unit. "We've brought together data from all of the partners and developed a machine learning model that will be available to everyone.

"Anyone will be able to go on to this platform and do broad-scale analyses. A researcher may want to ask how wolves are doing in protected areas around the world; in the past they would have had to approach individuals working in the relevant habitats, but Wildlife Insights gives them the opportunity to work across multiple datasets, fast."

Speed is a key factor in the platform's promise. Scientists will be able to have their camera trap images analysed in minutes, rather than months. "The hope is that it is going to drastically speed up the process of getting the data in the field on the camera up onto the Google cloud and open for analysis and mapping," says Tanya Birch, Google Earth Outreach's Program Manager. Ultimately, the long term ambition is that Wildlife Insights will work in real time, with cameras linked to the cloud that send images automatically for processing by the AI.

There is still some way to go – the technology requires the buy-in of conservationists around the world, and the freedom to share data. However, AI may represent the difference between spotting a drop in animal populations in weeks, or months. Giving conservationists the chance to act quickly, rather than after the fact. Find out more at wildlifeinsights.org **TZ**



Camera trap images of Bengal tigers (*Panthera tigris tigris*) in Nepal

UNLOCKING PETO'S PARADOX

Exploring the animal kingdom's secrets of tumour suppression

CANCER is a natural part of life for any multi-cellular species. As an organism grows and ages its cells multiply, and the more times a cell replicates the greater the chance that process could break down. Any cell can develop cancer and, in theory, the largest and longest-lived species should experience cancer most frequently. But in 1977, Richard Peto identified a paradox: this is not always the case.

"Elephants, one of the largest and longest lived of any land animals, very rarely get cancer," explains Hannah Davidson, Researcher at ZSL's Institute of Zoology and Barts Cancer Institute, Queen Mary's University of London. "In 2015, scientists were able to identify a tumour-suppressing gene in elephants, known as *TP53*. Once *TP53* detects DNA damage in a cell, it triggers cell death – protecting the elephant and slowing or stopping the cancer's development."

TP53 is also present in humans and other animals, but elephants have far more replications of the gene in their DNA – suggesting a greater sensitivity to DNA damage. Other animals, like the naked mole rat (which can live up to 30 years) or the capybara (a super-sized rodent found in South America) have developed different techniques for avoiding cancer. The naked mole rat's cells are hypersensitive to overcrowding and have developed a cell-signalling network that can override dividing cells, while the capybara's immune system has developed techniques for disabling potential cancer cells.

While scientists are already looking for ways to apply these tumour suppression techniques to humans, Hannah has begun an investigation into what cancer-fighting systems other species might be hiding. "Zoos represent a potential gold mine of information about cancer in other species," says Hannah. "ZSL conducts post-mortems on all animals in its two Zoos, from which we can identify incidents of cancer and trends in its frequency."

Hannah's research into ZSL's archives will feed into a larger project led by Barts Cancer Institute and Arizona Cancer Evolution Centre. "The project represents many challenges," adds Hannah. "Veterinary care and welfare has improved, as has our ability to detect cancer, and the ways we record data have also changed. But the opportunity to contribute to potentially revolutionary research in such a devastating disease is huge. It's also just another reason why the natural world is so important, and why we must conserve it for our own survival."

ZSL's Institute of Zoology is an advocate of the 'one health' approach recommended by WHO (World Health Organisation), a model that promotes the joined-up planning, legislation and research of human, domestic and wild animal health. **TZ**



Ulysses Swallowtail (*Papilio ulysses*), a large swallowtail butterfly of Australasia

GLOBAL ASSESSMENT OF SWALLOWTAILS

A rare insight into global insect status

ESTIMATES of the number of insect species vary. What scientists are clear on is that it is in the millions; almost one million have been described by science, with calculations about those yet to be discovered ranging from another million to as many as 30 million. We know very little about the conservation status of most of them while, in comparison, the majority of the known 17,500 mammal and bird species have been assessed by the IUCN Red List.

Swallowtails, a group of butterflies that alone number approximately 550 species, may offer a rare insight into the insect world – their group was assessed by the IUCN Red List in 1985. ZSL's Institute of Zoology has undertaken a reassessment of swallowtails, in the hope of building a better picture of butterfly trends and threats across the globe.

"There is very little data on insects," says Monika Böhm, Research Fellow at the Institute. "We know declines are happening at a local level, but the global magnitude of these changes is still unclear. We urgently need more data on how insects are faring."

"While it is impossible to generalise about insects – they are such a diverse taxonomic

group – butterflies have a close relationship with their habitat, and their sensitivity to environmental changes makes them an important indicator of ecosystem health. This project will help us identify the pockets around the world that require the greatest conservation attention for butterflies."

Swallowtails tend to prefer tropical forests, and some rely on a single species of plant for their larvae to feed on. Deforestation puts this at risk, and early indicators are that habitat loss is the greatest threat to swallowtails.

But Monika believes butterflies are valuable beyond their place in the ecosystem. "Butterflies are enchanting, bringing joy and wonder to people around the world – the perfect ambassadors for getting people to care about insects. If we are to redress the imbalance of conservation attention across animal groups, we need butterflies."

Monika's team have already drafted assessments for nearly 400 species, with 140 already submitted or published on the IUCN Red List, and are working with a network of butterfly experts to review them. They aim to publish a paper on global swallowtail status, trends and threats in 2021. **TZ**

THE MYSTERY OF THE DISAPPEARING CROCODILIAN

Tracking Nepal's Critically Endangered gharials

ONCE RANGING throughout the Indian subcontinent, the Critically Endangered gharial (*Gavialis gangeticus*) is now restricted to just five locations in India and Nepal. Since 1978, Nepal's gharial-rearing programme has released over 1,000 gharials into Chitwan National Park, and yet the Park's population has continued to decline to approximately just 50-60 adult individuals.

Searching for an answer to the missing gharials, PhD Researcher Phoebe Griffith began a project in 2018 to tag wild gharials and those reared at the breeding centre. "In 2018 we trialled the technology on five wild gharials and 20 individuals due for release from the breeding centre. In December 2019 we caught and tagged a further 15 wild gharials."

"We have very little insight into gharial movements and reproduction in Chitwan," says Phoebe. "It was always assumed that the numbers were not improving because gharials were swimming south towards India and being blocked from returning by an Indian dam on the Gandak River, but there is actually little research to support this."

Three of the tagged gharials have already died – an alarming insight into the pressures wild gharials face. "Early indications are that they aren't dispersing far," says Phoebe. "In fact, of those that died, two were as a result of journeying upstream of the national park into agricultural channels

and becoming entangled in illegal fishing nets. Suggesting that this is a local problem."

And the key to a local problem, says Phoebe, is community engagement. "The Philippine crocodile faced a similar problem – they were hated by many people and often killed on sight. But through a programme of outreach, conservationists were able to help communities see the intrinsic value of the crocodile, and it is no longer socially acceptable to kill crocodiles."

ZSL has a strong relationship with Nepal's local people, having built community development schemes that support both people and wildlife in the buffer zones of many of Nepal's national parks. Phoebe works closely with members of two indigenous tribes, Bote and Mahji, who have traditionally fished the river for centuries.

"They know these rivers, and have skills that benefit the project, but they also see the value of protecting the gharial," says Phoebe. "Many local people work in tourism, and that money brings education and job opportunities. Helping people to have a healthier relationship between the national park and themselves, and choose the right types of fishing gear, is going to massively benefit both them and the gharial."

Phoebe's research into the movements of this elusive crocodilian continue, but it appears that enlisting the local community might have won half the battle. **TZ**

The gharial (*Gavialis gangeticus*), a fish-eating crocodilian reaching up to six meters long, is one of Asia's most threatened reptiles



PLATES ARE SOARING SUCCESS

Alternative livelihoods key to success of landscape-level conservation model

A COMMUNITY initiative set up by ZSL and its partners recently hit Indonesian headlines as orders boomed for recycled plates and bowls. The tableware is made from the leaf sheaths of betel nut trees (*Areca catechu*) and provides income to villages living on the edge of Sembilang-Berkbak National Park, South Sumatra.

"The best way to help people live alongside wildlife is by linking their success to that of the wildlife, whether that's funds from ecotourism or local job prospects", explains Sophie Kirklín, Project Coordinator at ZSL. "Showcasing how something as common as a betel nut palm tree can be turned into sustainable additional income is just one of the ways we're working with communities in Indonesia."

"The betel nut tree held little value to local people, who were only able to sell the fruit once a year, and the leaf sheaths were often just discarded. Now they're able to gain income each month from the tree," explains Teguh Triono, Senior Technical Advisor at ZSL, based in Sumatra. "Unlike oil palm, betel nut palm is actually a natural species to South Sumatra's peatlands and adds to the value of the wider ecosystem."

"And it's not just the people who build the plates who benefit. There's a whole series of jobs created throughout the production line, and we hope the project will encourage people to plant more betel nut palm under agroforestry schemes."

Processing the betel nut palm leaf sheaths into plates involves a process of cleaning, drying and cutting them to size before they're pressed into plates at high temperature. Each plate costs about IDR 2,000 (around 11p) and are predominantly sold in Jakarta, at shops, cafes and restaurants – though the team are now getting requests internationally.

The scheme from Mendis Village Cooperative, named Koperasi Mendis Maju Bersama, is part of ZSL's KELOLA Sendang landscape partnership and is supported by Bandung Institute of Technology, and The Footloose Community. To find out more about the community-conservation initiatives ZSL is involved in, visit: zsl.org/conservation/how-we-work/community-conservation **TZ**

Betel nut tree trays and plates



TURTLE TURMOIL

ZSL works in Vietnam to strengthen the future of its freshwater turtles

IN the early 2000s, the IUCN identified the exploitation of Asian freshwater turtle species for their meat as the biggest threat to their survival. Southeast Asia is a hotspot for turtle biodiversity – 80 different species inhabit the region – and unsustainable levels of hunting continue, with countries such as Vietnam and Cambodia prime targets for poaching and illegal trade.

Asia is home to about one third of all turtle and tortoise species, and more than 50 species are either Endangered or Critically Endangered. This includes numerous species identified by our EDGE programme (Evolutionarily Distinct and Globally Endangered), such as the big-headed turtle, Swinhoe’s soft-shell turtle and Roti Island snake-necked turtle. Big-headed turtles (*Platysternon megacephalum*) are a particular focus for ZSL, as they are ranked 19 on ZSL’s EDGE Reptile list, making them a global priority for conservation initiatives. As well as being traded for their meat, big-headed turtles are also collected for the exotic pet trade, and in September 2018, ZSL London Zoo became home to four big-headed turtles seized by Canadian border officials and rescued from the illegal wildlife trade.

The threats posed to turtles has led to the establishment of government rescue centres in many Asian countries, including Vietnam. These centres hold freshwater turtles that have been seized from the illegal trade, eventually for re-release. The influx of seized turtles is often greater than the facilities can house and, as turtles are often traded over long distances before they are intercepted, there are opportunities for pathogen transfer. ZSL is working in Vietnam to develop a model for wildlife rescue centres, providing recommended biosecurity protocols and barriers, including testing and isolating healthy individuals prior to release. “Some pathogens are only detectable with lab-based techniques, which there wasn’t the capacity for,” says ZSL’s Curator of Reptiles and Amphibians, Ben Tapley. “We’ve helped equip a facility that can screen for two reptile pathogens, Chelonian herpesvirus and mycoplasma – a first for Vietnam.”

In November 2019, ZSL-Segré EDGE Fellow Ha Hoang worked with a team of rangers to release six healthy adult big-headed turtles into Pu Mat National Park in Vietnam. “We fitted each individual with a radio transmitter and data logger that records the specific microclimate experienced



A big-headed turtle (*Platysternon megacephalum*) fitted with a radio transmitter

by each turtle, so we can receive updates on the turtle’s movement and environment,” says Ha. All six turtles are doing well and have retreated into small, partially submerged caves, where they will likely remain throughout the winter. Not only do we hope to establish populations of big-headed turtles, the project will also provide unique insights into how big-headed turtles use their environments throughout the year and aid in improving the management of turtles in conservation centres around the world. **TZ**

EXPLORING NATURE-BASED SOLUTIONS

Can nature help us tackle climate change?



Mangrove reforestation

THE UK will host the UN’s much anticipated but now postponed 26th Climate Change Conference at some point next year, and governments around the world are, now more than ever, looking for ways to reach their carbon emission targets. One concept increasingly making its way into the public sphere is nature-based solutions, but what are these exactly?

A term first coined in the 2000s, the IUCN defines nature-based solutions as “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human-wellbeing and biodiversity benefits.” And although often used in the context of solutions to climate change, they can be used to address food security, water security, human health, disaster risk, social and economic development issues too.

The UK’s recent General Election saw the Government commit to planting at least 7.5 million trees a year as part of their climate action pledges. Trees, however, are just one of many nature-based solutions on offer from mother nature.

“Planting billions of trees across the world is one of the cheapest ways of taking carbon dioxide out of the atmosphere to tackle the climate crisis, but only if this is done in the right places and in the right conditions,” explains Dr Nathalie Pettorelli, Senior Research Fellow at ZSL’s Institute of Zoology. “Care must be taken to plant a range of tree species – forests need resilience to

droughts, floods, fires and disease, which are only gained through a natural mix of species.”

Natural solutions to environmental challenges that benefit both people and wildlife are at the heart of ZSL’s conservation strategy. “From mangrove restoration projects in the tropics, that protect coastal communities from storms, to rewilding initiatives here in the UK, the appeal of nature-based solutions is the benefits they offer to both wildlife and people,” explains Nathalie. “They can offer better access to food and water, enhanced pollination, carbon storage and diversified livelihoods. Rewilding, for example, can remove carbon from our atmosphere, while improving biodiversity.”

Even unassuming creatures like the UK’s native oyster can function as a nature-based solution. “When abundant, oysters aggregate together to make oyster reefs that act as carbon sinks. The oysters fix the carbon into the seabed, and are also capable of removing considerable amounts of nitrogen from the water,” says Celine Gamble, ZSL’s Native Oyster Network Coordinator. “Sadly, we don’t know of any oyster reefs left in the UK anymore – having declined by over 95% due to overfishing, disease and toxic chemicals. That’s why ZSL is working with fishers to help restore populations back to their former glory, starting with our first mother oyster sanctuary, established off the coast of Essex.”

To learn more about nature-based solutions and rewilding, listen to episode 18 of ZSL’s Wild Science podcast: zsl.org/zsl-wild-science-podcast **TZ**

NEWS JUST IN

ZSL and Financial Times partnership makes headlines with illegal wildlife trade crisis

As readers of *The Financial Times* (FT) will have seen, ZSL's work to tackle the illegal wildlife trade featured throughout the characteristic pink pages towards the end of last year. Selected by the paper to be their Seasonal Appeal Charity Partner, ZSL was the subject of a series of 13 articles published in the month before Christmas. Reaching an estimated 16 million people over that time, this was an exceptional opportunity to push the illegal wildlife trade to the top of global business, social and political agendas.

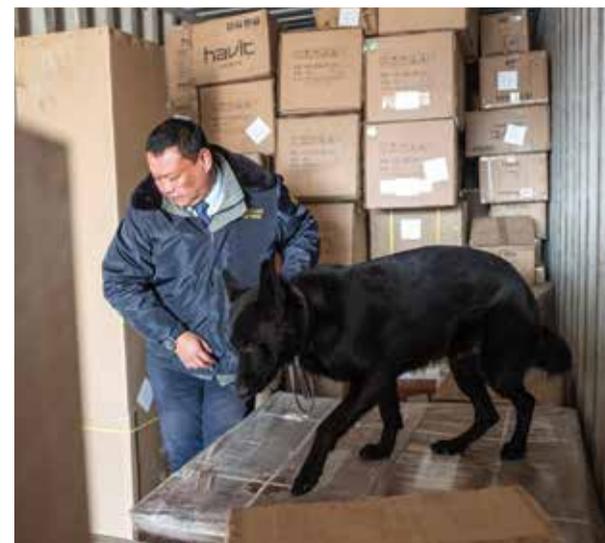
"The lead piece opens with the story of Mr Naranbadrakh, a Mongolian Customs Officer who was stabbed intercepting an illegal shipment of 17,000 marmot skins. He and his colleagues do their job because they have true passion for wildlife regardless of the danger they face," says Munkhjargal Bayarlkhagva, ZSL IWT Project Officer, whose work to train the detector dogs that police Mongolia's 8,253 kilometre border was the focus of the story launching the Appeal. "We wanted to show the world ZSL's commitment

to helping the authorities and local communities fight the illegal wildlife trade across Mongolia."

Worth up to £17 billion a year, the trade has far-reaching consequences for wildlife and people. As well as driving animals like pangolins and tigers to extinction, it facilitates corruption, funds organised crime, and exploits the most marginalised communities. The FT's editors jumped at the chance to help ZSL's work against it.

As well as reporting from the front line in Mongolia, the FT's journalists revealed how ZSL is pioneering new investment models to create the capital that funds conservation and developing technologies to transform wildlife protection. The final article explored the scale of poaching for the pet trade and how ZSL's zookeepers train eco-guards in Cameroon to best care for wild parrots saved from smugglers.

"The FT is read by some of the most influential global business leaders," says Oliver Withers, ZSL's Head of Conservation Finance and Enterprise. "The Appeal was an extraordinary opportunity



ZSL helped train Mongolia's detector dogs to find illegal animal products at the borders

to speak to them directly and galvanise support for our work to end one of the biggest threats to wildlife today. We've already seen a swell of interest from the private sector. Engaging the corporate world in conservation is key to its long-term success."

Read the series about ZSL's work in full at [ft.com/ft-seasonal-appeal](https://www.ft.com/ft-seasonal-appeal) TZ

VITAL WATERWAY GETS A HEALTH CHECK

Finding solutions to the Ganges' plastic problem

THE Ganges and its tributaries flow through four countries and support the lives of over half a billion people. *Ganga* is the most densely populated river basin in the world, one of the most iconic, and considered sacred by over a billion Hindus. However, research in 2018 also named the Ganges as one of 10 rivers in the world that account for an estimated 90% of plastic that reaches the ocean via river systems.

Last year, ZSL's Surshti Patel, a specialist in marine and freshwater community-led conservation, joined a National Geographic expedition to understand the scale of the Ganges' plastic problem. The female-led project brought together experts from around the world, and partners from across India, to collect data from the river, surrounding land and the people who live there.

"My focus was on understanding the social economic drivers behind plastic use, and the barriers to change," says Surshti. "Plastic is a human problem – a product we invented to replace natural materials – so understanding the behaviours that drive its use are essential to finding alternatives."

"One of the most common products finding their way into the Ganges are plastic sachets. The practice of selling condiments, food stuffs, shampoo and other toiletries in single-serving sachets is widespread throughout Asia. It is seen as more hygienic, and many people do not have the disposable income to purchase a whole bottle or jar of a product like we would in the UK."

At each of the expedition's 10 sites, Surshti and a team of researchers conducted focus

groups, workshops and surveys with local people. "We were often the first people to ask communities about their waste – most of the villages we visited did not have access to an adequate waste disposal system," says Surshti. "The majority of people we spoke to wanted change, but the opportunity for a dialogue about their waste did not exist."

"We also found that women tend to be responsible for waste disposal in the home, so we want to introduce an equitable system that involves them in waste planning decisions and recognises the needs of those who rely on it."

"Battling humanity's reliance on plastic can feel like an uphill battle, but what is exciting is local people's desire to change," she adds.

"Unlike the UK, where plastic underpins much of society and alternatives remain prohibitively expensive, plastic is still new to many in rural India and there is real appetite for a return to traditional materials."

Research papers are due to be published using data from the expedition, and the team will be presenting their recommendations to local partners and governments in Bangladesh and India this year. TZ



ZSL's Surshti Patel (front, third from left) and the rest of the Sea to Source team pose for a portrait in Rishikesh, Uttarakhand. © Sara Hylton, National Geographic



Deforestation and biodiversity loss undermines the environment's ability to absorb carbon dioxide, potentially increasing climate change



Matthew Lowton, Policy Officer, ZSL

SCIENTISTS' CORNER

Q&A with Matt Lowton

We would love to get your feedback.

Go to zsl.org/thezoologist to send us your suggestions.

MATTHEW Lowton is ZSL's Policy Officer. With experience at global forums on wildlife trade, Matthew now helps manage ZSL's engagement with national and international policy and supports ZSL's work at governmental and intergovernmental meetings.

TZ: Why is this such an important time for the conservation of wildlife around the world?

ML: In 2010, at a meeting in Japan, signatories to the UN's Convention on Biological Diversity (CBD) set a series of goals. Known as the Aichi Targets, these laid out a 10-year plan to tackle biodiversity loss. Sadly, as ZSL's Living Planet Index (LPI) highlights, these targets were not met. The CBD are due to meet again (postponed until 2021) to acknowledge the missed opportunities of the last decade and set targets for the next. This is our chance to put the biodiversity crisis at the top of the political agenda and align future conservation with existing commitments. We must move away from just stopping biodiversity loss. It's time we started to reverse it.

TZ: What's the biggest change policymakers need to make to take that opportunity?

ML: There are currently separate initiatives to tackle the climate crisis, promote sustainable development, and to stop biodiversity loss, but the world doesn't work like that. Each is inherently linked and progress in one area – or lack of it – affects others. Research shows that less biodiverse ecosystems are less productive. As ecosystems lose species, they absorb less carbon dioxide, become less effective at purifying air and water, and produce less food. This exacerbates climate change and hinders socio-economic growth. We need to ensure policymakers advocate for wider investment in nature-based solutions and move away from a siloed approach. Also, without a clear implementation mechanism backed by spending

hundreds of billions of pounds, these new targets will be little more than wallpaper over dry rot.

TZ: How is ZSL working with policymakers to achieve the changes that are needed?

ML: We can only make a strong case for changes in policy with clear evidence, so it all starts with our science. ZSL's LPI is one of the metrics used to assess progress against the Aichi Targets and we work with local and national governments to implement changes that meet those obligations. These include helping to manage and monitor protected areas, reducing single-use plastics, species reintroductions and the restoration of habitats. A robust scientific-evidence base is key. People are familiar with the vital role forests have in storing carbon, but marine algae and seaweed play an equally important role, highlighting the importance of preserving aquatic ecosystems too.

TZ: What can people do to help?

ML: Things are going to move quickly. People should stay engaged and follow the agenda as it shifts. There's been a swell of public support for action on climate change and leaders are starting to listen, evidenced by the recent decision on the Heathrow runway expansion. We need to do the same for biodiversity loss and every person can make a difference. Look for opportunities to get involved in conservation locally and urge your councillors and MPs to take an interest too. With the new Environment, Agricultural and Fisheries bill we can influence domestic policies, and governments all over the world must be held accountable for the commitments they've made. If we do not take action now, we will be failing future generations. ZSL is working towards ambitious targets to protect and restore biodiversity. You can help make sure we're heard. **TZ**

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