

BBC

DISCOVER BRITISH BUTTERFLIES

Wildlife

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BLOGGERS ● ARTISTS ● ROYALTY ● CAMPAIGNERS ● SCIENTISTS

THE WILDLIFE POWER LIST

BRITAIN'S TOP 50 CONSERVATION HEROES

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BIG BUSINESS**

● Alaska's strange mix of ecotourism and hunting



**SEABIRDS
NEED HELP!**

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DID YOU
KNOW?

THE MARKINGS AROUND THE EYES OF DUSKY LEAF MONKEYS ALLOW RESEARCHERS TO IDENTIFY INDIVIDUALS.

Find out more on p40



Welcome



Who are the British conservation heroes who will change the way we see the natural world and deliver a positive outcome for wildlife in the coming years? That question kick-started the *BBC Wildlife Power List* just a few months ago. Our Editorial

Advisory Board (see p111) nominated a longlist of candidates and then weeks of debate were required to get to the final 50. The youngest are just 13 years old, and though their wildlife CVs are already impressive, we reckon there's much more to come. While broadcasters like David Attenborough and Steve Backshall feature, you'll also find street artists and bloggers. And then there are the conservationists, scientists and campaigners whose influence is felt both in the UK and across the globe. When you've seen the list, we want your nominations for our Local Conservation Heroes – those people working for wildlife in your area, whether creating habitats, volunteering on a reserve or introducing more people to nature. Find out more on p35.

Stefano Unterthiner

Matt Swaine Editor
matt.swaine@immediate.co.uk

May 2015

WHAT WE'VE LEARNED *this issue*

Lizards

Only one UK lizard is oviparous, laying eggs rather than live young

See p12



300

The number of species of tree that can be found in a hectare of the Amazon See p52

Turtles

return to their natal beach using the Earth's magnetic fields

See p89



IN BBC WILDLIFE THIS MONTH



STEFANO UNTERTHINER **PHOTOGRAPHER**

"It was tricky photographing dusky leaf monkeys. They spend most of their time feeding high in the canopy, and they are elusive, fast-moving primates." See p40



PATRICK BARKHAM **CONTRIBUTOR**

"Like most people, I adore puffins. But if I could fly, I'd want to be a gannet – their grace, power and epic journeys in search of food are awe-inspiring." See p58



RICHARD JONES **CONTRIBUTOR**

"Normally I need to impart gravitas when extolling the virtues of tiny insects, but when it comes to butterflies I admit to an almost childish glee." See p66



ISABELLE GROC **CONTRIBUTOR**

"Brown bears are a symbol of Alaska's vast landscapes. Conserving these remarkably intelligent animals is about protecting America's wilderness." See p76



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ON THE COVER: Illustration: Matt Herring; D Attenborough: Charles Best; C Packham: Paul Carter; J Goodall: Benjamin Tankersley/Alamy; Insets: bear: Suzi Eszterhas; gannet: T Cavnar; hen harrier: Alamy

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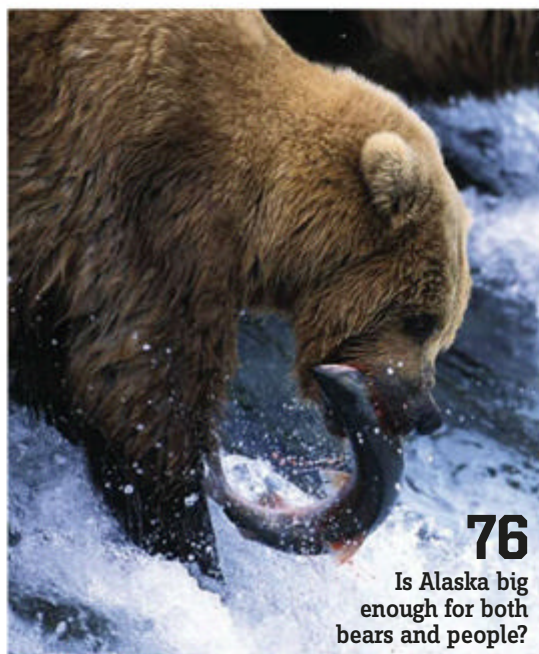
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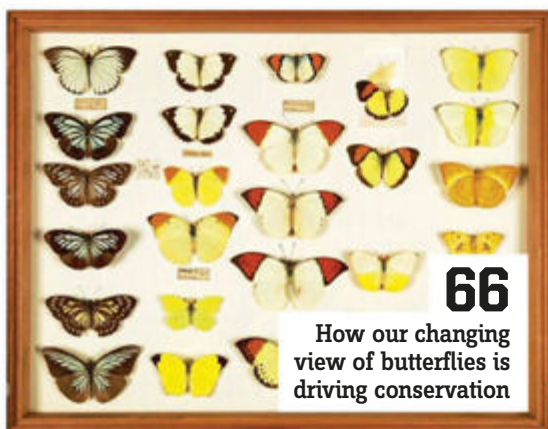
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CHRIS PACKHAM

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AMY-JANE BEER

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MARK CARWARDINE

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WILD MAY

WHAT TO SEE ● BEHAVIOUR ● CONSERVATION



45

The number of occupied barn owl nests found by the Pang Valley Barn Owl Group in Berkshire in 2014. Usually it finds about 14 nests; in 2013 there were none.



**CHRIS
PACKHAM'S
MUST-SEE**

CONSERVATION

HUNTING BARN OWLS

That ex-vole didn't know what hit it, but its demise is a key part of a healthy, properly functioning grassland ecosystem. How many field voles there are has a critical impact on the fortunes of barn owls. So the beautiful yet violent drama of one of these small-mammal hunters with a vole in its talons always makes the heart soar. And the great news is that in 2014 barn owls had an exceptionally good year. Somerset Wildlife Trust monitored three times as many active nests as in 2013; most had big broods, with an average of four-and-a-half chicks fledging (84 per cent higher than the county's norm). All around Britain, surveyors also reported a record season. According to the BTO, the barn owl is one of our best-monitored birds – last summer it received 2,766 nest records, out of a UK total of about 4,500 breeding pairs. This mountain of data is summarised in an annual Barn Owl Trust report, which suggested that in 2014 a peak year for voles happily coincided with ideal hunting conditions – a mild winter, early spring and long, dry summer. Just as well, as it came hot on the heels of several awful years.

GET INVOLVED To help barn owls and join the national survey, visit www.barnowltrust.org.uk

**“BARNIES
FLOAT LIKE
A BUTTERFLY
AND STING
LIKE A BEE.
PURE GRACE IN
THE AIR, BUT
RUTHLESS”**

UK HIGHLIGHTS

The essential wildlife highlights you have to see this month, compiled by **Ben Hoare**.



■ BEHAVIOUR

THINGS THAT GO BUMP...

On sultry evenings this month big beetles thwacking rural windows are likely to be flying cockchafer, or May bugs. The outlandish feathered antennae are – as in many insects – larger in males, which use them to detect females' pheromones. Pick up one of these bronze-backed beauties and the claws on its tarsi (the last leg segments) will grip like miniature billhooks.

TOP TIP To attract cockchafers leave curtains open in a lit room at dusk.

■ BEHAVIOUR

SPRING WHITES

The first generation of green-veined whites are on the wing now. They're often mistaken for large whites, but check their underwings which are dusted in yellow-green, with thick-looking, dark green veins; your eye may also be drawn by their weaker, fluttery flight. Though primarily found in woods and pasture, they do visit leafier gardens, so keep an eye out during the National Garden Bioblitz weekend (30–31 May).

SURVEY To join in the Garden Bioblitz, visit www.gardenbioblitz.org



■ BEHAVIOUR

SEA SWALLOWS

Arctic terns return to the British Isles in mid-April from their Southern Ocean wintering areas, after the longest migration of any of our breeding birds. During peak passage, flocks of these streamer-tailed seabirds appear at inland reservoirs and lakes, pausing before sweeping north to reoccupy their coastal colonies. By late May many successfully paired birds have eggs. Scotland hosts the vast majority of our breeders, with southern strongholds on the Farne Islands and Anglesey. The RSPB Belfast Lough reserve (recently revamped) offers a rare chance to see urban arctic terns in the UK.

FIND OUT MORE Learn more about the migration and follow an animated route at www.arctictern.info

■ CONSERVATION

UNDER THE RADAR

Scan calmer spring and summer seas for harbour porpoises – these small cetaceans don't create big ripples in the water as they surface to breathe, so winter swells hide them. We know precious little about their UK distribution – one surprise is that the Thames Estuary is a porpoise hotspot, according to a new study led by the International Fund for Animal Welfare and Zoological Society of London. It's all the more remarkable given that six decades ago the river was biologically dead.

SURVEY Take part in the study at www.zsl.org/inthethames



Cockchafer and painted lady butterfly: Laurence Couther; green-veined white butterfly: David Chapman; porpoise: L Campbell; arctic tern: Damian Waters; leaf: Dave Bevan; cornflake: Steve Round; red squirrel: Colin Vaindell



4 **TWEET OF THE DAY**
<http://bbc.in/1ffQ4c0>



CONSERVATION

FIGHTING FOR ASH

Always one of our last native trees to burst into leaf, the ash may still be unfurling its foliage at the end of May or in early June, especially further north. But healthy trees should be in full leaf by mid-June, so any that are still bare then could be suffering from ash dieback. Telltale signs include blackened, dead leaves (above), diamond-shaped lesions where twigs or branches join the trunk, and cracked or split young stems. Records from citizen scientists have a key part to play in fighting this disease.

GET INVOLVED For more tips on spotting ash dieback, go to www.forestry.gov.uk/chalara

WILDLIFE UPDATES

EARLY BASKERS

Following a poor summer for records in 2014, basking sharks seem to have returned exceptionally early this year. The first of these giant migratory fish to be spotted in Scotland appeared off the Isle of Coll in the Inner Hebrides on 3 April.

BUTTERFLY BOOM?

Late May and early June is when it becomes clear if there is going to be a mass arrival of painted ladies from North Africa. Previous boom years included 1996 and 2009, so are we overdue another? Keep up to date with Butterfly Conservation's Migrant Watch at <http://butfli.es/migrantsurvey>.



THE HOGS HAVE IT

In a victory for common sense, fast-food giant KFC has at last redesigned its milkshake packaging in Britain and Ireland, to stop hedgehogs getting stuck in the discarded cups. It would be even better if people didn't litter in the first place...

RED ALERT

There's a new website offering red squirrel ID tips and conservation updates, which aims to boost Scottish records via its GPS-enabled reporting feature designed for smartphones. Visit <http://scottishsquirrels.org.uk>.



CONSERVATION

RASPERS RETURN

Until World War II, the bizarre grating song of corncrakes drifted across much of lowland Britain and Ireland on May and June nights. Nowadays, most of our breeding 'land rails' are confined to traditional hay fields in the Outer Hebrides, Orkney, County Donegal and Connemara, where the elusive birds skulk in lush nettle and iris beds. But since 2005 there has also been a thriving reintroduced population in the Nene Washes, near Peterborough, with 22 singing males in 2014. To hear their unique nocturnal chorus, walk east or west from Eldernell along the Nene Way. Arrive early and you can enjoy summer-plumaged black-tailed godwits – 90 per cent of the British population nests here.

PLAN YOUR VISIT For visitor information, go to www.rspb.org.uk/nenewashes



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QUESTION OF THE MONTH

Why do badgers have black and white stripes?

Badger cubs emerge in May. Their distinctive markings have long puzzled naturalists.

Newborn badgers show hints of two dark eye-stripes in otherwise thin, silky fur, and by the time they leave the sett they have developed full adult coloration. They also behave exactly as adults do when threatened, facing the enemy with lowered heads and fluffed-up coats. This displays remarkable confidence for their size, suggesting that the stripes may be a warning.

Badgers have poor eyesight, so their stripes are unlikely to be for soliciting grooming or attracting mates, and in 1911 Reginald Pocock was one of the first zoologists to speculate that it was warning coloration. His hypothesis was backed up in a 2005 paper by Chris Newman,

DID YOU KNOW?

- Badger guard hairs are oval or nearly square in cross section. If you think you've found one snagged on a wire, rub it between your thumb and index finger to check how it feels.
- 'Erythristic' badgers have ginger fur rather than black, giving them a pallid sandy coat.

Christina Buesching and Jerry Wolff. They concluded that the European badger, American striped skunk and other middleweight carnivores evolved dazzling patterns to flag up their main defence (anal scent glands in skunks; huge

jaws in badgers) to predators. An old name for badger is 'grey', alluding to a rather odd attribute. Its body and leg fur is mostly pale grey: only part of the longest, wiry 'guard' hairs is black, producing the overall grizzled appearance. A drawing in Ernest Neal's monograph *The Badger* (1948) shows how each mature male's guard hair is white for 4.4cm, black for 2.2cm and white for the final 1.4cm. **Ben Hoare**



Mint humbug: a young badger cub displays its distinctive stripes.

FIND OUT MORE

You can learn more about the ecology of badgers at www.mammal.org.uk and www.badgerland.co.uk

James Warwick

THREE OF A KIND

LONGHORN BEETLES

May is the time to seek these handsome beetles, named for their typically long antennae. Having spent one to three years as grubs chewing through deadwood (they can be forestry pests), the new adults emerge in spring sunshine.



Wasp beetle

CLYTUS ARIETIS

6–15mm. Mimics wasps, both in its markings and rapid, jerky movements (other longhorn beetles mimic bees or ants). Basks on sunlit logs and leaves.



Two-banded longhorn

RHAGIUM BIFASCIATUM

12–22mm. Together with *R. mordax* (right), one of our largest longhorns. Loves hawthorn and bramble blossom and hogweed flowers, feeding on the nectar.



Black-spotted longhorn

RHAGIUM MORDAX

13–23mm. Big, stocky and well armoured, with relatively short antennae. Also feeds on hawthorn and hogweed flowers.

Illustrations by Felicity Rose Cole

Sexual dimorphism

Adult males have a much broader head with heavier jaws, and their eyes tend to be located nearer the neck. This helps identification outside the breeding season, when the sexes can look very similar.

Aggressive encounters

One reason males have larger jaws is to defend their territories in the spring breeding season. Though usually wary, they now become aggressive, grabbing opponents by the neck and rolling rivals over.



Unique egg layer

The sand lizard is our only native 'oviparous' lizard – the female lays eggs. The common lizard and slow-worm are 'ovoviviparous' – the female retains eggs inside, giving birth to live young.

EXPERT BRIEFING

BEHAVIOUR IN FOCUS

BREEDING SAND LIZARDS

The rarest, most strikingly marked of our native lizards are now at their most active. Having emerged from hibernation in self-dug holes or small-mammal burrows, males moult into brilliant green mating colours during April, then begin display-posturing to fend off rivals and attract partners. By early May successful males have paired up with females, basking together and mating. They're at the north-west edge of their range in the UK, so are restricted to warm, open habitats – mainly sand dunes and lowland heaths.

These lizards bask in sandy patches between low vegetation –

each has a favourite spot to which it returns – and once warm they hunt a variety of invertebrate prey. On heaths they seek out the drier areas with a mosaic of shelter and bare ground; among dunes, they favour outer ridges with marram grass to hide in.

After a long decline, this lovely species naturally remains in just Dorset, Surrey and Merseyside – the Sefton Coast has our largest population of dune animals. But captive-bred sand lizards have been reintroduced in 11 counties.



● **Nick Moulton** is an ecologist for Amphibian and Reptile Conservation: www.arc-trust.org



Second clutches

Some females in southern England have started to lay a second clutch of eggs in late summer. This trend could become more marked if average temperatures keep rising.

Courtship colours

Males only develop their intense green coloration during the April–May breeding season. After this, it fades to a dull yellow. By contrast, females (see panel below) are always brown or grey, with bolder spotting and a pale grey or yellow underside.

Spots and stripes

The body has 'eye-spots' and grey-brown lateral stripes. Habitat often determines pattern. Dune animals are more stripy, and also lighter and straw-coloured (as camouflage), whereas the genetically distinct heath animals are spottier and darker.

Predation risk

A female sand lizard preoccupied while nest-digging may be at increased risk of predation, for example by a kestrel. As a last line of defence, she casts off her tail, which wriggles for several minutes, hopefully distracting the predator. The tail grows back, though often shorter.

NESTING IN SAND



1 FEMALE In late May and June the female starts looking for nest sites in areas of firm, south-facing sand, about 20cm from cover.



2 BURROWS She digs numerous burrows to gauge optimal temperature and humidity. Only one is used – about eight eggs is typical.



3 JUVENILE The babies hatch in 8–10 weeks, depending on how sunny it has been. When small, they're at risk from cannibalistic adults.



THE SCIENCE OF NATURE

AMY-JANE BEER'S

NATURE TABLE

Uncovering the science of seasonal treasures.

3 DANDELION SEED HEAD

If the sight of dandelions on your lawn makes you panic, you have a problem. Firstly, excluding these glorious wildflowers will be an endless battle; and secondly, you're missing one of nature's wonders right on your doorstep.

Dandelions survive mowing by adopting a low rosette form and flowering rapidly. But it's their seed-dispersal mechanisms that make the flowers truly wondrous. The 'seeds' of dandelions and other members of the Asteraceae family differ sufficiently from those of other plants that they have their own name: cypselae. Dandelion cypselae are dispersed by the wind, a process known as anemochory. Each cypselae is attached to a downy calyx, or pappus, often described as a parachute but actually more like

Mary Poppin's umbrella because it enables the structure to float up as well as down.

As the cypselae ripen, they dry out and their connection to the seed head weakens until they are dislodged by a gentle puff of wind. This deceptively simple mechanism is fine-tuned to an extraordinary degree. The seeds of dandelions growing on meadows and other extensive habitats are light and carry a long way, making good use of the large expanses of land available to them. However,

“IT'S DANDELIONS' SEED-DISPERSAL MECHANISMS THAT MAKE THE FLOWERS TRULY WONDROUS”

We've all blown dandelion seeds at one time or another, but do you know the science behind them?



on small islands and in urban areas dandelion seeds tend to be relatively large with respect to the pappus, meaning that

they drift only short distances. This reduces the proportion that blow out to sea or die in some equally hopeless spot.

The role of the pappus doesn't end there. Once the

seed makes landfall, its hollow stalk acts as a conduit for water, drawing essential moisture into the seed and helping it germinate faster. And, if you need any more reasons to love dandelions, they're a magnet for bees and other pollinators, their roots combat soil compaction and their leaves are deliciously and nutritiously edible.

AMY-JANE BEER is a naturalist and writer. You can join her on our forum at www.discoverwildlife.com/forum

Illustration by Holly Exley, shrew: Andy Sands/NPL; horntail: Derek M. dutton/FLPA

DID YOU KNOW?

BATS AREN'T THE ONLY GARDEN ANIMALS THAT DO IT - SHREWS ECHOLODATE AS WELL.



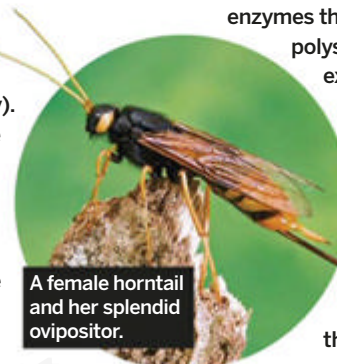
Shrews are most active at dawn, dusk and night.

Common shrews' shrieks and twitters lie in the upper range of human hearing and beyond. The insectivores use these ultrasonic vocalisations to communicate, and also as a form of primitive echolocation. It enables them to recognise features such as burrows and cavities in pitch darkness on their relentless search for food.

GARDENWATCH

Marvel at an ingenious larva-fungus partnership.

An outburst of expletives is understandable when you first see a greater horntail, or giant wood wasp (actually a species of sawfly). The adult female is 4cm long, not including the sabre-like ovipositor used to lay eggs in the bark of conifers. Alongside the



A female horntail and her splendid ovipositor.

eggs, she also deposits spores of basidiomycete fungi stored in special pockets on her tail. The fungi colonise galleries excavated by the hatched larvae, producing enzymes that convert woody polysaccharides (for example cellulose) into simpler sugars that the grubs can digest. You can safely admire horntails up close - despite their appearance they're harmless.



WWF

TIGER ADOPTION



Photo: © Klein & Hubert / WWF

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DISCOVERIES

The latest news in scientific research from all over the animal kingdom.



Written by
**STUART
BLACKMAN**

An orca pod of two males, two females and one calf in the Solomon Islands.



CETACEANS

GRANDMOTHERS KNOW BEST

NEW RESEARCH INTO ORCAS' HUNTING BEHAVIOUR PROVIDES A CLUE TO THE EVOLUTION OF MENOPAUSE.

Just like their human counterparts, female orcas stop reproducing long before the end of their natural lives. And new research suggests why.

Menopause is very rare in the animal kingdom. The females of most species are able to reproduce throughout adulthood. However, female orcas generally stop breeding at around 40 years old, though they can survive into their 90s.

In 2012, researchers found that the presence of a post-reproductive female in a pod increases the year-to-year survival of her offspring – especially her sons (see Q&A, September 2014).

“These are not dependent offspring. These are adult killer whales whose life is part-dependent on their mother being around,” explained Exeter University’s Lauren Brent.

Brent and her colleagues have now discovered how the matriarchs are helping. Their study of orcas off Vancouver Island shows that older females actively lead their pods on foraging expeditions, closely followed by their sons. This role is most pronounced when

DID YOU KNOW?

- The western and north-western coasts of Britain and Ireland are orca hotspots.
- Adult males are larger – and stockier – than females. They can reach 9.8m long and weigh up to 9,000kg, while females can grow to 8.5m and 5,500kg.

salmon, their primary food, are scarce. The post-reproductive females, it seems, are sharing a lifetime of ecological knowledge with their offspring.

Brent believes that the findings shed light on human menopause. “It’s quite logical that older individuals share information that benefits relatives,” she said.

Brent cited one factor that may explain why male orcas, in particular, benefit: “Like a lot of species with sexual dimorphism (see box), it’s make or break for

males. They do either fantastically well or very badly, while females just sort of plod along and pop out a baby every five years, pretty consistently.” In which case, sons might have more to gain by learning from their mothers.

Also daughters may be less able to take advantage of their mothers’ experience. “Once they start to have their own calves, female orcas are a bit more limited in terms of their own movement,” said Brent. “The males are just a bit spoiled and get to do whatever they want.”

SOURCE *Current Biology*
LINK <http://bit.ly/18lLnPx>



A female sparrow and her chicks.

■ BIRDS

THE OLDER PARENTS PROBLEM

Reproduction late in life, when one has more experience and resources, has its advantages. But it also has its drawbacks, as highlighted by a study of house sparrows on Lundy Island in the Bristol Channel.

The researchers found that the offspring of older parents themselves produce fewer young. The daughters of old mothers and the sons of old fathers are particularly disadvantaged.

Cross-fostering experiments showed that the effect is probably the result of chromosomal defects accumulated in older birds, rather than a lack of parental ability.

However, the findings are puzzling in light of previous studies showing that female sparrows seem to prefer to mate with older males.

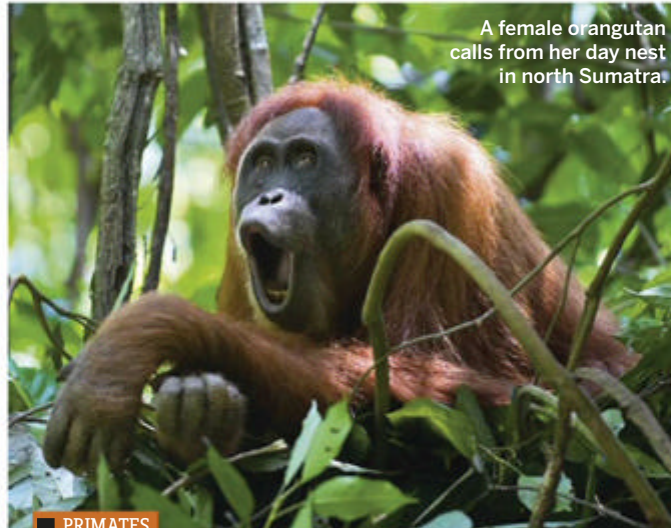
SOURCE PNAS LINK <http://bit.ly/1NT7qep>

■ CONSERVATION

FRIENDLIER FORESTRY

It is possible to log tropical forests while conserving wildlife, according to new research in Guyana's Iwokrama Forest. A study of reduced-impact logging, which targets trees of commercial interest while leaving the rest of the forest intact, reveals that the technique has very little effect on resident birds, bats and large mammals.

SOURCE *Journal of Applied Ecology* LINK <http://bit.ly/1ycCIRm>



A female orangutan calls from her day nest in north Sumatra.

■ PRIMATES

HEARING IS NOT BELIEVING

Orangutans can appear disconcertingly human. It's an uncanniness that is now bolstered by the discovery of a remarkably human-like communication technique.

When approached by a predator, orangutans issue what is called a 'kiss squeak' alarm call. But biologists in Borneo have noticed that some of the apes place a cupped hand in front of the mouth when making the sound.

In humans, such a gesture is usually employed to keep

whispered conversations private. But it seems that, for orangutans, it serves a very different purpose.

The cupped hand makes the kiss-squeak call resonate, so the animal sounds bigger than it actually is.

"No other mammal appears to modify their calls in this way," said Bart de Boer of the Free University Brussels, who led the research. "It is probably a signal to the predator: 'Don't bother stalking me, I have spotted you already!'"

SOURCE *Journal of Experimental Biology* LINK <http://bit.ly/1HPIYck>

The EXPLAINER

Scientific terms put into plain English for the rest of us.

SYMBIOSIS

Any relationship between species in intimate proximity is termed 'symbiotic'. There are three main types. In *parasitism* one party benefits at the other's expense: for example, a tick sucking blood from an antelope. In *mutualism* both benefit: in the relationship between antelopes and tick-eating oxpeckers, one species gets a meal while the other has its ticks removed. And in *commensalism* one party benefits at no cost to the other, as would be the case if the oxpeckers did not eat ticks, but just hitched a ride on antelopes' backs.



Mutualism in action.

From top: Dave Hoshing/FLPA; Menden P. d'ursi/Superstock; Martin B. Whithers/FLPA; Tim Krynka

NEW SPECIES OF THE MONTH

MUTABLE RAINFROG *Pristimantis mutabilis*

WHAT IS IT? When scientists checked on a spiky-skinned frog they had collected the previous day in an Andean cloud forest, they found that it wasn't spiky any more. The little amphibian can radically alter its skin texture, which might help it blend in with different surfaces.

WHERE IS IT? Two populations have so far been discovered in the Ecuadorian Andes. The report in the *Zoological Journal of the Linnean Society* adds that a closely related species in the same region has similar abilities. The discoveries raise problems for herpetologists, who sometimes use skin texture to distinguish between frog species.



The frog can make its transformation in only a few minutes.

FISH

DEADLY MIMICRY

Dusky dottybacks are pretty little coral reef fish with ugly habits. On the Great Barrier Reef, in the Coral Sea off Australia's north-eastern coast, they are either brown or yellow to mimic the colour of various species of damselfish, on whose babies the dottybacks prey.

It has traditionally been assumed that a dottyback's colour was determined genetically. But zoologists have now discovered that they can switch between the two forms depending on whether they find themselves among yellow or brown damselfish.

An added benefit of the mimicry is that it protects the dottybacks from

Dottybacks change their colour to match their prey and blend in with their surroundings.

attack by predators, because the damselfish are themselves camouflaged against their preferred habitat – yellow ones live on live coral, while brown ones live on rubble.

And the story might be more complicated still. "We would like to travel to Papua New Guinea to investigate the pink, grey and orange morphs that don't occur on the Great Barrier Reef," said Fabio Cortesi of the University of Basel in Switzerland. "It will be very interesting to see why they adopted different colours there."

SOURCE *Current Biology* LINK <http://bit.ly/1NdOL3Y>



A male harvestman (with yellow ink marks) and nest.

INVERTEBRATES

DADDY-LONGLIVED

Various arachnids and flies get called daddy-longlegs, but it may most suit the Panamanian harvestman *Zygopachylus albomarginis* with its long limbs and males that guard eggs in mud nests for months. It turns out, though, that house-husbandry is the easy option: dotting fathers have higher survival rates than either bachelors or females.

SOURCE *Oikos* LINK <http://bit.ly/1lrAOu9>

PLANTS

PALM TREE OFFERS PRIME PARENTING

The coco de mer palm of the Seychelles is most famous for its suggestively shaped fruits. It's almost as famous for the fact that those fruits are the world's largest, containing the heftiest of all seeds.

But new research shows that well-provisioned seeds are not the only head start that coco de mer palms provide for their offspring. Botanists have found that the mother plant's huge leaves are arranged so as to channel rainwater, along with the nutritious animal droppings and pollen that accumulate on their surfaces, onto a small patch of ground around the base of the stem – which is precisely where the huge seeds will inevitably fall.

SOURCE *New Phytologist* LINK <http://bit.ly/1FkwztZ>



IN THE FIELD

TITANOBOCHICA MAGNA

Researcher **Ana Sofia Reboleira**

Current focus **The fauna and flora of the world's deepest cave systems**



Why are you so drawn to caves?

I was a cave explorer before becoming a biologist. I was attracted by the unique environment, the beauty of subterranean spaces and the challenge of exploration – we know more about the surface of the Moon. And caves, as islands, are truly laboratories of evolution. It's the perfect combination of profession and hobby.

What is your most exciting discovery to date?

Probably the giant cave species from southern Portugal, including perhaps the world's biggest pseudoscorpion *Titanobochica magna* (pictured) because its discovery was so unpredictable. More recently, we have described four species of fungi that parasitise cave millipedes – the inhabitants of cave inhabitants!

Isn't it dangerous down there?

I feel very comfortable in caves, but getting lost, rockfalls and floods are always an issue. Most caves are extremely cold, wet and muddy, too, which is particularly hard when we are several days from the surface.

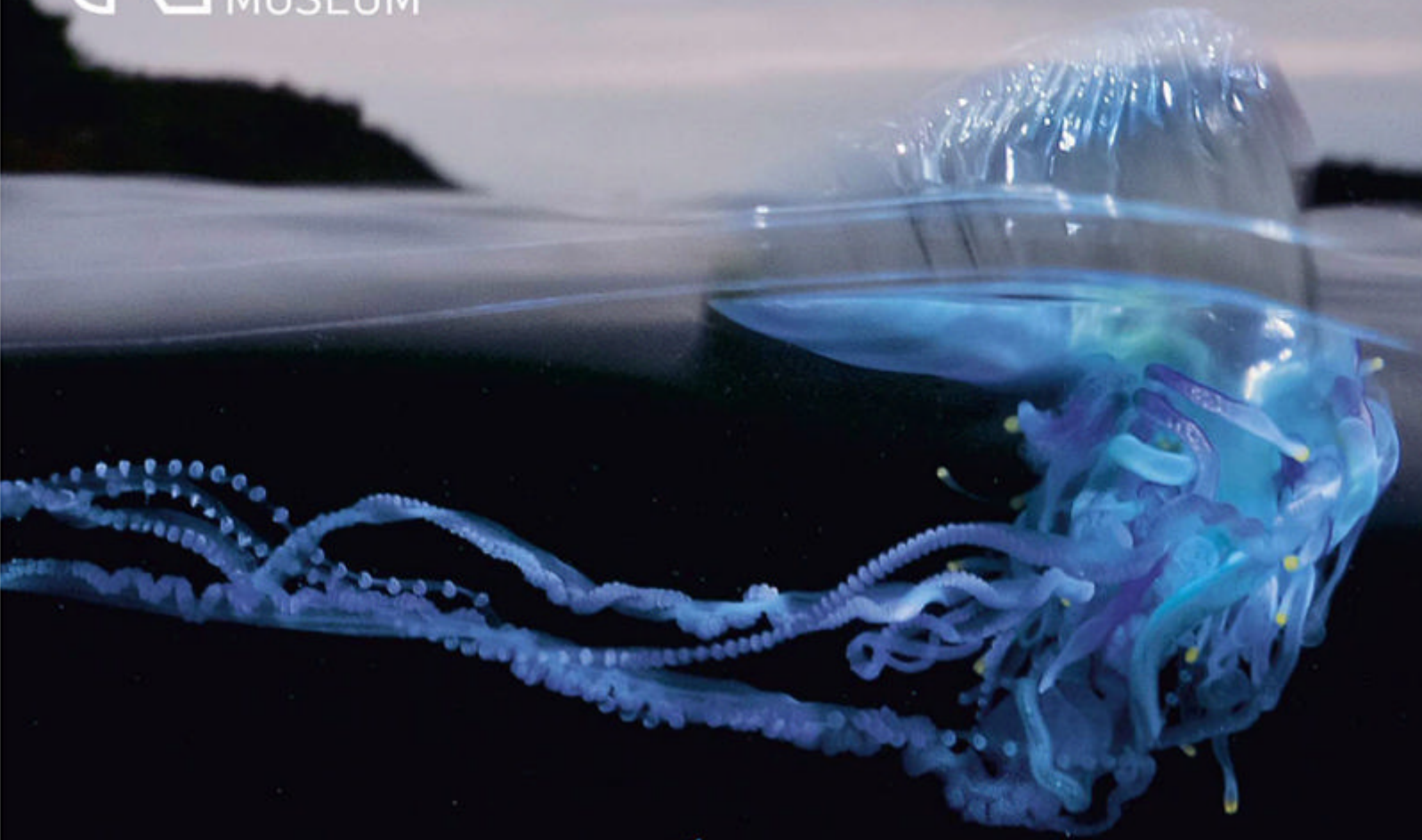
Is there anything that you dream of finding one day?

I'd like to know what makes an animal a cave animal. Is there any special predisposition to cave life that explains why only some groups of animals have evolved underground?



● **Ana Sofia Reboleira** is based at the Natural History Museum of Denmark (<http://sofiareboleira.weebly.com>).

Dottyback fish: Universitat Basel/Christopher El Mirbach; scorpion: Ana Sofia Reboleira; harvestman: Gustavo S Requena



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COSTA RICAN SLOTHS



HIGH-TECH GADGETS ARE REVEALING THE SECRETS OF THESE ARBOREAL MAMMALS, SAYS BECKY CLIFFE OF THE SLOTH BACKPACK PROJECT.

The 18th-century naturalist Georges Buffon described sloths as the lowest forms of existence, but when I came to study them in Costa Rica five years ago I was hooked. No one had researched their ecology in much depth, so I hatched the idea for sloth backpacks.

The 150g devices, nicknamed 'Daily Diaries', are a unique design by Rory Wilson of Swansea University (see p29). They measure eight variables 32 times a second, including every time a sloth breathes and chews, as well as light, pressure, temperature, humidity and orientation. Each backpack's battery lasts only about two weeks, but it produces a mountain of data. I can create a 3D visualisation of the sloth's behaviour, superimpose that image in *Google Maps* and estimate its habitat and diet.

I work with brown-throated three-toed and Hoffmann's two-toed sloths (the difference is in the number of *fingers*, but the Spanish was mistranslated when they were first described). Finding enough sloths to fit with backpacks is difficult, because they melt into the forest canopy,

may stay in the same tree for a fortnight and only come down at night or early in the morning. So far I've tagged 17 animals – I would love it to be more, but the detail I have already captured is very valuable.

Equipment failures are an issue, too. Humidity affects the backpacks, so I pack them inside a pair of condoms to keep them dry when not in use!

I also work on rehabilitating injured animals and education – sadly sloths are still beaten or burned, usually by children. I take orphaned babies from the Sloth Sanctuary of Costa Rica into schools, to teach kids how gentle and harmless these animals really are.

Interview by Jake Kendall-Ashton.

“ I CAN SUPERIMPOSE A VISUALISATION OF THE SLOTH'S BEHAVIOUR IN GOOGLE MAPS AND ESTIMATE HABITAT AND DIET”

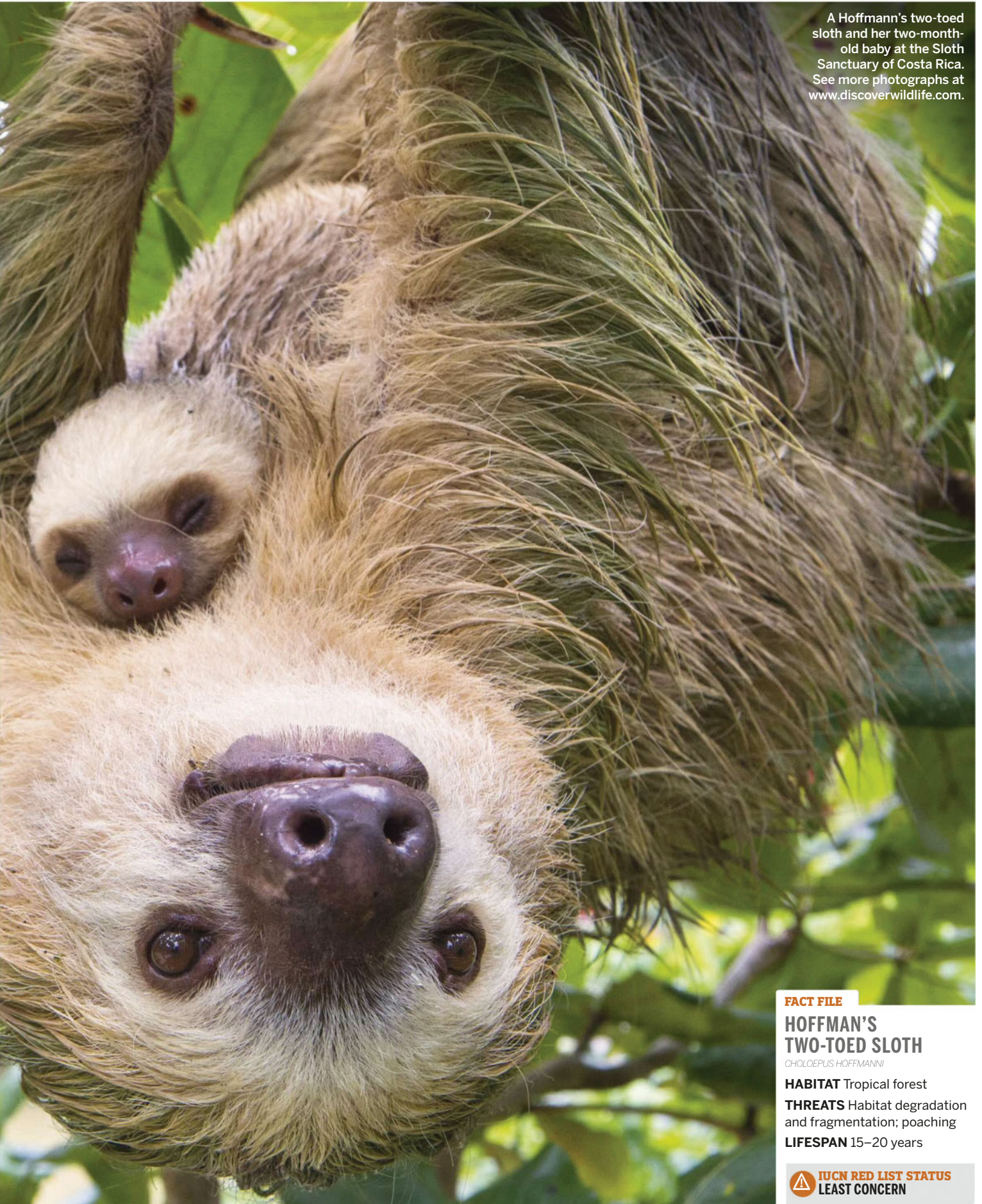
+ FIND OUT MORE

Visit <http://beckycliffe.com/sloth-backpack-project> and www.slothsanctuary.com

Becky fits a brown-throated three-toed sloth with a backpack. The £550 devices are shedding new light on the secretive animals' behaviour.



2 x photos: Suzi Eszterhas



A Hoffmann's two-toed sloth and her two-month-old baby at the Sloth Sanctuary of Costa Rica. See more photographs at www.discoverwildlife.com.

FACT FILE

HOFFMAN'S TWO-TOED SLOTH

CHOLOEPUS HOFFMANNI

HABITAT Tropical forest

THREATS Habitat degradation and fragmentation; poaching

LIFESPAN 15–20 years



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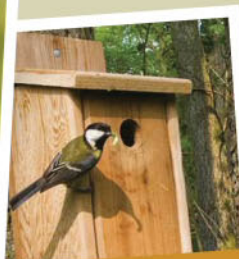
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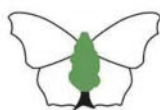
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Butterfly
Conservation

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Our secret gardener will help to separate your perennials from your annuals and reveal tips on how to fill your garden with butterflies, moths and beautiful

flowers. We will transport you to our wild and beautiful reserves where you will come face to face with some of our most exceptional wildlife.

Our resident expert Richard Fox will reveal what butterflies and moths to look out for each month and where and when you can spot them.

Sign up for our **FREE** e-newsletter at www.butterfly-conservation.org/enews



CHRIS PACKHAM

NO ZOO IS PERFECT, BUT I DON'T WANT TO CLOSE ZOOS DOWN. INSTEAD, LET'S ALL VISIT THEM AND ASK HOW WE CAN HELP.

OPINION

A new Warwick University study, reported in last month's Agenda section, provides evidence that zoos help us to understand biodiversity and make us more aware of conservation issues. But zoos remain a difficult subject. Perhaps especially so for me, as my partner Charlotte runs one.

I like 'meeting' animals – and recently at Paignton Zoo I had my best day in a long while, engaging with its tamarins, giraffes, zebras and a reluctant male golden pheasant. The excitement was no less vital than in the distant days when my tiny hands reached into the enclosures at Southampton Zoo (long since closed) to get pecked, scratched or bitten by things that otherwise only appeared in black-and-white photos or as poor illustrations in my library books.

Strange, given that the curious young naturalist grew into a man very sensitive to how we treat other species. So was this just a flash of nostalgic, selfish escapism? Unlikely, as the following weekend I got a real thrill from tickling one of Charlotte's lemurs. It was a thoroughly mutual

exchange – the lemur is a bit 'nippy' and his fortune was favoured by my brave fingers.

I've seen wild lemurs, but this purring prosimian pressing his fluffy armpit into my palm was a powerful moment. Because I touched him, smelled him, nearly got bitten by him. I liked him as an *individual* – ultimately, I 'felt' him.

Yet just a couple of years ago I similarly connected with a dolphin in a US aquarium, and was jolted not with joy but with a profound sadness and lingering sense of shame. The sentient, remarkable creature was incarcerated in a sterile pool where it performed circus tricks, and the 'show' failed to even mention wild dolphins, let alone their plight at Japan's Taiji cove. It haunts me still – that dolphin swims in a sensory and moral vacuum.

This is the nub of it. There are species that should simply *never* be kept captive.

Modern zoos have to be about education and developing an affinity for – and a real desire to conserve – *wild* life.

Yes, I know some zoos preach that they are 'arks', protecting rare animals from extinction and captive-breeding them for potential release back to the wild. And with invertebrates, reptiles and amphibians there have been a few notable successes.

But among big, charismatic mammals there have been mainly failures. Disasters involving releases of lions, tigers, gorillas, rhinos and – dare I say it – giant pandas. These are vanity projects. There's little safe 'wild' left for these ill-equipped individuals to return to, and little hope of them ever surviving. And when the day dawns, as it

surely will, when there are no wild tigers or rhinos, what will their captive counterparts then represent?

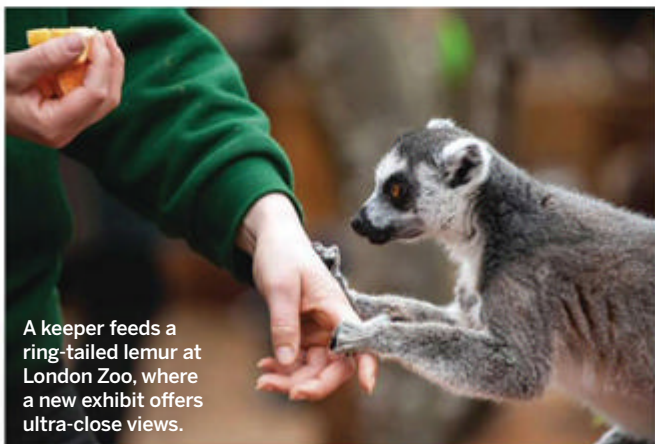
For me, they will be reminders of our failure to conserve life – badges of shame, pale shadows of nature's greatest masterpieces that should be burning bright in the forest of the night. So come on zoos, cut (most of) the 'captive-breeding

for release' crap, be far more critical about what you keep, phase out unsuitable species and concentrate on good-quality education.

I've never been to a wholly good zoo. But I don't want to close zoos down; this makes me want to improve them. In the UK, zoos attract 25 million visitors a year but get no direct public funding. The ludicrously decadent monster that is English football gets over £25 million of our cash, despite having a turnover of £300 million! Absurd.

So if you visit a zoo and consider it is not up to scratch, instead of fantasising about releasing all of the animals back into some utopia, why not ask what you could do to help? How can you positively influence its future so that new generations of nascent naturalists' fingers get nibbled? 🐾

“UK ZOOS GET 25 MILLION VISITORS A YEAR BUT NO PUBLIC FUNDING. ENGLISH FOOTBALL GETS OVER £25 MILLION OF OUR CASH”



A keeper feeds a ring-tailed lemur at London Zoo, where a new exhibit offers ultra-close views.

Stephen Chung/Alamy

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MARK CARWARDINE

GREEN BELTS HAVE BENEFITED BRITAIN'S COUNTRYSIDE AND ECONOMY FOR 60 YEARS. SO WHY ARE WE SO KEEN TO BUILD ON THEM?

OPINION

My list of 'British Politicians For Whom I Have Absolutely No Respect' grows so rapidly that even I find it hard to keep track.

But I could forgive the latest incumbents for at least some of their shortfalls if they would do just one thing: bring one of the most innovative bits of legislation we've ever had back to life.

I'm talking about green belts. These swaths of countryside and farmland draw a firm line around towns and cities and, as if by magic, stop them from merging into one another to form one great urban sprawl. They provide a lot of other benefits, too, from encouraging urban regeneration (instead of urban expansion) to providing an easy escape from the city and forming a buffer zone to protect the deeper countryside.

Quite simply, green belts are brilliant. And in their 60-year lifetime they've stood the test of time remarkably well.

Until now, that is.

They are supposed to be safe from

development – indeed, that's the whole point – but our dictatorial state has been slackening and speeding up the planning process in a way that allows developers to build on once-sacrosanct green-belt land.

Every time I open a local newspaper, there seems to be yet another story about a community campaign to stop new houses (plus all their associated roads and superstores) being built on the local green belt. But these days it doesn't matter whether there is public approval or not. The answer to developers is inevitably a resounding 'yes'.

Politicians claim that it's to meet an ever-increasing demand for affordable housing. But they ignore one blisteringly obvious alternative. One of the best qualities of green-belt legislation is that it forces developers to build on brownfield sites, locations that have previously been developed, which keeps new houses and businesses close to services and transport links. According to the Coalition's own figures, there are enough derelict brownfield sites available and suitable for building no fewer than 1,494,070 new homes – and still more for commercial and industrial development.

But the problem is this. Politicians have a vested interest

in building on green-belt land. They are tempted by the false promise of an easy construction boom (why else would they ignore the fact that there are enough long-term empty houses to provide homes for more than 300,000 families?), and at the same time they can help their plutocratic developer friends to make bucket loads

of dirty money. It's no coincidence that many brownfield sites would be more costly to develop than virgin countryside – which is precisely why so many of the Coalition's develop-at-any-cost cohorts quote "affordable housing" as justification for building on green belts instead.

The irony is that weak planning laws are

actually bad for the economy. Cities decline as they are hollowed out, while longer and longer travel times drag down efficiency. More importantly, the planning system isn't there to be hijacked by politicians desperate to promote economic growth at any cost. It's not about money – it's about quality of life.

The Coalition saw conservation as a worthless impediment to economic growth, and blatantly despised anyone even remotely linked with the environmental movement. Maybe the new government will be different. It will certainly need to act quickly. As our green belts are eaten away piece by piece, we are already sliding down a very slippery slope. Once they have gone, that will be it. We'll never be able to suck them back. 🐾

“ THE IRONY IS THAT WEAK PLANNING LAWS ARE ACTUALLY BAD FOR THE ECONOMY. CITIES DECLINE AS THEY ARE HOLLOWED OUT”



Green-belt land in the Vale of Clwyd, north-east Wales, is destroyed to build houses.

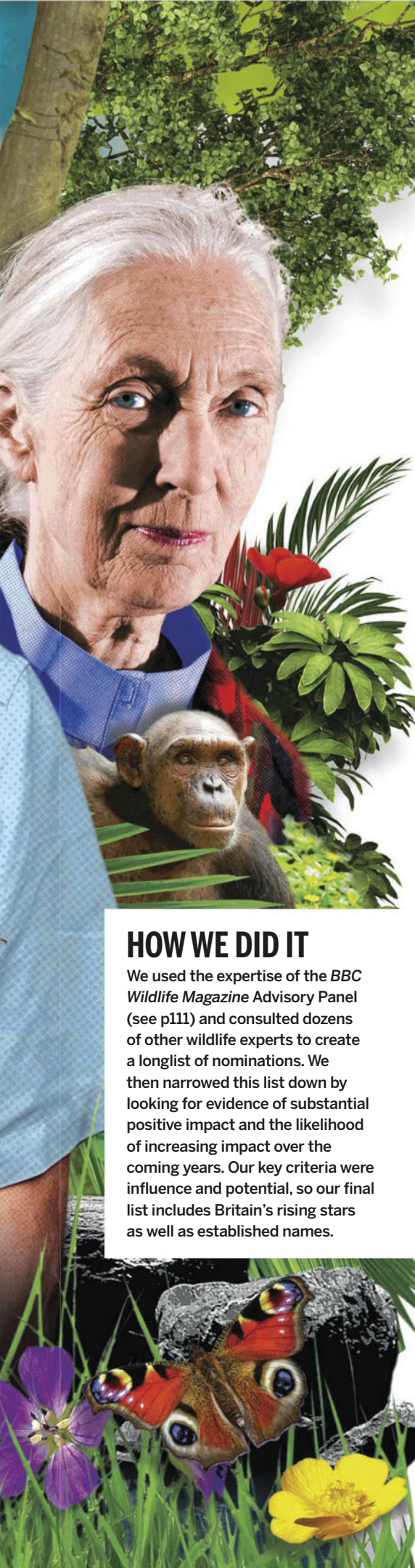
David Woodfall/naturep.com

MARK CARWARDINE is a zoologist, photographer, writer, conservationist and BBC TV presenter. Visit www.markcarwardine.com to find out more.

The BBC logo is a purple square with the letters 'BBC' in white, positioned above the word 'Wildlife' in the main title.

The Wildlife Power list

Who has the potential to change the fortunes of wildlife and the way we experience the natural world over the next decade? We asked a team of experts to nominate conservationists, scientists, broadcasters, artists and writers to identify the 50 most influential people in British wildlife...



The 'great bustard of Whitechapel' – ATM at work.



50 **ATM**
Conservation street artist

Bitterns have been spotted in Bethnal Green, barn owls in Acton and great bustards in Whitechapel. These and other threatened birds are surprising countless Londoners thanks to the larger-than-life murals of 'ATM', one of several street artists using bare concrete and brick to highlight conservation issues in the unlikely setting of our often-monochrome urban environment.

49



CHRIS WATSON
Sound recordist

No one has done more to shape how we hear the natural world. From displaying lyrebirds in Australia to the incoming tide and groaning glaciers, Chris's immersive soundscapes are part-documentary, part-artform and always staggeringly beautiful. Chris was a key member of the team that produced BBC Radio 4's groundbreaking and much-loved *Tweet of the Day* series.

46



PETER EVANS
Director, Sea Watch Foundation

One of the Sea Watch Foundation's key roles is monitoring the bottlenose dolphins, porpoises and grey seals of Cardigan Bay, off the west coast of Wales. Peter established the charity in 1991. Data collected by its researchers helped to win protection for the area's marine wildlife in the first place, and is still crucial in ensuring that potentially harmful developments are thwarted.

48



GEORGIA LOCKETT
Blogger and activist

Disaffected teens? Sixteen-year-old Georgia shows why that's such a tired cliché – when not introducing children to nature at her local forest school, she blogs, writes for newspapers, campaigns and volunteers with a badger bTB vaccination programme in Staffordshire. She has also appeared on CBBC and *Autumnwatch*: one to watch.

45



HELEN BROWNING
Chief executive, Soil Association

Some UK farmers go the extra mile for wildlife – the Merricks and Fulton families at Elmley on the Isle of Sheppey, Chris Knights in Norfolk, Nicholas Watts in Lincolnshire and Henry Edmunds in the Salisbury Plain all spring to mind. But as head of the UK's leading organic farming group, Helen has great influence. Nothing better represents our connection to nature than soil and the way we use it to produce the food we eat. Helen runs the 54oha organic Eastbrook Farm in Wiltshire, a role model for wildlife-friendly agriculture. She has planted 35,000 trees, laid 11km of hedges and you can taste the produce at her pub, The Royal Oak.

HOW WE DID IT

We used the expertise of the *BBC Wildlife Magazine* Advisory Panel (see p111) and consulted dozens of other wildlife experts to create a longlist of nominations. We then narrowed this list down by looking for evidence of substantial positive impact and the likelihood of increasing impact over the coming years. Our key criteria were influence and potential, so our final list includes Britain's rising stars as well as established names.

47



CHRIS POWELL
Co-owner, Gigrin Farm

One of the great conservation success stories of the past 30 years has been the comeback of red kites across large areas of Britain. Kite feeding has become one of our most spectacular wildlife experiences, and Gigrin Farm – owned by Chris and Dominique Powell – was not only the first to get in on the act, it's also still one of the most popular.

DID YOU KNOW?

On a good day you can spot more than 600 red kites wheeling in the winter sky at Gigrin Farm – a far cry from the 1930s, when there was just a single breeding pair left in Wales. ▶

42



MAGGIE GOWAN
British Wildlife
Photography Awards

Maggie launched the British Wildlife Photography Awards in 2009. While lacking the global reach of other competitions, they enjoy an impressively high profile in the UK, and are a potent vehicle for highlighting domestic conservation. Their importance will surely grow, bringing the beauty of Britain's wildlife to an ever-wider audience.

41



DAVE SEXTON
RSPB Mull officer

The wildlife-rich island of Mull is a symbol of the benefits of ecotourism, mainly down to its resident white-tailed and golden eagles. In 2010 a survey found that one in four visitors to Mull were there because of these raptors, contributing £5 million annually to the local economy. Dave is the lucky man tasked with keeping an eye on the eagles and making sure they continue to pay their way.

40



JAKE MCGOWAN
Bone collector

Aged six, Jake's discovery of a rabbit skull sparked his passion for bones; seven years later, he has one of the UK's largest private collections, with over 3,000 specimens. He explains how to identify and preserve bones via his website (www.jakes-bones.com) and has a global following. He's shared the BBC *One Show* sofa with David Attenborough and proves hands-on biology can be cool.

43

JESS FRENCH
TV presenter and
trainee vet

Minibeast Adventure with Jess, a huge hit on CBeebies last summer and endlessly repeated since, has transfixed the nation's two- and three-year-olds, showing them the wonderful world of spiders, earwigs and slugs. Jess filmed the series after doing work experience at *BBC Wildlife*; she hopes to work with wild primates, but we predict she'll also be back in front of the TV cameras soon, inspiring a new generation.

New evidence suggests that there may be two orangutan species on Sumatra, in addition to the one on Borneo.



44



IAN SINGLETON
Conservation director,
Sumatran Orangutan
Conservation Programme

Protecting orangutans in Sumatra is a hard and gruelling business. It's not the field work, however, but dealing with rapacious palm-oil companies and weak governments that really takes its toll. Ian is in the frontline of the fight to protect Sumatra's rainforests for its orangutans and, by extension, tigers, hornbills and many other rare species.

39



RICHARD LEWINGTON
Entomological artist

Anyone with an interest in Britain's moths, butterflies, dragonflies or damselflies will have pored over Richard's phenomenally accurate illustrations (see a sample on p69). This autumn he will revolutionise the identification (and therefore conservation) of another insect group, with his new field guide to bees – the first single-volume book on British Apoidea since one by Edward Saunders in 1896.

38



LUCY McROBERT
Campaigns manager,
Wildlife Trusts

Lucy exemplifies the modern conservationist, equally at home in a House of Commons panel debate, *Springwatch Extra* studio or windswept wetland. Three years after graduating, she campaigns for The Wildlife Trusts and helped to set up A Focus on Nature, which offers mentoring for young conservationists aged 16–30. A future CEO.



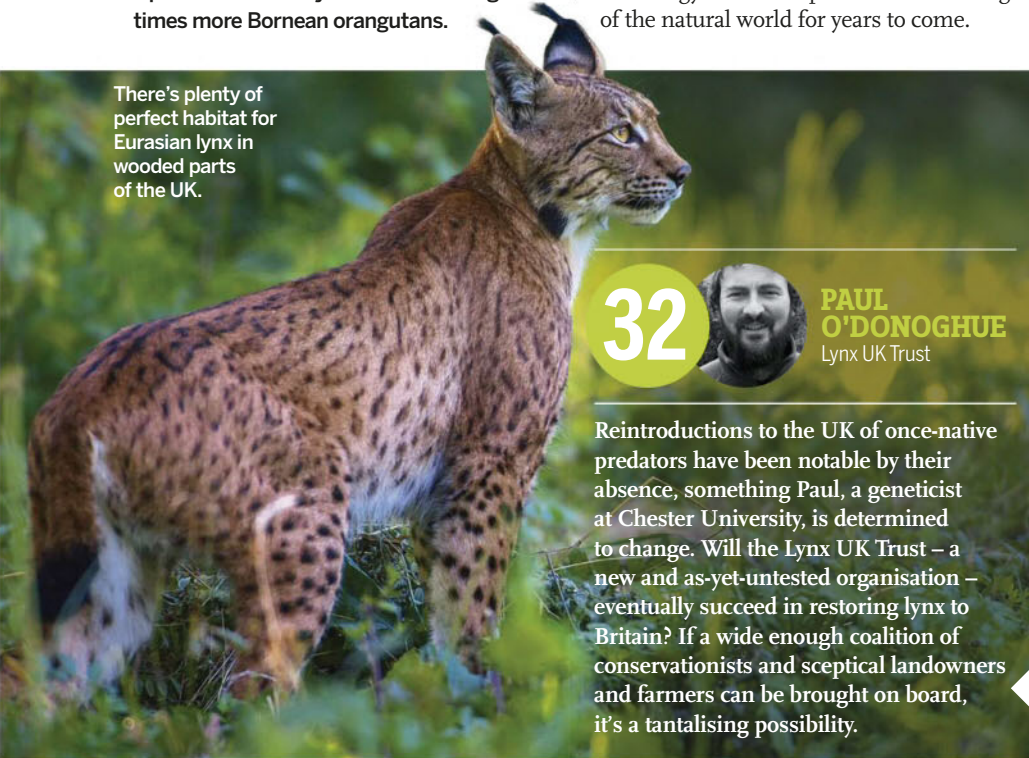
'Bug girl' Jess is on a mission to spread love for invertebrates.



DID YOU KNOW?

Just 6,600 Sumatran orangutans remain: an 80 per cent fall in 75 years. There are eight times more Bornean orangutans.

There's plenty of perfect habitat for Eurasian lynx in wooded parts of the UK.



37



MIKE RANDS

Executive director, Cambridge Conservation Campus initiative

Why shouldn't conservation share the same status at universities as business, medicine or law? That's the philosophy guiding the new Cambridge Conservation Campus, led by Mike, formerly head of BirdLife International. When fully open in 2016, it will be the world's biggest gathering of conservation NGOs, providing a base where scientists from organisations including the IUCN, BirdLife, BTO, RSPB, Fauna & Flora International and TRAFFIC can share ideas.

36



RORY WILSON

Professor of aquatic biology, Swansea University

While studying penguins in the 1980s, Rory invented the data logger, a device that records information about the movements of animals. His increasingly sophisticated devices have been tagged to over 100 species, including cheetahs, condors, oryx, sloths (see pp20–21) and whale sharks. He won a Rolex Award for Enterprise in 2006 and this technology will develop our understanding of the natural world for years to come.

32



PAUL O'DONOGHUE

Lynx UK Trust

Reintroductions to the UK of once-native predators have been notable by their absence, something Paul, a geneticist at Chester University, is determined to change. Will the Lynx UK Trust – a new and as-yet-untested organisation – eventually succeed in restoring lynx to Britain? If a wide enough coalition of conservationists and sceptical landowners and farmers can be brought on board, it's a tantalising possibility.

35



FINDLAY WILDE

Blogger and activist



He won't be able to vote until 2020, yet Finn is more politically active than many experienced conservation 'suits'. A blogger and trainee ringer, he created Harry the Hen Harrier – a fibreboard mascot that is touring the UK to raise awareness of crime against raptors. When he shared the stage with five other young conservationists at a recent BTO event, there wasn't a dry eye in the house.

34



TIM MACKRILL

Senior reserve officer, Rutland Osprey Project

The high-profile osprey-translocation scheme at Rutland Water, which Tim starting helping aged 14 years old and today manages, is as much about education and community engagement as species conservation. Through guided visits and boat trips, nest webcams, outreach to schools both locally and in Gambia (where many British ospreys overwinter), and World Osprey Week – a global online celebration of migration – Tim and his team of volunteers have reached many thousands of people.

33



ZAC GOLDSMITH

Conservative Party

Conservatives and wildlife conservation should go hand-in-hand (the clue's in the name), though this is seldom the popular perception. However, Zac – former editor of *The Ecologist* and MP for Richmond Park – breaks the mould. He speaks out on issues such as animal welfare and the illegal wildlife trade, and achieved a notable success in March when, together with the Pew Charitable Trust, he persuaded the Government to set up a marine conservation zone around the Pitcairn Islands.

DID YOU KNOW?

The Scottish Highlands could support 400 lynx, with a further 50 in southern Scotland and Northumberland's Kielder Forest.

31


CALLUM ROBERTS

Professor of marine conservation, Univ. of York

From oceanic acidification to plastic pollution and ever-shrinking fishing catches, Callum popularises the scientific evidence that shows in stark terms just how much – and fast – our seas are changing. For years he has been one of the world's most influential proponents of marine protected areas and no-take zones, and his compelling, passionately argued 2012 book *Ocean of Life* is a must-read.

30


TONY JUNIPER

Author and activist

Tony is unapologetic about the need for conservation to embrace business and commerce, and his latest book *What Nature Does for Britain* dares to quantify nature in monetary terms, pointing out that it does an estimated £1.5 trillion-worth of work for the UK each year. A former director of Friends of the Earth, Tony can be found beating a drum for the environment at seminars, conferences and festivals around the world.

29


DEBBIE PAIN

Director of conservation, Wildfowl & Wetlands Trust

As the author of 26 studies into lead contamination in wild birds, Debbie is an important voice on the Lead Ammunition Group. It may hardly be a household name, but this panel's recommendations to the Government (expected soon) could have a lasting conservation impact because thousands of wildfowl and other birds are still poisoned every year after ingesting lead shot. One of the many other important projects Debbie oversees is the complex international rescue of the Critically Endangered spoon-billed sandpiper.



THE POWER OF SOCIAL MEDIA 10 TOP TWEETERS TO FOLLOW

BRIGIT STRAWBRIDGE
@B_STRAWBRIDGE

BLOG: Brigit Strawbridge
Bees, sustainable living and conservation, for example tackling 'overtidiness'.

HEATHER KOLDEWEY
@HEATHERKOLDEWEY

BLOG: Heather Koldevey
Marine conservation worldwide, especially coral reefs, fish and seahorses.

PHIL GATES
@SEYMOURDAILY

BLOG: Cabinet of Curiosities
British wildlife, particularly invertebrates, plants and macro photography.

DUSTY GEDGE
@GREENROOFSUK

BLOG: Dusty Gedge
Conservation news from around the world.

ED YONG
@EDYONG209

BLOG: Not Exactly Rocket Science
Wide variety of science news and views.

RICHARD FOX
@RICHARDFOXBC

BLOG: Butterfly Conservation blog
Butterflies and moths – the latest sightings and conservation news.

MAYA PLASS
@MAYAPLASS

BLOG: Maya Plass
Marine wildlife and conservation.

GRRL SCIENTIST
@GRRLSCIENTIST

BLOG: Guardian science blogs
Scientific news and views, especially ornithological.

ROB MCBRIDE
@THETREEHUNTER

BLOG: Tree Hunter Rob
Campaigns for greater protection for Britain's ancient and veteran trees.

DAVID STEELE
@STEELYSEABIRDER

BLOG: Isle of May
Wildlife on his patch – he is warden on the Isle of May (and was formerly based on the Farne Islands).


Maya: a marine ecologist passionate about education.

28


MARK CONSTANTINE
Owner, Lush

High-street store Lush is best known for its nostril-assaulting bathbombs, but also sets a high standard for responsible business, giving 2 per cent of profits to charities such as Sea Shepherd, the Dorset Wildlife Trust and the Sumatran Orangutan Society. Mark is a keen birder and as part of the 'Sound Approach' team publishes innovative books, most recently on owl vocalisations.

27


MARY COLWELL
Radio producer and blogger

Working for Radio 4's *Shared Planet*, Mary helps define the conservation debate. As a contributor to *The Tablet*, she speaks to the Catholic faithful. On hunting in Malta, she writes: "The Church so often is afraid to rock the boat and can't decide what it really thinks about nature. This is such an obvious issue on which to lead from the front." Her blog is excellent: <http://marycolwell.blogspot.co.uk>.



Wildfowl such as Bewick's swans – here being caught for a WWT study – will benefit from tighter controls on lead shot.

23 **DYLAN WALKER**
Co-founder, World Cetacean Alliance and WhaleFest

If SeaWorld bows to growing pressure and stops keeping orcas captive, it will in part be due to campaigning by the World Cetacean Alliance. The WCA acts like a planetary loudhailer for marine conservation and responsible tourist organisations. WhaleFest, its sister event in Brighton, is a family-friendly celebration of the marine environment. He also set up ORCA, which surveys the Bay of Biscay and established it as a key whale-watching destination.

21 **JOHN BURTON**
Chief executive, World Land Trust

Any organisation that counts Chris Packham and David Attenborough as its patrons must have something going for it, and the World Land Trust certainly does. Established in 1989 by former *BBC Wildlife* assistant editor John Burton, the charity pioneered a new conservation model that involved helping local organisations to buy and protect land. Since then, John has helped raise £19 million for conserving wildlife habitat in South and Central America, Africa and Asia.

22 **CAROLINE LUCAS**
Green Party

This list was compiled prior to the Election, so at the time of writing we can't be sure if Britain's first Green Party MP will retain her seat, or be joined by other Greens. As MP, Caroline has campaigned against pesticides, fought to protect woodland and endangered species, and argued for a plastic-bag tax. She has often been a lone parliamentary voice for the natural world, but with Green Party membership at an all-time high, she has set her party on a path that could do a great deal to benefit Britain's wildlife.

20 **TIM BIRKHEAD**
Professor of zoology, University of Sheffield

One of our top ornithologists, Tim sparked a national debate about the importance of long-term field studies when the grant was cut for guillemot research he has carried out on Skomer Island since 1972. Turning to crowdfunding to cover the shortfall, he raised awareness of a financial fix more zoologists now look likely to adopt. Tim is also co-founder of New Networks for Nature, a collective of conservationists, scientists and artists that runs a two-day public symposium each November – highly recommended. ▶

26 **WILLIAM BIRD**
GP and health campaigner

Many studies prove that nature is good for our health, so why not harness it to relieve pressure on the NHS? This logic is what drives William, a practising GP. His organisation Intelligent Health promotes green gyms, ecotherapy and prescriptions for time outdoors. He works with local authorities and Clinical Commissioning Groups. Could more time outside also help to foster more concern for the natural world?

24 **MICHAEL DIXON**
Director, Natural History Museum

Each year up to 4.5 million people visit Britain's largest natural-history museum. Michael sets the direction for its research and special exhibitions, including *Wildlife Photographer of the Year*. The museum's collections are of great educational and historical importance, while its specimens (and their DNA) have huge research value.

25 **HELEN ROY**
Principal scientist, Biological Records Centre

Citizen science has come of age and Helen is at the forefront of efforts to use websites, apps and bioblitzes to engage more people in species recording, which provides data for effective conservation (see p99). She is best known for work on the UK Ladybird Survey (www.ladybird-survey.org), which tracked the spread of non-native harlequin ladybirds. Last year she launched the Big Bumblebee Discovery Project, which got 30,000 people (many of them youngsters) involved in practical ecology.



Helen Roy champions mass participation in species recording and field biology.



16



DEREK GOW
Ecologist

The re-release of five adult beavers on the River Otter in Devon in March marked a significant stage in a campaign that has been running for some two decades. Derek has been the most vocal advocate for bringing beavers back to England, and Defra's decision to allow the rodents to remain for a five-year trial is partly thanks to him. "It's a tipping point," he says. "Society made it clear they wanted the Devon beavers to stay." He has also assisted the Scottish Beaver Trial.

18



WENDY DARKE
Head, BBC Natural History Unit (NHU)

In 2012 marine biologist Wendy Darke became the first female head of the BBC's NHU. She made her name in children's TV, launching Steve Backshall's *Deadly 60*, and last year's *Hidden Kingdoms* is representative of the innovative, drama-driven series that she believes will help re-energise wildlife broadcasting. For many, primetime TV is the most significant interaction they have with nature, but series like *Springwatch* have phenomenal potential to inspire people to get out and discover wildlife for themselves.

17



GEORGINA MACE
Professor of biodiversity and ecosystems, University College London

The IUCN Red List is described as the most comprehensive inventory of life on Earth: a measure of the global conservation status of plants and animals. Georgina is a specialist in measuring the trends and consequences of biodiversity loss, and played a pivotal role in developing criteria for species on the Red List. It is these criteria that will inform and determine the priorities conservationists set for many years to come. "Biodiversity is a concept that is hard to summarise," explains Georgina, "but its increasing policy presence means that it is important to consider how best to measure it."

15



MARTIN WARREN
Chief executive, Butterfly Conservation

If our butterflies and moths have a voice, it is largely down to Martin, a disarmingly modest entomologist who began his career studying the wood white and later dreamed up the idea of a charity dedicated to Lepidoptera. Martin was the organisation's first employee in 1993, and it currently boasts more than 70 members of staff, 34 excellent reserves and an enormously successful summer survey – the Big Butterfly Count (see p70). Nowadays, the charity's most crucial work is landscape-scale habitat creation, for example to boost marsh fritillary populations in Scotland and Devon.

14



MARK AVERY
Blogger and activist

One of our most influential conservation bloggers, Mark is a formidable debater who relishes locking horns with politicians and the shooting lobby, particularly over illegal raptor persecution. He has put moorland degradation on the news agenda and is a key figure in the campaign to ban driven grouse shoots. His 2014 book *A Message from Martha* looked at lessons from the North American passenger pigeon's demise; his next, *Inglorious: Conflict in the Uplands*, will keep the focus on hen harrier persecution.

13



MATT SHARDLOW
Chief executive, Buglife

A decade ago, you'd have struggled to find media outlets giving column inches to invertebrates. The emergence of Buglife in 2002 changed that, and today the decline of our bugs and beetles is of increasing public importance. As the cheerleader for Buglife, Matt has been instrumental in this shift in attitudes, though he's clear that there's still much work to do. "Bugs are 70 per cent of the planet's species, but the focus of under 1 per cent of published wildlife science – this will have to change," he said recently.



19

BRAIN MAY
Activist

Queen guitarist Brian May has been the unlikely heart and soul of the campaign against badger culling. Though protestors in Gloucestershire and Somerset didn't need his rallying cry to begin direct action against the culls, Brian nevertheless provided a focal point for what became a grassroots uprising. He brought the issue to much wider attention, too. His eccentric *Save The Badger Badger Badger* video, featuring hundreds of 'hawkmen' badgers from the cult film *Flash Gordon*, has had more than 1.5 million hits on YouTube. If you haven't seen it already... you should.

DID YOU KNOW?

In 2014, the second year of Gloucestershire's trial badger cull, only 253 out of a minimum target of 615 badgers were culled.

Steve campaigns for much-needed legislation and catch limits to save sharks.



STEVE BACKSHALL
Broadcaster

Anyone who has young children or grandchildren will have felt Steve's influence in their homes. In smash-hit series such as *Deadly 60* and *Deadly Pole to Pole*, he's been on global missions to get close to a host of exciting animals. He's been bitten by a shark and attacked by a caiman, and his audience adores him for it. The stat-heavy *Deadly* format is one of the BBC's most successful brands – wherever Steve appears, crowds of families follow.

Though the BAFTA award-winning presenter puts in the hours with numerous wildlife charities, Steve's real impact will be measured by how many of the *Deadly* generation are inspired to do more for the natural world. In 20 years, how many will cite his shows as the reason they became scientists or conservation volunteers?



HELEN MACDONALD
Author

Nature writing is the new rock 'n' roll, but even so the success of Helen's *H is for Hawk* has been stratospheric. Acclaimed for its "muscular" and "scalpel-like prose" by the judges of the Costa Book Awards 2015, it has reach far beyond the audience that might be expected for a book about falconry. "I have this utopian notion that if you have close personal contact with wild animals... you feel a responsibility and a love for it, which is what drives proper conservation," Helen explains. Nature writing has long



MARTIN HARPER
Conservation director, RSPB

Like his predecessor Mark Avery (see p34), Martin acts as a 'keeper of the flame' for the UK's biggest, best-funded conservation charity. As such, his blog gets significant scrutiny. So when he wrote in March that shooting pheasants and grey partridges can provide benefits for wildlife, there was a firestorm. But, as Martin said, he was merely giving praise where it was due:

"Nature needs all the friends it can get, especially those who invest in managing their land in a sensitive and thoughtful way." The RSPB is itself a major landowner and his department is key to how it runs its reserves and its relationships with other landowners, especially farmers.



DAVE GOULSON
Professor of biological sciences, University of Sussex

Dave founded the Bumblebee Conservation Trust and is the driving force behind the recent reintroduction of the short-haired bumblebee (a species that died out here in 1988) to Kent's coastal marshes. But he earns his place in our Top 10 for the clarity, verve and unyielding determination with which he speaks out against the dangers that neonicotinoid pesticides pose to our wildlife, especially bees. For this he has had to endure media uproar, as described in Chapter 13 of his superb 2014 book, *A Buzz in the Meadow*. "We can't easily solve all of the problems affecting bees, but we can stop poisoning them," he writes. "Isn't it time we did so?" With an end to the UK's temporary ban on neonics in sight, his voice will be increasingly important.

Beaver: Nick Upton/NPL; Br an May: WENN Ltd/Amy; Steve Backshall: M chae Kemp/Amy; Helen Macdonald: Anthony Harvey/Getty; Martin Harper: Graham Madger/rspb-images.com

08



ROSIE WOODROFFE
Senior research fellow, ZSL

Any journalist worth their salt knows exactly who to talk to if they really want to understand the science behind the badger cull. Professor Rosie Woodroffe sat on the Independent Scientific Group on Cattle TB (which produced the final verdict on the Randomised Badger Culling Trials in 2007), and has carried out extensive research into the impact of badger culling on TB in cattle. She has also studied alternative methods of dealing with the disease. And her view? “Despite the environment secretary’s optimism, there is so far no evidence that these pilot culls have reduced disease,” she wrote in *The Ecologist* back in January. Rosie’s respected, authoritative position makes her a key figure in this ongoing and high-stakes debate.

07



DAVID LINDO
Broadcaster

As a kid David’s local patch was Wormwood Scrubs in West London, and his focus on urban wildlife puts nature within the reach of a whole new demographic. But it’s his campaign to find a national bird for the UK that propelled him into our Top 10. When so many headlines about wildlife are doom and gloom, he has found an uplifting way to talk about even divisive issues such as hen harriers. “This poll was all about national identity, politics, educating kids and, importantly, conservation,” he says.

06



GEORGE MONBIOT
Environmental commentator and author

George says simply that he writes about things that make him angry, but his ability to pick the subjects that matter, nail an argument and confront vested interests makes him Britain’s leading independent commentator on the environment. The lasting impact of his book *Feral* (2013), which examines the case for rewilding, continues to win over sceptics. His *Guardian* column is hugely influential and his talks electrify lecture halls – one of his most inspiring messages is that by acting on what we believe we can all make a difference.

● George will contribute the first in a new series of BBC Wildlife Essays, coming soon.



Prince William meets an Asian elephant during his trip to China in March 2015.

DID YOU KNOW?

David Attenborough has described humans as “a plague on the Earth”, adding that limits on population growth are needed. He’s one of very few stars to speak out on the issue.



David pictured with a blind black rhino calf during the filming of *Africa* for BBC One.

Prince William: STR/AFP/Getty Images; David Attenborough: David Chancellor/BBC Pictures; Michael Blencowe: Sue Curmoo/Sussex Wildlife Trust

05

HRH PRINCE WILLIAM

Global ambassador, United for Wildlife

Royalty and celebrity culture may not be to everyone's taste, but put them together and you can achieve great things. So Prince William's decision to back a new global campaign against wildlife crime might come to be seen as a tipping point in the war against the illegal wildlife trade. Can his charity, United for Wildlife, stem the demand for products from rhinos, elephants, tigers, pangolins, sharks and other species? He has the ear of Chinese president Xi Jinping, and images of him standing on an anti-poaching podium with David Beckham and former basketball player Yao Ming (a huge celebrity in China) have reached millions of smartphone screens where it matters – in the Far East. It is William's ability to attract celebrity endorsement and bring international politicians and conservation groups together that makes him such a potent force for change.



NOMINATE YOUR LOCAL HEROES!

What impact can we have as individuals when faced with a neighbour, developer or council hellbent on environmental destruction? There are only two options, Chris Packham wrote in his February *BBC Wildlife* column: "Give up, become apathetic and moan as Earth goes to hell in a handcart; or believe that we can win by fighting every last battle."

Action at a local level can make a profound difference, and we want *your* help in celebrating this often-unsung conservation work. Do you know someone like Michael Blencowe of Sussex Wildlife Trust, who engages thousands of people in wildlife activities around the town of Lewes? Or Amanda Hunter,



Michael Blencowe – definitely a hero. Now we want your nominations...

who rescued more than 550 small blue caterpillars by hand from a Torbay quarry threatened with redevelopment? Tell us who your local hero is, along with a 100-word explanation of the impact they've had. We'll be celebrating your conservation heroes in a future issue of the magazine.

GET INVOLVED

To nominate your Local Conservation Hero, just email us at wildlifeletters@immediate.co.uk and use the subject line "Local Hero".

04

DAVID ATTENBOROUGH

Broadcaster

"Oh, I'm not ready to stop yet," David breezily told *BBC Wildlife* at home in 2012. He gave us the same answer on location in 2013. And he's carried on working as hard as ever, relentlessly pushing boundaries in his epic natural-history programmes, for example to embrace the latest 3D, CGI and high-definition technology.

A favourite with his production crews as well as vast TV audiences watching worldwide, David has been a star for six decades now. Previously criticised for glossing over harsh conservation realities in his gorgeous wildlife documentaries, the veteran presenter (he turns 89 this May) has increasingly voiced his fears about climate change, human

overpopulation, Creationism and the English badger cull, among many other issues. In 2014 his opposition to oil exploration in Uganda's Virunga National Park made British company Soco International think twice.

An Attenborough appearance or endorsement is fundraising gold for charities. Yet his refusal to do commercials, refreshing in the modern age, is vital to the authority of his storytelling. When David speaks, we listen.

"I can't believe this is my day job," David confided to *BBC Wildlife*, before adding: "Well, it's not really a proper job, is it?" We think it is, and it is to David that millions of people owe their understanding of nature.



03

DAVID MACDONALD

Director, WildCRU, Oxford University

Oxford University's Wildlife Conservation Research Unit has many pioneering projects worldwide, including work on the Endangered Ethiopian wolves of the Bale Mountains, and on lions in Hwange National Park, Zimbabwe. David's influence is felt here in the UK, too. "I'm very proud of our 25 years of badger studies," David says. "They spawned the original idea of perturbation, which has proved useful in understanding bovine TB." WildCRU has also begun a 'panther' programme, training students from poor backgrounds around the world before sending them back to their countries to work as agents of change.

Much of what we know about badger ecology is down to WildCRU research led by David.

Another spring, another crime victim on Malta, this time a female Montagu's harrier.

02

CHRIS PACKHAM

Broadcaster

With his forthright opinions and rockabilly quiff, Chris has long been the punk presenter of wildlife TV – and today is its most important spokesperson. "I've run out of patience for fence sitters," he told *BBC Wildlife* in 2011. "The worst are those putting the 'con' in conservation; organisations that care more about blindfolding their members than making a real difference."

And Chris puts his money where his mouth is, organising a mission to Malta in spring 2014 to highlight the illegal massacre of migratory birds, which thousands of people followed on YouTube. Whether it is the "shameful" English badger cull trial or "barbaric" animal abuse on *I'm a Celebrity... Get Me Out of Here!*, Chris knows how to make headlines and get people talking. Most of all, his public appearances, writing and TV programmes have the credibility that comes from a lifetime spent exploring the natural world. "You have to get scratched, stung and slimed," he says. "It needs to come from the heart, not the hard drive." His ability to inspire others to follow this mantra is what puts him so high on our power list.

● Chris joins BBC Wildlife this month: see p23.



01 **JANE GOODALL**
Jane Goodall Institute

It's February 2014, and at a major international conference on the depressingly lucrative illegal wildlife trade, a slight, grey-haired woman is standing in a corner being mobbed by journalists. She is without doubt the superstar at this event.

Jane Goodall, together with David Attenborough, belongs to a very select group of people – British conservationists who have a genuinely global reach. She manages it through the Jane Goodall Institute, a huge community-focused environmental organisation for which she travels on speaking tours for 300 days a year. The Institute works with villagers across five chimpanzee range states in Africa, and its Roots & Shoots youth movement has 150,000 members spread across 130 countries.

Jane's revelatory work with chimps made her reputation. She was the first to document chimps using tools, one of the most momentous scientific discoveries of the 20th century, and she arguably has a deeper insight into the chimpanzee mind than anyone else alive. "They are capable of violence and brutality," she says, "but my definition of evil is that it's premeditated. I don't think a chimp could plan to torture. We do." Jane's enduring influence and global reach put her clearly at the top of our list.

DID YOU KNOW?

We have lost up to 1.7 million wild chimps since the early 1900s. There could be fewer than 300,000 left today.



WHAT DO YOU THINK?

A great deal of work went into this list – but did our expert panel get it right? We'd love to know what you think: write to us (see p5), email wildlifeletters@immediate.co.uk or tweet us at [@WildlifeMag](https://twitter.com/WildlifeMag).

Meeting of minds: Jane with rescued chimp 'LaVielle' in the Republic of the Congo.

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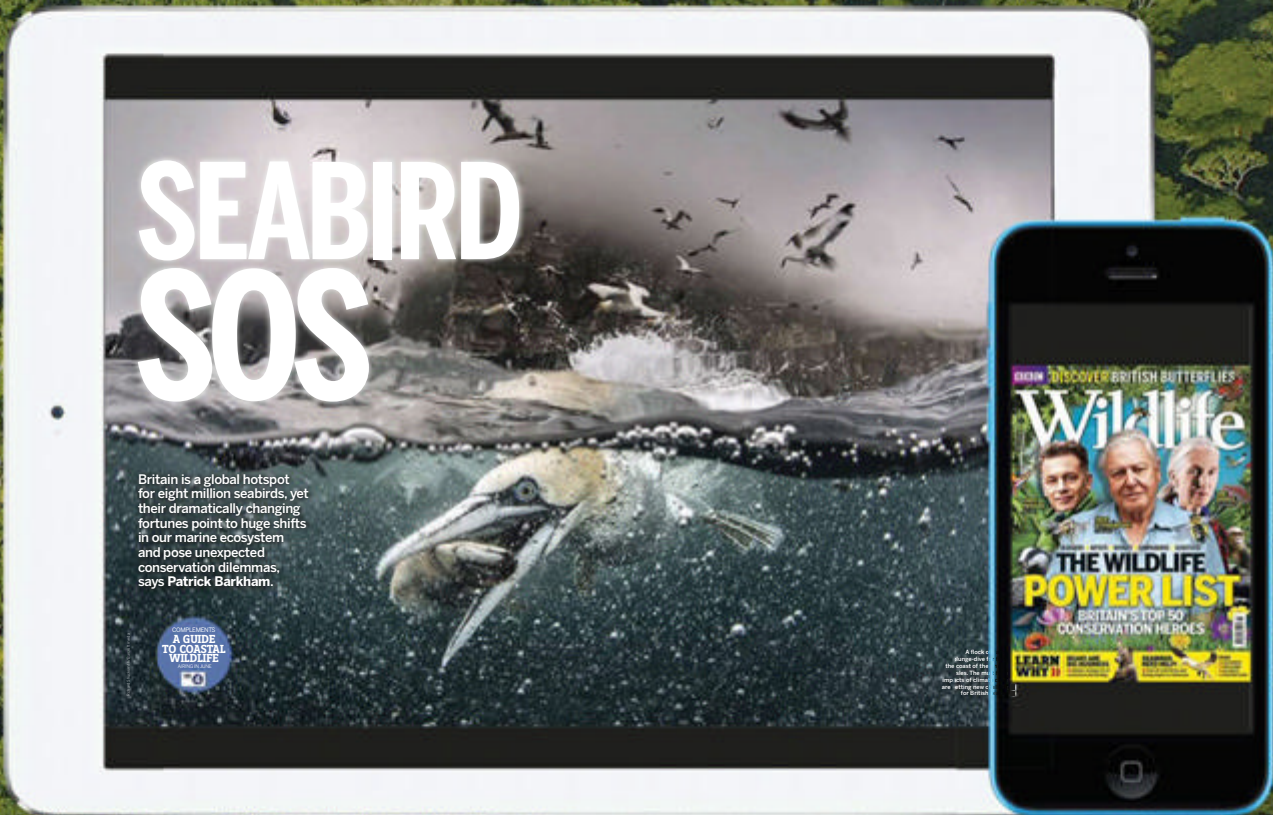
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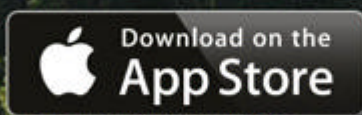
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There are seven subspecies of dusky leaf monkey *Trachypithecus obscurus* found across Burma, Malaysia and Thailand, where this group was photographed. Outside of Khao Sam Roi Yot National Park, the animals face multiple threats including illegal hunting and habitat loss. They are listed as Near Threatened on the IUCN's Red List.

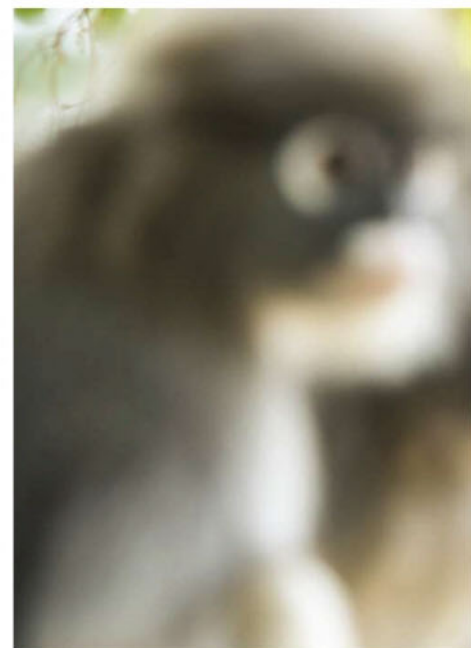
Leaf monkey magic



Dusky leaf monkeys have evolved to exploit a niche diet in the canopy of South-East Asia's forests. But these adaptations could also make them a target for the illegal wildlife trade, says primate scientist **Dr Dirk Meyer**.



Like many Old World monkeys these langurs have a sacculated or chambered stomach, as well as special bacteria, to enable them to break down their mainly leaf-based diet. They spread their foraging through the day so they don't overload the digestive processes that help them to remove plant toxins and digest leaf matter.





FAR LEFT After eating, young monkeys spend a lot of their time playing. Aggression is rare and when it does occur they are quick to make up, sometimes within a matter of minutes. Reconciliation often involves a mixture of social grooming and chest-to-chest hugging.

LEFT Also known as spectacled langurs, these primates are characterised by large rings around their eyes and mouth. The size and shape of these markings allow researchers to identify individuals within groups, but they are shy and not easy to observe for any length of time.



E

Evolution plays some strange tricks. It has equipped a select group of primates with a ruminant-like, multi-chambered stomach that allows them to digest a diet of leaves and unripe fruit. For dusky leaf monkeys this could be the very reason they are so highly prized by hunters.

“We conducted a survey with local people in Myanmar who said that these monkeys are delicious, particularly the stomach,” says primatologist Dr Dirk Meyer. “Their bones are also used in traditional Chinese medicine.”

He is currently in Myanmar (Burma), collecting samples from faecal matter and leeches. “Genetic material in the leeches’ gastro-intestinal tracts remains in a useful condition for a long time, so it’s possible to verify the existence of species that are difficult to observe,” he explains. “Using a combination of these samples and recordings of primate vocalisations we hope to get insights into their genetic relatedness.” Dusky leaf monkeys are a diverse group with seven subspecies, and Meyer believes this research could be an opportunity to classify one of them as a species in its own right.

Finding these elusive monkeys, and the samples they leave on a leaf-strewn forest floor, is a real challenge. “They are a difficult group to study,” explains Meyer. “They’ve been hunted for hundreds of years and shyness has been fixed in their genes, which makes them difficult to approach or observe for more than a few minutes.”

The dusky leaf monkeys in these photos are from a national park in Thailand. Though much of that country’s rainforest has been lost, in neighbouring Myanmar large areas still remain. The country’s growing political openness has sparked rapid deforestation driven by the expansion of palm oil production, which represents a threat to many species in this area. 📍

PHOTOS BY

STEFANO UNTERTHINER

Stefano is a zoologist and photographer who specialises in projects that put him in close contact with a species for a long period of time. He has a strong commitment to wildlife conservation and environmental issues, particularly the interactions between people and animals. His latest book is about Italy’s Gran Paradiso National Park.
www.stefanounterthiner.com



THE LOCATION

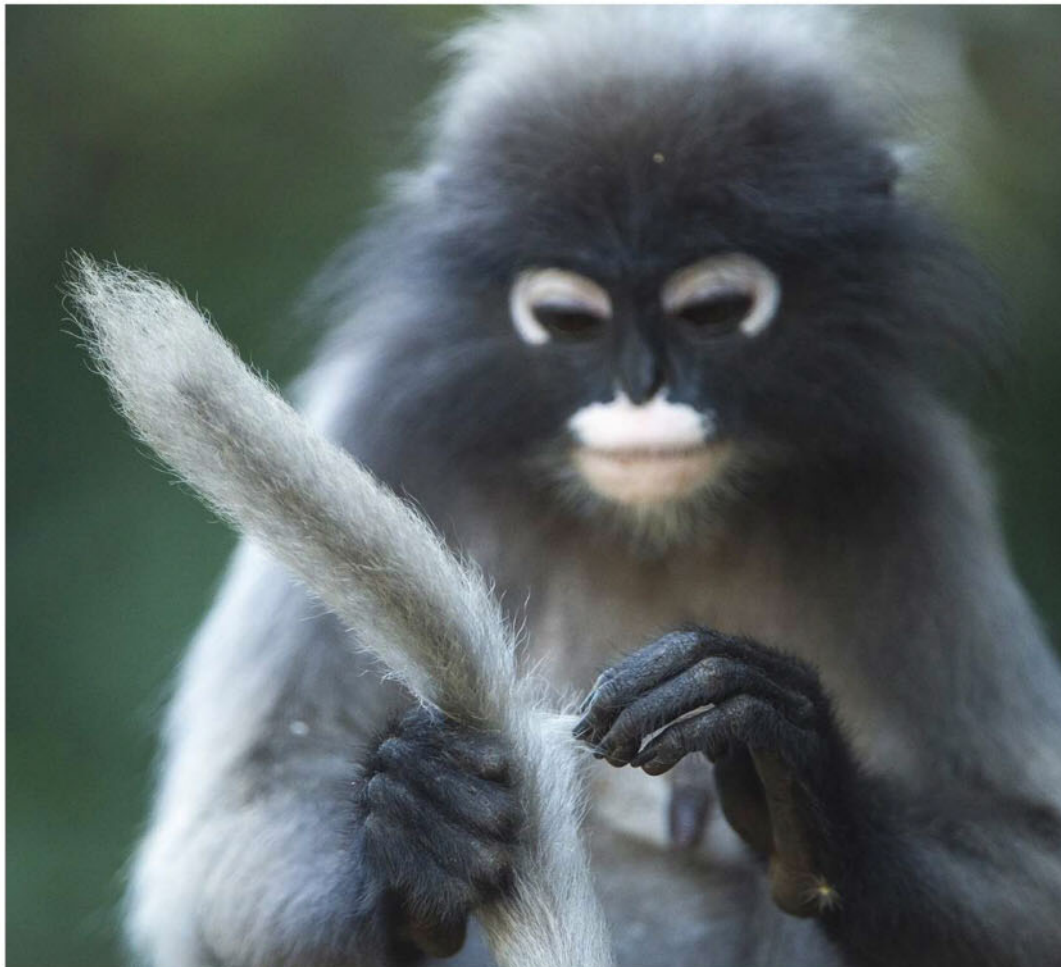
KHAO SAM ROI YOT NP
Established in 1996, this was Thailand’s first coastal national park and the name translates to “the mountain with 300 peaks”. It is a haven for wildlife with more than 300 bird species. The park is a mixture of limestone mountains and marshland, as well as relatively inaccessible forest areas which hold the dusky leaf monkey, crab-eating macaque, slow loris, Malayan pangolin and the Thai fishing cat.

Dusky leaf monkeys are capable of breeding throughout the year. They give birth to a single offspring, which spends most of its first three weeks suckling and sleeping. After this time they begin to develop their motor skills through play jumping. At this stage the mother will also encourage independence by increasingly biting and pushing the infant away.





ABOVE During the day a troop will split up and forage in smaller groups that then come back together again in the evening. When they find a tree with edible fruit on it they will include that in their daily patrol until the food has been exhausted. Locations like this limestone rock are a good place for researchers to look for faecal samples.

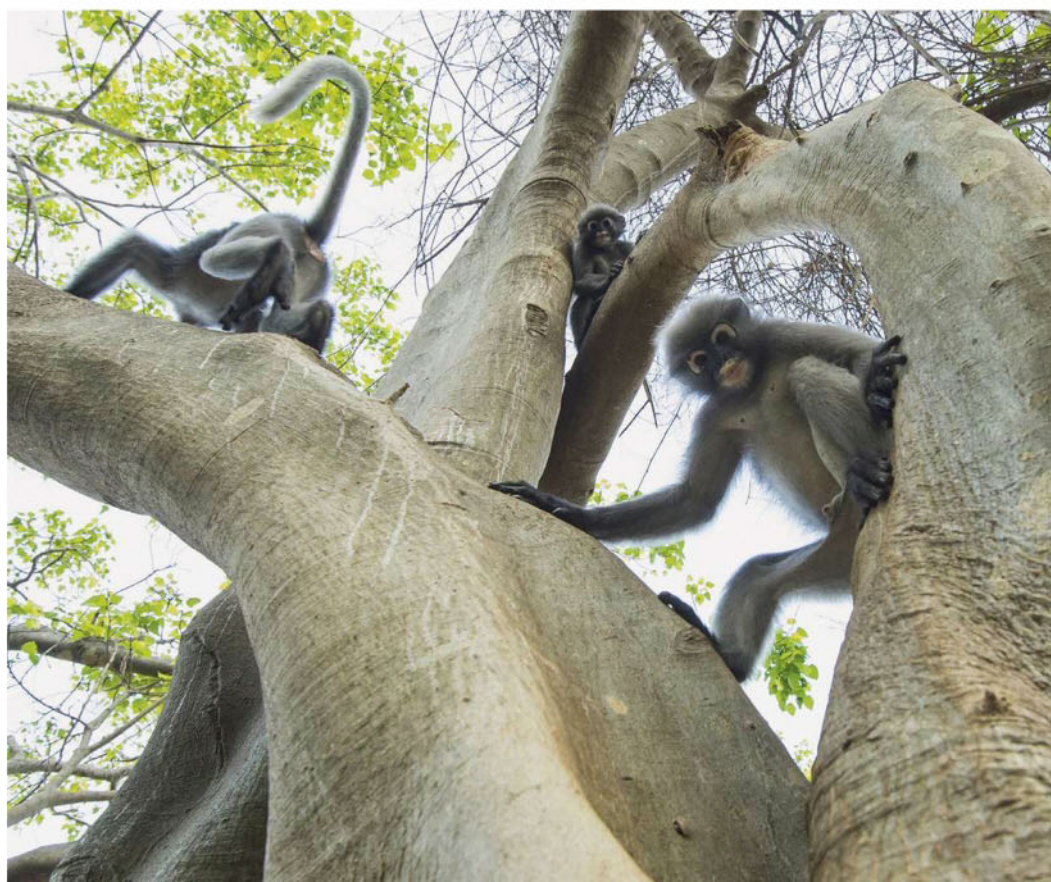


LEFT Young monkeys begin social grooming at around 70 days old. This is an important part of reinforcing bonds between individuals in the group. Other forms of tactile communication include hugging and 'bottom holding', where one individual will hold the hindquarters of another to communicate dominance.



ABOVE Young monkeys are often transferred from one female to another. A single female may watch up to four infants at a time, allowing others in the group to rest, forage and feed. By the time infants are eight months old they are increasingly distant from their mother.

RIGHT Dusky leaf monkeys spend most of their time in the canopy. Though their diet is mostly leaves, they also eat flowers and unripe fruits, using the same digestive adaptations required to break down plant toxins. The ability to consume food other species can't digest allows for a more sedentary lifestyle.





A newborn has bright orange fur, which begins to darken at around one month old. The reason for this striking difference between adult and infant is unknown, but it could provide a signal to all of the members of the group that this individual requires extra care and attention.



LEFT Dusky leaf monkey troops have a defined territory that rarely overlaps with other groups, which may be a reason why conflict is so rare. The males maintain their home range through their 'territorial honk', which can be heard most in the morning and is often accompanied by an arboreal display.

+ FIND OUT MORE

Dr Dirk Meyer from the German Primate Centre is working with Fauna & Flora International: www.fauna-flora.org

● Discover more amazing photos at www.discoverwildlife.com



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AGENDA

» UNDERSTAND THE ISSUES | BE PART OF THE SOLUTION

HOT TOPIC

Is rewilding value for money?

● READ MORE LETTERS AND TAKE PART IN THE DEBATE ON P54



Because they tend to live in poorer, less well-governed states, forest elephants are badly hit by the illegal ivory trade.

Mick Baines & Maren Reichelt/Robert Harding

FOREST ELEPHANTS UNDER SIEGE

ILLEGAL IVORY TRADE DISPROPORTIONATELY HITS ELEPHANT POPULATIONS OF CENTRAL AND WEST AFRICA.

Elephant poaching in parts of Africa continues to outstrip the population's birth rate, according to the Convention on International Trade in Endangered Species (CITES).

Figures from its 'Monitoring the Illegal Killing of Elephants' (MIKE) programme suggest that, in Central Africa, the number of elephants killed for their ivory has exceeded the number born since 2011. In West Africa – where elephants are already under intense pressure from habitat loss and fragmentation – this has been the case since 2007.

In contrast, elephant poaching has decreased in East Africa from

a peak in 2011, and has remained stable in Southern Africa where it was never as high. Overall, at least 20,000 elephants are being lost to feed the demand for ivory, mainly in China, every year.

Elephants in Central African countries such as the Democratic Republic of the Congo and the Republic of the Congo are forest elephants, regarded by some experts as a separate species to those in the rest of the continent.

The CITES data reflects a study published in 2013 by

researchers from the Wildlife Conservation Society, which suggested that the forest elephant population had declined by more than 60 per cent in a decade and was less than 10 per cent of its potential size given the available habitat.

"Whether forest elephants are a separate species or not is not really the issue," said MIKE co-ordinator Julian Blanc. "The key is that they play a significant role in forest ecosystems."

MIKE data shows that poaching is highest

42

The number of tonnes of ivory confiscated in China in 2013 – the greatest quantity since a ban on the ivory trade was imposed in 1989.

where poverty is most extreme, Blanc added. "Poachers are more likely to operate where people do not have secure livelihoods, and turn to it for money or meat."

Other factors associated with high poaching levels are weak law enforcement and governance. The rise in consumer spending in China also correlates with the rise in overall poaching rates over the past decade. **James Fair**

➕ FIND OUT MORE

Born Free sponsors an anti-poaching team in Burkino Faso: www.bornfree.org.uk

A turtle surfacing in an area of water contaminated with oil is an overt sign of the Deepwater disaster – other impacts may be less obvious.



GULF SPILL LEGACY CONTESTED

BP report downplays the impact of the 2010 disaster in the Gulf of Mexico, say campaigners.

A report by BP into its oil spill in the Gulf of Mexico has been criticised as an exercise in cherry picking by environmentalists.

The Deepwater Horizon rig exploded in April 2010, killing 11 workers and causing the worst environmental disaster in US history. The US government estimates that 4.2 million barrels spilled into the gulf – more than 15 times the quantity lost from the *Exxon Valdez* in 1989.

The BP report concluded that “significant progress” had been made “toward understanding the accident’s environmental impact, cleaning the shoreline

and restoring the Gulf.”

But Ryan Fikes, of the National Wildlife Federation (NWF), said that BP had finalised its conclusions prematurely. “I’m annoyed that the public may look at the report and think things are okay when they’re not,” he said.

For example, while BP asserts that an unusual spike in dolphin deaths around the time of the disaster was not connected to it, the NWF says this is not proven. An ongoing study by the National Oceanic and Atmospheric Administration (NOAA) has suggested that “multiple groupings of high dolphin mortalities may be due to different factors, including the oil spill,” Fikes said.

The NWF also criticised BP’s

claims about the spill’s impact on Kemp’s ridley sea turtles. BP says that nesting turtle numbers “were above historical averages for the two years after the accident”, but the NWF points out that, up until 2009, nests were increasing at a rate of 15–19 per cent a year, and that in 2010, 2013 and 2014, there were significant decreases in nests.

BP said that the report “provides an overview of five years’ worth of data”, adding that “no reports indicate that oil was the cause of any dolphin’s death”. **Mark Rowe**

➕ FIND OUT MORE

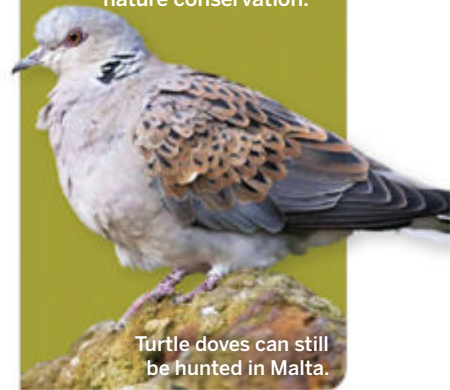
The National Wildlife Federation: www.nwf.org

MALTA HUNTING VOTE LOST

Conservationists have lost a fight to end spring hunting of quail and turtle doves on Malta after a referendum held in mid-April went against them by a margin of just 50.4 to 49.6 per cent.

Defeat in the campaign, which was backed by TV presenters Chris Packham (see p23) and Bill Oddie, means up to 11,000 turtle doves and 5,000 quail can continue to be legally shot each year during a two-week period in April. Conservationists say this also leads to illegal persecution of other birds.

Though disappointed by the result, BirdLife Malta’s Steve Micklewright said, “Thousands of people voted to end spring hunting, and we’re sure they will continue to act as champions of Maltese and European nature conservation.”



Turtle doves can still be hunted in Malta.

From left: Carel Guzy/The Washington Post via Getty Images; Paul Sawyer/FLPA; Nick Upton/naturepl.com

From left: WWF/LiKu; David Fisher/REX/Shutterstock; Sayyugem National Park Paul Naylor

CONSERVATION briefing

PORPOISE RESCUE

Four Yangtze finless porpoises have been moved to a new home in a bid to save this Critically Endangered cetacean from extinction. Scientists say there are just 100 individuals left and that time is running out for the porpoise because of the poor state of the River Yangtze.



“WE DINED ON SMOKED WHALE CARPACCIO”

Pippa Middleton writes about a trip to Norway. “It might have been better... to take a whale-watching trip. She may have thought twice about condoning and promoting this cruel trade,” said Whale and Dolphin Conservation’s Vanessa Williams-Grey.





The beavers were re-released into the River Otter after being checked for diseases.

BEAVERS ARE GO!

After Scotland, now England: wild beavers are officially approved in East Devon trial.

Beavers on the River Otter in East Devon have now entered a five-year trial period during which they will be extensively monitored to see what impact they are having on the landscape and – in particular – farming.

After being trapped and tested for any harmful diseases (which came out negative), the five beavers were released at the end of March. There are a further four beavers that were not recaptured, making nine individuals in total.

Pete Burgess of Devon Wildlife Trust, which has taken responsibility for keeping an eye on the beavers, said that local people seemed to appreciate the new residents, but the Trust wants to see if views change over time. "Agriculture is such an important land-use and industry in East Devon, and we want to monitor the effects the beavers are having on farmers' incomes," he said.

TAKE ACTION

To see the beavers, walk the River Otter between Ottery St Mary and Budleigh Salterton.

52

The number of seals killed by Freedom Food-certified salmon farmers to protect stocks in 2014. "The shooting of one seal is one seal too many," said an RSPCA spokesperson, "but a determined predator may be able to bypass all efforts to exclude them."

BIG-CAT BOOM

Researchers in the Altai Mountains of Siberia in southern Russia report they have recently camera-trapped three or possibly four snow leopards. Biosphere Expeditions, which has been working in the region for 10 years, says snow leopards appear to be thriving in the newly created reserve of Saylyugem National Park.



MyAGENDA

MARINE CONSERVATION



PLANS TO REOPEN A QUARRY IN CORNWALL COULD HIT ONE OF THE FIRST MARINE CONSERVATION ZONES IN BRITAIN, EXPLAINS DIVE CENTRE OWNER **JO ANSELM**.

People come from all over the world to dive at The Manacles Marine Conservation Zone (MCZ) off the east coast of The Lizard. It is renowned for its maerl beds, pink sea fans and spiny lobsters, while bottlenose dolphins, minke whales and basking sharks are all seen offshore.

The quarry owners want to build a 535m-long breakwater and two jetties within the MCZ. This will allow them to transport rock in barges pulled by tugs – it's the first major development that could affect an MCZ, and could act as a precedent.

Maerl is a rare, coral-like seaweed, and is fragile and slow-growing. Beds can be up to 8,000 years old, but are easily destroyed and irreplaceable.

We have many concerns about the impact of the quarry on the marine habitat. Building the breakwater and jetties will stir up sediment that

would damage the maerl beds and other wildlife, as would the action of the tugs' propellers. Dumping rocks on the seabed will change the tidal flow, and we worry about the impact of noise on marine mammals.

The Manacles is a treacherous shipping area. Navigating tugs pulling a barge through its inner area is surely an accident waiting to happen.

Local people have formed an action group. It's called Community Against Dean Superquarry (CADS). We are going to do our own wildlife survey with the help of the Marine Conservation Society and Exeter University, and unlike the one done for the quarry company's environmental impact assessment, it will be carried out by divers.

The Manacles is just one of 27 MCZs. Though more are in the pipeline, it is important that we protect the ones already in place – otherwise, what's the point?



Spiny lobsters thrive in the marine habitat of The Manacles.

Although the past 10 years have seen a reduction in deforestation, recent figures worry conservationists.

WARNING SIGNS FROM THE AMAZON

GLOBAL CONSUMPTION IS DRIVING AN ALARMING INCREASE IN DEFORESTATION THAT COULD SEE THE EXTINCTION OF MANY AMAZONIAN SPECIES, REPORTS RICHARD SCHIFFMAN.

Fly into the Amazonian metropolis of Manaus and you may not see a single paved road for the last hour of your flight.

But the world's biggest rainforest is far from untouched. The southern and eastern flanks of Amazonia are a patchwork of soy plantations and cattle pasture punctuated by islands of standing forest. Nearly 20 per cent of Brazil's Amazon has been felled, and another 20 per cent degraded, in the past 50 years.

In the past decade the rate of forest loss in Brazil actually fell by more than three-quarters, while deforestation worldwide rose 62 per cent in the tropics during the 1990s and the 2000s.

But deforestation in Brazil is now rising again – dramatically. Using satellite photography, the Amazon research group Imazon

estimated that 1,660km² of rainforest was cleared between August 2014 and January 2015. That's more than double the loss during the same period a year earlier. Scientists say if we don't stop cutting the world's rainforests, 5–10 per cent of tropical species could be lost, a rate of extinction higher than in any other major ecosystem.

"The main cause of deforestation is the expansion of pastures, which account for 60 per cent of all deforested areas," said Francisco de Oliveira Filho of Brazil's Ministry of the Environment. Some of the pasture area is not actually used for cattle ranching, he explained, but cleared in a "land grab" for later resale using false papers.

Logging is another problem. More than half of Amazonia is made up of reserves where

clearing is forbidden. Yet Brazil's protected areas are routinely raided by criminal timber gangs, often under cloud cover or at night to avoid detection by satellite-monitoring systems. Between 60 and 80 per cent of all the timber cut in the Amazon is illegal, according to a recent Greenpeace report.

The government is cracking down, said Oliveira Filho, citing the recent arrest of the 'King of Deforestation' Ezequiel Antônio

“THE EXPANSION OF PASTURES ACCOUNTS FOR 60 PER CENT OF DEFORESTATION”

Castanha, who was reputedly responsible for a fifth of the illegal forest destruction in the Amazon.

But others will quickly take up the slack, predicted Christian Poirier of the NGO Amazon Watch. "These highly publicised cases are encouraging," he said. "Deforestation numbers should drop when we take out a kingpin like this, but they don't. They continue unabated."

One reason is the rising price of beef. Growing global demand has stimulated clearing for ranches and for growing soybeans, sold largely as a cattle feed, said Phillip Fearnside, a scientist at Brazil's National Institute of Amazonian Research. Changes in the exchange rate make exports more profitable too.

But Fearnside also blamed a recent government amnesty for deforestation. "The expectation



BRAZIL'S RAINFOREST IN NUMBERS

TWO BILLION TONNES

THE AMOUNT OF CARBON DIOXIDE THAT IS ABSORBED BY THE AMAZON IN A YEAR, WHICH MAKES IT A KEY ASSET IN COMBATING GLOBAL CLIMATE CHANGE.

Rainfall

The Amazon forest creates **50-80 PER CENT** of its own rainfall through leaf transpiration, and boosts precipitation as far afield as Argentina and the American Midwest. Some scientists believe that deforestation is a critical factor in the current drought, which is causing water rationing in Sao Paulo, South America's largest city.

65%

The proportion of deforestation in the Mato Grosso region of Brazil associated with soy production, according to a study. About a fifth of Brazil's soy exports go to Europe.

More than 2,000 tropical forest plants have been found to have **ANTI-CANCER PROPERTIES**. Medical researchers have analysed less than 1 per cent of all rainforest species.

THE EU

is the largest importer of illegal wood products from Brazil, says Greenpeace. It alleges that much of the wood has come from sawmills that launder wood using fake documents.

According to a report issued in March, **15 PER CENT OF ALL BEEF** and **31 PER CENT OF ALL LEATHER** produced on **ILLEGALLY CLEARED RAINFOREST** ends up in the EU, which makes it the largest global importer per capita.

is that if you clear illegally now, sooner or later there will be another amnesty to forgive your past crimes," he said.

Fearnside warned about several new hydro-electric dams and roads advocated by Brazilian president Dilma Rousseff. "The most dramatic case," he said, "is the proposed highway BR-319 which would link Manaus in the centre of the Amazon with the arc of deforestation in the south, where 80 per cent of the deforestation has occurred."

Fearnside added that if these massive developments go ahead, the recent spike in forest clearing may be just a taste of worse yet to come.

A fifth of the world's oxygen comes from Amazonian **PHOTOSYNTHESIS**, which is why the region has been called the 'lungs of the planet'. It also pumps out moisture helping to keep temperatures cool, preventing desertification over a vast area.



300 SPECIES OF TREE can exist in a single hectare of the Amazon – more than seven times the number of species we have in the UK.

THE AMAZON BASIN HOLDS **1/5** OF THE WORLD'S **FRESH WATER.**

➕ FIND OUT MORE

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Tower House, Fairfax Street, Bristol BS1 3BN
-  **POST ON OUR FORUM**
www.discoverwildlife.com/forum

LETTER OF THE MONTH



What will the new government's policy be on farming and badgers?

BADGERS NEED DEBATE

In your Election Special (April) you pitched a question on bovine TB to representatives of the political parties. It made for depressing reading with none of them understanding the issue.

In his excellent book *Badgerlands*, Patrick Barkham quotes a group of vets explaining how badgers have been scapegoated for poor farming practices, saying: "TB is often a disease of poverty, in humans as well as animals, and many of our dairy cattle live in poverty equivalent to that of a workhouse... The only long-term solution is a paradigm shift in

favour of cattle welfare, small farmers and wildlife – not mega dairies and money."

The vets say we have bred 'mutant cows' that produce vast quantities of milk but are not resistant to diseases such as bovine TB and BSE. This is not an idle attack on the farming industry, for we are all responsible in our desire for cheap food. What is needed is a grown-up political debate about our farming and food industries balancing the demands for affordable food, healthy cattle and the needs of wildlife.

Pete Carty, Via email

BE A WINNING WRITER

The Letter of the Month wins a pair of HI-TEC V-Lite SpHike Mid waterproof boots, worth £79.99 and perfect for hiking. They're available in sizes 7–12 for men and 4–8 for women. For more information, visit www.hi-tec.com/uk



POSTS ON OUR FORUM

"One of my favourite insects, the bee-fly, bounced from flower to flower, performing its pollinating duties impeccably."

Sophie May Lewis
The Oak by the Rife

"I visited Elmley Nature Reserve, Kent, to try to see hares boxing and the most amazing orange moon rose over the marshes."

Carol Donaldson naturegirl

"What happens when I turn my back on the garden – it explodes into life. A space of green transforms into a field of white flowers."

John Coldwell The Messy Gardener

● Share your wildlife experience at www.discoverwildlife.com/forum

Scotland badger question

I am writing to challenge the 'Scotland's answer' letter (Spring). The letter poses a simplistic argument. I speak as a retired farmer and chair of our local wildlife group. Bovine TB presented a very small problem before 1992 when badgers became a protected species. Since then numbers have doubled. I am not arguing for or against a cull, but I consider that this is a fact that speaks volumes.

J Hicks, Via email

Is rewilding real value?

Regarding 'Lessons from a wild Europe' (Spring), the enormous amounts being spent on reintroductions are worrying. It is an expensive form of conservation when habitats are being destroyed at an alarming rate, and always emphasises the big, charismatic species. But the spread of scavengers such as kites and buzzards and the reintroduction of beavers hide the fact that migrant songbirds are plummeting towards extinction, and virtually all insects are in free fall, while all small-mammal, reptile and amphibian populations are fragmented.

It is a sad reflection on our attitudes to conservation when Knepp Castle Estate is heralded as a "major rewilding project". I don't know how much this project will cost, but here at the World Land Trust we would not consider 1,400ha major. We are currently considering a project to protect an area of 300,000ha for a cost of about £300,000. While I am not suggesting

PLAYGROUND PREDATOR

My husband recently took this photograph in our child's playground! I thought I'd share it with you because I was keen to know what kind of bird it was that he'd photographed.

Lucy Calderbank, Via email

Jemima Parry-Jones of the International Bird of Prey Centre in Wales says:

"This falcon looks like a peregrine x saker cross, and is someone's escaped bird. These larger falcons are able to bring down a big gull like this one, more easily than peregrines."



Mystery species: Lucy's husband took this fantastic photograph.



Share pictures on our forum: www.discoverwildlife.com/forum

we should not be rewilding, I think it is important to realise that there are huge areas of the planet where pristine habitats are being destroyed. Pound for pound, surely it makes more sense to conserve real wilderness?

John Burton, World Land Trust

Schools and wildlife

I agree with Linus Monaghan (Feedback, Spring) that there should be more wildlife education in schools. Unfortunately it is seen more as a 'kid's subject' and given less time as children progress through school. I was glad that at A-level they had something for me: environmental studies. However, when my sister wanted to do it, she was told they were scrapping it! The Government clearly has little interest in nature.

Gemma Kitchin, Aged 17, Suffolk

Human evolution

I liked your article 'Nature's weirdest designs' (April). However, I read the box "Did you know we may have stopped evolving?" with doubt. I agree that humans are using culture to defer lethal events, and this reduces evolutionary pressure upon our physical adaptations for survival. However, I disagree that this "probably uncouples us from natural selection's influence". It merely places evolutionary pressure on our brains that drive and control our cultural behaviour. Of course our present culture is separating us from nature, but never from natural selection. In time our culture may change so much of our surroundings that it can no longer support us, and we will suffer extinction ourselves. Natural selection's most lethal outcome I'd say.

Flo Kent, Via email

Cornflower concern

The language used in your 'Meadow-making tips' box was alarmist (Discover Wildlife, April). You wrote, "Beware of commercial 'wildflower mixes'. Many contain annual cornfield plants... which only

flower repeatedly if the soil is cultivated."

Such wildflower mixes give a fantastic display of corn marigold, poppy and cornflower in the first season after sowing. These provide interest and wildlife benefits

while the perennials such as ox-eye daisy, lady's bedstraw and red campion establish before flowering in the second season.

Many customers demand these mixes for the colourful display they achieve, and are prepared to provide the right conditions for new seed to germinate every year.

I hope that this reassures readers they can plant cornfield annuals, and corrects a slur on reputable seed producers.

Tony Jones, CEO, Landlife

Madagascar threat

I agree with Mark Carwardine (April) – I visited Madagascar in 2011 and I came home feeling utterly desperate about the situation. Not only has 90 per cent of the original forest been felled, but there is a huge population explosion. The locals eat lemurs as bushmeat and keep ring-tails as pets. The government does nothing to protect this unique ecology.



◀ We were also taken to the most horrible zoo I've ever seen in the capital Antananarivo. The cages were small, sometimes only just big enough for the animal with hardly any room to move around.

Unless something is done, most of Madagascar's unique wildlife will disappear within a few years.

Julia Larsson, Via email

Reporting bias

Your article 'A year with hares' demonstrated reporting bias (April). Your writer only quoted people who opposed hare shooting. She did not talk to landowners or farmers to see why hares are shot, or ascertain their views on illegal coursing. The coursing mentioned was illegal before the Hunting Act 2004 because it involves trespass. Most of the convictions under the Act have been for illegal coursing. The



Act made it easier for the police to obtain convictions than had previously been the case, and for that reason is welcomed by landowners as a tool to stop trespass and coursing. If you had spoken to landowners some of them would have told you that they deliberately keep hare numbers low to avoid unlawful coursing and trespass.

David Frost, Via email

Cover hare shooting!

Hare coursing has received increasing attention in the press. However, a threat of far greater magnitude is shooting, which kills in the region of 300,000-400,000. Though increased press about coursing heightens awareness, it diverts attention away from the shooting issue. Scotland has already introduced a closed season, so why is the Government so reluctant to follow their example?

A Hillyer, England

Superb new column

As an occasional reader I'd like to bid a hearty welcome to your new columnist Amy-Jane Beer. I've just read her article on blackbird eggs with interest (Nature Table, April) and she's off to a good start. It would have been more impressive if the picture (left) had shown blackbird eggs, rather than those of the song thrush.

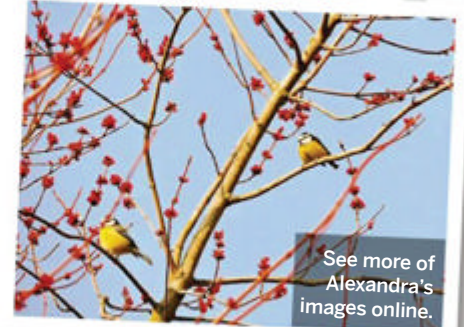
Clive Haley, Ilkerton



BLOGGER OF THE MONTH

ALEXANDRA BURKITT

BIOLOGY UNDERGRADUATE ALEXANDRA DISCOVERS THAT THE SOLAR ECLIPSE CAN HAVE AN IMPACT ON BIRDSONG.



See more of Alexandra's images online.

There is something very powerful about watching a solar eclipse so it was definitely worth the early weekend start. The thing that I found most striking was the light. Colours became progressively more opalescent as the sun was covered, until the sky turned from blue to dove-grey.

As the sky brightened again, anything with red shades started to glow... fantastic for photographs. It wasn't only people reacting to the eclipse. When the sky was at its darkest, the birdsong changed.

The sound had been

getting slowly louder, perhaps because the birds were reacting to the light levels and were starting a very early dusk chorus. But with the sun almost covered, they went so quiet it was eerie. I hadn't really realised how loud they were until they stopped.

For the rest of the day colours seemed unnaturally bright. And after that strange minute without birdsong, I've been far more aware of it surrounding me.

► <http://aboomofbitterns.blogspot.co.uk>

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SEABIRD SOS

Britain is a global hotspot for eight million seabirds, yet their dramatically changing fortunes point to huge shifts in our marine ecosystem and pose unexpected conservation dilemmas, says **Patrick Barkham**.

COMPLEMENTS
**A GUIDE
TO COASTAL
WILDLIFE**
AIRING IN JUNE





A flock of gannets
plunge-dive for fish off
the coast of the Shetland
Isles. The multifarious
impacts of climate change
are setting new challenges
for British seabirds.



Above: almost three-quarters of the world's gannets nest in the UK, with the largest colonies on rocky islands. Below: razorbills are also thriving; Britain and Ireland host about 20 per cent of the global population.

Our country is more edge than middle. The UK coastline is longer than India's, and while our frequently grey waters may lack the lustre of tropical seas, they are incredibly rich in nutrients. Add a wide continental shelf and you have the vital ingredients to support a huge array of fish and phenomenal blooms of plankton each spring.

Seabirds are the sentinels of this ecosystem: a very visible sign of change in a mostly mysterious marine world. The largest colony of northern gannets on Earth is found on Bass Rock just off south-east Scotland, and the lion's share of the global populations of several other species, such as the Manx shearwater and great skua, visit Britain to breed.

Yet British seabirds are facing a perfect storm. Overfishing has decimated fish stocks, while temperature rises and ocean acidification associated with climate change are causing the disappearance of plankton on which whole food-webs depend. Though seabirds may be famously tough – picture, for example, a tiny puffin riding the midwinter swell for weeks on end – they must also adapt to increasing storminess, oil spills and offshore wind farms.

In the North Sea alone, breeding numbers of terns (arctic, little, common and Sandwich), kittiwakes, guillemots, shags and fulmars have all fallen over the past three decades; only the razorbill has bucked the trend. And this is just the visible tip of the iceberg. All too often we forget about life beneath the surface, says Callum Roberts of the University of York. “The sea is

inscrutable – it hides its secrets. So we haven't seen the ransacking of the marine environment,” he explains.

As early as 1376, commoners petitioned Edward III to stop fishermen trawling, for it was destroying “the flowers of the land below water”. Yet with each technological advance – motor engines, industrial dredging, computerisation, radar – marine life has diminished. “The sea has been simplified,” as Roberts puts it. “We are close to a nadir in our relationship with it, and we are not going in the right direction.”

PREDATORY PARADOXES

The story of our seabirds is full of paradoxes, however. Conservationists agree that overfishing of cod is bad, but it has benefited some seabirds that once competed for prey with these predatory fish. Gulls, fulmars and skuas have also thrived on wasteful fishing practices, consuming discards thrown overboard. In particular the gannet has flourished in recent decades, and innovative technology has revealed how it interacts with other big marine

ON THE ISLE OF MAY GUILLEMOTS WERE PUSHING CHICKS OFF THEIR ROCK-LEDGE NESTS BECAUSE THE COLONY WAS SO SHORT OF FOOD.





Top: gulls follow a trawler to feed on the bycatch its crew throw overboard. Above: fulmars squabble over titbits as a net full of cod is pulled alongside a fishing boat.

predators – porpoises, dolphins and *Homo sapiens*.

When Stephen Votier and colleagues at the University of Exeter first put cameras on gannets, the tiny machines filled up with salt water, such is the force of the birds' 90kph dives. So they reattached the cameras pointing backwards, gaining new insights into gannets' fishing expeditions from their huge Grassholm colony, off Pembrokeshire. Matching GPS data from gannet tags with fishing fleets showed how the birds sought out boats. When Votier caught returning birds, they regurgitated their last meal, revealing species such as haddock and whiting that they couldn't ordinarily catch – proving that they fed on discards.

This is the first year of a five-year phasing-out of discards under the EU's Common Fisheries Policy – a welcome development – yet scientists wonder what impact this will have on gannets. "It seems likely that discards have been good for gannets, but it's not quite as straightforward as that," says Votier. As with many long-lived seabirds, there are big differences in individual behaviour. Some gannets scavenge discarded fish, while others don't, and males tend to scavenge more.

Moreover gannets have also evolved to feed on oily fish such as mackerel. Eating discarded cod and haddock, which have much lower fat content, might not meet their dietary needs. "It's been argued that discards are a bit like junk food for gannets," says Votier.

In the end, reducing discards (fishermen will still be permitted to throw away some fish species) may not harm gannet populations, reckons Votier. "But there could be

PLUNDER TO PROTECTION: MAKING LEGAL HISTORY

Britons have a long history of harvesting seabirds.

The earliest written record of men collecting *guga* – gannet chicks – on St Kilda, in the Outer Hebrides, dates from 1549, while in Victorian times every season people caught more than 20,000 kittiwakes and puffins on the island of Lundy in the Bristol Channel. Twenty-four puffins made 1lb of feathers, which sold for a shilling on the mainland. Feathers were also used in hats, and puffin eggs were sold to sugar refineries.

But seabirds inspired some of Britain's

earliest conservation efforts. The Sea Birds Preservation Act (1869), which safeguarded seabird nests, was the first legal protection for any wild bird in the UK. The first land to be protected by the National Trust, in 1895, was also by the sea, and early nature reserves were mostly created to protect coastal seabird colonies.



Traditional gannet hunting on Scotland's Sula Sgeir Island.

other unforeseen complications," he adds. For instance, studies show that predation of puffins and kittiwakes by 'bonxies', or great skuas, in Scotland falls in years of high discards. Stop them, and the predation may increase again.

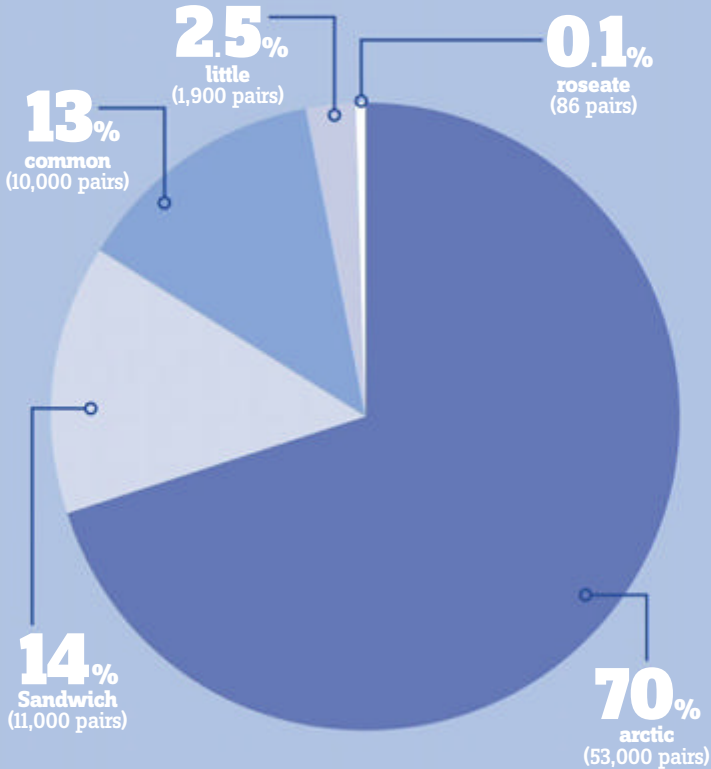
BOOM AND BUST

Sarah Wanless of the Centre for Ecology and Hydrology studies seabirds on the Isle of May, in the Firth of Forth. "We're seeing a pretty bleak picture of populations declining, certainly since 2000," she says. This contrasts starkly with our memories of booming seabird populations in the 1980s and 90s. "That was a fantastically good time for seabirds," Wanless agrees. But she adds that, counterintuitively, those decades of abundance may have been the consequence of wasteful industrial fishing.

"We're trying to get our heads around how numbers are starting to adjust," explains Wanless. "As stocks of cod, haddock and whiting increase, which is good, we may need to look at whether they are in turn taking many of the fish that seabirds would be eating. There are a lot of competing demands, and we may not be able to have a win-win-win situation."

In 2007 scientists on the Isle of May were horrified to see guillemots pushing chicks off their rock-ledge nests because the colony was so short of food. Where one parent used to always stay with a chick, food was so scarce that both parents needed to go fishing, and unattended offspring were sabotaged by starving neighbours. "If you wanted an example of how badly things have gone wrong, that was it," says Tim Birkhead of the University of Sheffield.

BRITAIN'S SEABIRDS IN NUMBERS



880,000
 GUILLEMOT PAIRS IN THE UK, MAKING THEM OUR MOST ABUNDANT BREEDING SEABIRDS

GOING UP
56%
 increase in razorbill population 1986-2013

82%
 decline in arctic skua population 1986-2013
GOING DOWN

FAMOUS FIVE: BRITISH TERN FAMILY

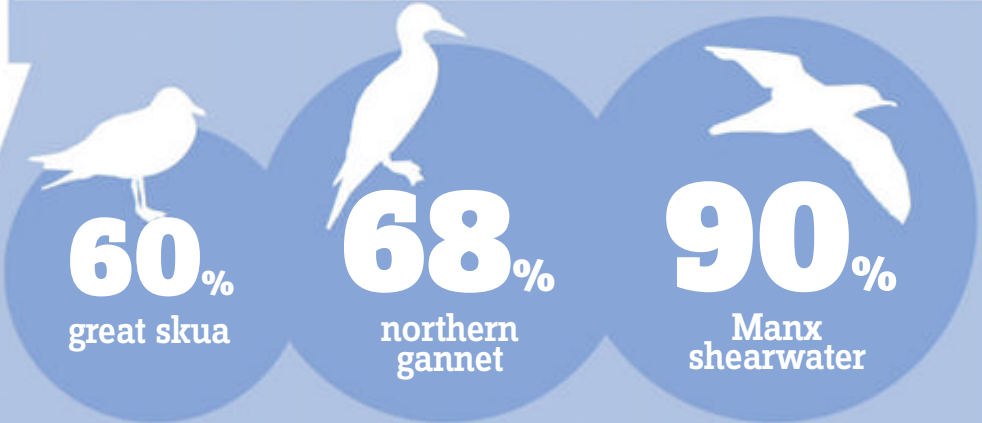
1-2 PAIRS
 size of Britain's smallest storm-petrel colonies

OCCUPIED GANNET NESTS ON BASS ROCK - A 24% RISE SINCE 2009

75,000

1,155km

DISTANCE FLOWN BY A GANNET IN 24 HOURS, MAKING IT BRITAIN'S FASTEST BIRD



30+ YEARS
 age of the oldest arctic tern recorded

GLOBAL POPULATION IN BRITAIN



THERE ARE MANY UNANSWERED QUESTIONS ABOUT THE IMPACTS OF CLIMATE CHANGE IN SUCH A VARIED ENVIRONMENT AS THE UK COAST.

More happily, since Birkhead began studying guillemots on Skomer in 1972, its colony has expanded from 2,000 pairs to about 25,000 today. The monitoring pioneered by Birkhead and undertaken every year since (though recently threatened by funding cuts) has vastly increased our understanding of these enigmatic auks. “When I started, I just couldn’t believe how little was known,” he says. “We didn’t even know how to count these things properly.”

Skomer’s guillemot population stood at about 100,000 pairs in the 1930s, then virtually disappeared, probably because of oil spills. Birkhead’s studies found that they are tough animals, however: 95 per cent of adults survive from one year to the next, meaning most live at least 20 years, and half of all fledged chicks survive to breeding age (seven years old). “This astonishing survival rate appears likely to be due to climate change,” says Birkhead. “Changes in nutrient levels and fish populations make more food available.”

SCARCE SANDEELS

Yet the effects of climate change vary in the dynamic marine environment – many trends are less positive. Take sandeels, an important prey for terns, auks and kittiwakes. Overfishing caused sandeels to decline in the North Sea, which in turn affected kittiwakes (down by 60 per cent in 2013 compared with the 1980s) and guillemots. But the impact of sandeel fisheries has been fairly localised – a greater threat comes from climate change. Warmer seas are making the sandeels smaller and less plentiful.

Matthew Carroll of the RSPB is studying the impact of climate change on kittiwakes. He explains the complex

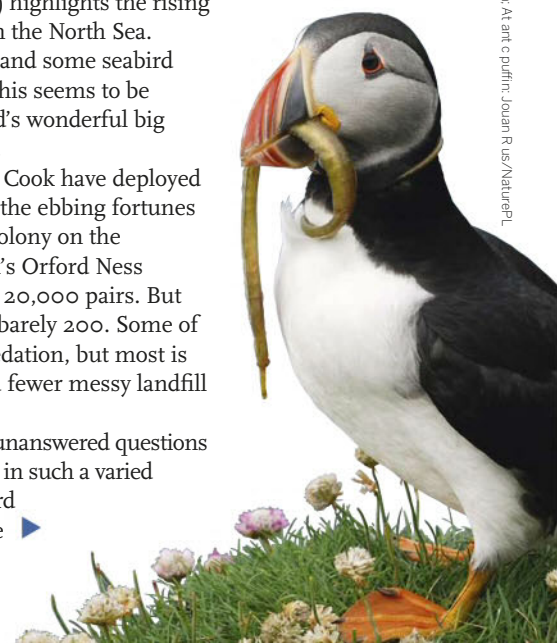
shifts in North Sea food-webs, beginning with sandeels’ food, the tiny plankton *Calanus finmarchicus*, which flourishes in northerly latitudes. As sea temperatures rise a warm-water species, *C. helgolandicus*, is moving in. This lacks the nutritious fat content of cold-water plankton, and its abundance peaks later in the year. Such changes may be crucial if predators, such as sandeels, cannot adapt quickly enough. “Warm-water plankton don’t seem to be able to sustain the sandeels so well,” says Carroll.

These effects are mirrored when seabirds seek alternatives to scarce sandeels. Viola Ross-Smith of the British Trust for Ornithology (BTO) highlights the rising numbers of warm-water pipefish in the North Sea. Pipefish have a low nutrient value, and some seabird chicks can’t even swallow them. “This seems to be contributing to declines in Scotland’s wonderful big seabird colonies,” Ross-Smith says.

She and her colleague Aonghais Cook have deployed GPS trackers to better understand the ebbing fortunes of the lesser black-backed gull. A colony on the magnificent shingle spit of Suffolk’s Orford Ness thrived in the late 1990s, reaching 20,000 pairs. But when I visited recently there were barely 200. Some of the decline has been due to fox predation, but most is caused by fewer discarded fish and fewer messy landfill sites.

Zoologists admit there are many unanswered questions about the impacts of climate change in such a varied environment as the UK coast. Seabird populations may have crashed in the ▶

This Sandwich tern (above) has caught a sandeel, though the species is increasingly scarce. In contrast the puffin (below) is settling for a pipefish, a nutrient-poor alternative.



Sandwich tern: Graham Eaton; Ai art; c puffin: Joann Rus/NaturePI

SEABIRDS



Gannets give a wide berth to wind turbines, here passing Sheringham Shoal wind farm off the Norfolk coast.

LOOKING OUT FOR BIRDS: COASTAL OBSERVATORIES

From guillemots and puffins to shearwaters and gulls, much vital seabird research has been undertaken at bird observatories, which also provide a base to study bird migration. Ornithologist Ronald Lockley established the first British observatory on Skokholm, the sister island to better-known Skomer, in 1933. It's open to this day, and has recently been refurbished by the Wildlife Trust of South and West Wales.

Since then another 17 observatories have

been set up in Britain and Ireland, all in migration hotspots on our coast or just offshore. The most accessible are located on headlands or spits, such as Dungeness, Portland and Spurn Point. But the most dramatic are without doubt those on islands, including Skokholm, Bardsey, the Isle of May, Copeland and Fair Isle. Many offer visitor accommodation, and for the birdwatcher they represent some of the most exciting B&Bs in the country.

● *Plan a visit at www.birdobscouncil.org.uk*

BECAUSE FISHING IS PROHIBITED WITHIN OFFSHORE WIND FARMS, THEY ACT AS UNOFFICIAL MARINE NATURE RESERVES.

North Sea because it is warming more markedly than the North Atlantic, yet our west coast could be buffeted more by increasingly extreme storms. "People tend to focus on temperatures, but what about changes in wind?" says Votier. "Higher variability in wind speeds could have a major impact on birds that travel a long way out to sea."

MARINE MYSTERIES

Other riddles that seabird science must solve include the effect of ocean acidification – which imperils shellfish populations – and, ironically, the impact of one of our tools to combat climate change: offshore wind farms. Belgian studies found terns being chopped up by turbine blades, but data from the BTO's GPS tagging shows gulls simply weaving between them. "Species respond differently," says Ross-Smith. "We know that gannets tend to avoid wind farms quite strongly, while there is some evidence that gulls ignore them – or their numbers may even increase around wind farms."

Because fishing is prohibited within offshore wind farms, they act as unofficial marine nature reserves. Stocks of fish and 'benthic' (seabed-dwelling) organisms recover in much the same way as in a formal Marine Conservation Zone (MCZ).

Meanwhile the fate of our officially designated MCZs remains mired in controversy. So far just 27 have been established in the seas around England – from a list of 127 sites recommended in 2011.

Roberts is less concerned with the low quantity than the quality of what he calls "paper parks". He likens the continuation of fishing in newly protected areas to allowing a wildflower meadow

to be ploughed up, for this is what dredging does to the seabed. "There's no protection for England's MCZs until 2016 – and even then the protection they get will be miserably pathetic," he says.

"The bare minimum is protection from bottom trawlers and dredgers," Roberts continues. "We need to go further than that and create 'no take' zones – not just for conservation but to improve the vigour of marine habitats in the long term, which will benefit fishing communities."

Yet as long as seabirds continue to charm and inspire us, there will be hope that we can reverse decades of despoiling our marine riches. Seabird scientists readily admit to being seduced by their charismatic subjects. Ross-Smith is a self-confessed gull addict, while Birkhead adores Skomer's penguin-like guillemots: "Their social behaviour is every bit as interesting as that of humans."

Votier smiles at his memories of working amidst Grassholm's gannet colony in June. "You have 150,000 gannets on a bit of granite off the Welsh coast – the noise, and smell, is just awesome. Some of the best things I've done in my life have involved sitting on the middle of a rock in the middle of nowhere with these fantastic birds." 🐾



PATRICK BARKHAM is a journalist for the Guardian. His new book *Coastlines: The Story of Our Shore* (Granta, £20.00) is available now.

Wind turbine: Roger Tidman/FLPA; Isle of May: Lynne Sutherland/Alamy



The Isle of May's Low Light lighthouse is now used as a bird observatory.

FIND OUT MORE

4 The five-part series *A Guide to Coastal Wildlife* starts in June.

● For more information about seabird conservation, visit www.seabirds.net and www.bto.org

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Britain's BUTTERFLY



The four-volume *Encyclopedia of Sport* (1911) includes an entry on collecting butterflies and moths. “That butterfly and moth hunting is a sport, no one will deny who has ever chased a strong-flying fritillary over rough country,” it begins. However you view this statement – whether you see it as whimsically eccentric, or cringe-worthily outdated – it came at a crucial moment in our interest in the natural world.

For 18th- and 19th-century naturalists, possession was nine-tenths of it all. Insect collecting was like stamp collecting, with proud owners vaingloriously displaying pinned butterflies in glass-topped cases, just as they might hunting trophies on the

billiard-room wall. How or where the prizes were collected was often little more than a detail, so long as the wings were crisp.

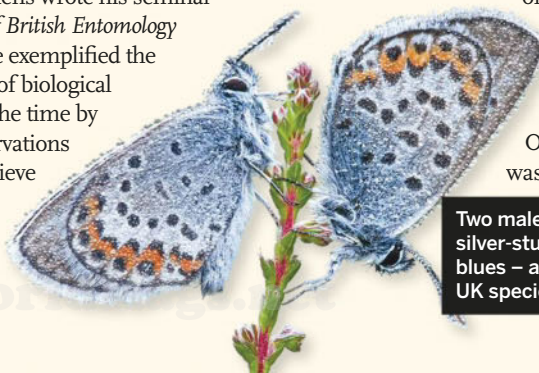
DATA DEFICIENT

The idea of scientific data being attached to a specimen was rarely considered. When James Francis Stephens wrote his seminal *Illustrations of British Entomology* (1828–46), he exemplified the parlous state of biological recording at the time by making observations such as “I believe it has been found in Yorkshire”

(regarding the Glanville fritillary; see p69), or “I believe in the vicinity of Epping” (referring to the purple-edged copper). Other comments were equally vague and unhelpful.

Possession of even a single specimen could entrench opinion. As a boy I was mesmerised by the small, neat illustration of a brown butterfly given a full page in my father’s copy of *A History of British Butterflies* by Francis Orpen Morris (1852). It was reputedly collected by

London naturalist Eleazar Albin on Hampstead ▶



Two male silver-studded blues – a rare UK species.

MANIA

Butterfly watching in Britain has gone from collecting mania to mass-participation science. **Richard Jones** looks at how our understanding of Lepidoptera has evolved, and asks why they fascinate so many people.

COMPLEMENTS
**A HISTORY
OF NATURAL
HISTORY**
BROADCAST ON
 

Local children help lepidopterist L Hugh Newman catch butterflies in the cabbage fields of a Kent farm in June 1940.



Beautiful but scarce nowadays, pearl-bordered fritillaries have to be sought out – see p70 for tips.

Heath in the early 1700s, and the story of his so-called ‘Hampstead eye’ had been parroted down the years, well after the unique specimen was lost – just another stamp to be added to the collection should it ever appear again.

After 200 years, the original specimen resurfaced in London’s Natural History Museum. It proved to be the meadow argus, a South-East Asian butterfly that, in the days of sail, could never have arrived alive in Britain. Albin had simply muddled his specimens, inadvertently ‘creating’ a new species.

During the late 19th century, however, entomologists were busy professionalising themselves. Gone was the overarching need to display the Creator’s beautiful works under glass,

as gentleman scientists sought to understand more about caterpillars, distributions, life histories and genetic variation. For the next 100 years, butterfly collecting – whether for sport or for science – had a more worthy aim.

It was the late-20th-century results of these continuing studies that revealed a startling and unnerving trend: the catastrophic decline of many butterfly species regarded as widespread and common barely a couple of (human) generations earlier. Regular

butterfly-counting transects, computer-generated distribution maps and the co-ordinating hand of the charity Butterfly Conservation, founded in 1968, showed how desperate the situation was.

DOWNWARD SPIRAL

The figures were – and still are – shocking. Take the high brown fritillary: 85 per cent have been lost in Britain since the 1970s (though numbers

AS SHEER WILDLIFE ABUNDANCE HAS BECOME A DISTANT MEMORY, SO OUR UNDERSTANDING OF ECOLOGY HAS ADVANCED.

hit a 10-year high in 2014, thanks to warm spring weather and habitat restoration). Pearl-bordered fritillary: 60 per cent down over the same period. Duke of Burgundy: 52 per cent have vanished. People began asking which one will become extinct here first.

Yet Butterfly Conservation’s head of species recording Richard Fox remains upbeat. “Conservation wouldn’t exist if things didn’t decline,” he says. “That concern, tempered with wonder at the natural world, is what carries you through.”

Fox happens to live near Dartmoor. “If the sun is shining, I can nip up onto the moor at lunchtime. At least once a year I get to see high browns gliding around.” Fox also lives 15 minutes from a pearl-bordered fritillary colony. “These beautiful butterflies may now



Lepidoptery has moved on since Charles de Worms’ day (1903–1979).

From top: Giampiero Ferrarini/FLPA, Brian Seeger/Getty



Above: the cryptic wood white is found only in Ireland and Northern Ireland. Left: collector's cases are a relic of the previous era of butterfly collecting. Below: Royal Mail celebrated British butterflies with Richard Lewington stamps in 2013, including our largest species the swallowtail.



be scarce, but the joy and wonder you get from seeing them hatching, growing as caterpillars and finally taking wing, like they always have, is the perfect antidote. It motivates you to push yourself even harder to save them."

And it's not just about the rarities. "Some of the most significant data to emerge from national surveys concerns relatively plentiful species, such as the speckled wood or painted lady," says Fox. "Sightings from gardens, allotments, woods, fields, parks and waste ground can be as valuable scientifically as those from nature reserves."

Indeed, today's mass observations come from an empowered body of citizen scientists throughout the land. Last year no fewer than 45,000 people joined in the Big Butterfly Count, for instance, tallying over 800,000 individual insects.

It is an oft-remarked irony that, as sheer wildlife abundance – clouds of butterflies rising up in front of you on country walks – has become a distant folk memory, so our understanding of species' ecology has advanced in leaps and bounds. In 2011, for example, genetic analysis led to the naming of a brand new species for Ireland and Northern

Ireland: the cryptic wood white. As its name suggests, it had been there all along – we just hadn't looked closely enough to separate it from the very similar Réal's wood white.

Butterfly field guides, smartphone apps and websites are now so good that even the finer points of identification are no longer the preserve of experts. Butterfly watching has been democratised. We all have access to information and resources that would have astonished 19th-century butterflyers.

One person pushing the boundaries of identification is Richard Lewington, the UK's most revered entomological artist (find out his position on *BBC Wildlife's* Power List on p26). During his career he's seen notable changes ▶

GREAT BRITISH BUTTERFLY ECCENTRICS

LADY ELEANOR GLANVILLE (c.1654–1709)

had one of the noblest collections of butterflies in all England, but she left chaos in her family when she died. Her eldest son tried to get her will set aside on the grounds that no one but a lunatic would go cavorting inappropriately dressed across the countryside "in pursuit of butterflyes". No written verdict survives, but the will was upset. The pretty Glanville fritillary (*pictured*) is named after her, because she was the first to find the species in England in the 1690s. The butterfly is now restricted mainly to the Isle of Wight.



ALFRED RUSSEL WALLACE (1823–1913),

the co-discoverer – with Charles Darwin – of evolution by natural selection,

sought butterflies overseas. In early 1859, on his first walk into the forests of Bacan in Indonesia, he glimpsed the most beautiful insect he had ever seen. It took him another two months before he caught one, and he was so excited it gave him a headache for the rest of the day. Wallace's birdwing is a riot of jet black and liquid gold.



LORD BADEN-POWELL (1857–1941)

was an army officer, chief scout and spy, and took on the persona of Englishman abroad during

the Boer War. As he blundered about with a butterfly net and notebook, nobody suspected that his sketches of butterfly wings concealed the outline plans of fortifications he found in the hillsides, complete with details of gun emplacements.

10 EASY STEPS TO GET INTO BUTTERFLIES

Don't wait for them to come to you – use our top tips to gain a deeper understanding of these fabulous insects.



1|LOOK CLOSELY

Observe the unique behaviour and 'jizz' (character) of each species. Do they zigzag, spiral upwards or have a direct flightpath? Do they flutter or glide? How do they hold their wings and bodies when at rest?

Speckled woods often perch in sunny spots.

4|COUNT 'EM!

Don't just watch – count. Take part in the Big Butterfly Count (this year's kicks off on 17 July: www.bigbutterflycount.org), or carry out regular transect walks along an imaginary corridor 5m wide, noting the species you encounter. There's also the national butterfly-monitoring scheme (www.ukbms.org.uk).

2|REAR YOUR OWN CATERPILLARS AT HOME

Easy species include the peacock, small tortoiseshell, comma and red admiral (all of which feed on stinging nettles), and large whites (which like brassicas). Keep them in a well-ventilated cardboard box with the sides cut away and a net curtain, gauze or fine muslin glued over the top.

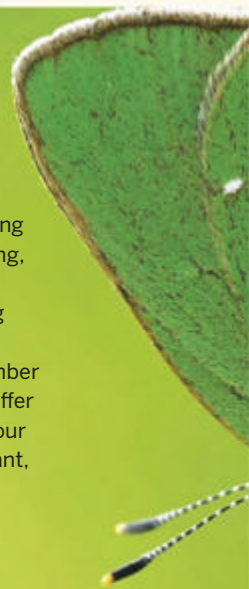
Replenish the foodplant frequently, and watch out for mould.



Prickly gardener: a peacock butterfly larva on a nettle leaf.

3|KNOW THE KEY FEATURES

Get into the habit of scrutinising both the upper- and under-wing, focusing on key features such as wing shape, patterned wing margins and the number and arrangement of spots. Remember that males and females can differ in both coloration and behaviour – females may be more hesitant, reluctant fliers, for example. Second or third broods may appear different, too, while some species also have variant colour morphs.



5|TIME IT RIGHT

Go out when activity is peaking – butterflies have distinct flight seasons. Watch the weather – a warm spring may mean adults emerge earlier, but cool or wet conditions can dampen numbers.



8|USE CLOSE FOCUS

Close-focus binoculars will be a revelation. Invest in a pair that focuses down to 1–2m in order to see sun-basking, courtship, egg-laying and feeding in close detail without disturbing your subjects.

9|VISIT A HOTSPOT

Plan a few visits to butterfly hotspots. While some British species remain widespread or are strong migrants that can turn up almost anywhere, others are very local and seldom travel far, so require a special trip to be seen. Britain's top spots are listed at www.ukbutterflies.co.uk and in *Discover Butterflies in Britain* by DE Newland (WILDGuides, £21.95; left).



Naturalist David Measures was the first to paint butterflies in flight.



7|SKETCH OR PAINT THEM

Painting or sketching butterflies, rather than simply snapping them with your macro lens or smartphone, is a great way to train your eye to observe specimens more closely. Due to butterflies' relatively flat, two-dimensional form when viewed from above, it's easy to record wing shape and pattern, though it can be somewhat trickier to capture the poise and vivacity for which these insects are renowned – and celebrated.

From top clockwise: Steve Round; Christopher Smith/Alamy; Matt Cole; Rupert Sockin; Wildlife sketch no.28/Natural History Museum/Bridgeman Images



The green hairstreak is the UK's only green butterfly.

6 | LOOK FOR FOOD

Knowing the foodplants, of both adults and caterpillars, will help you to predict where butterflies might occur. Some species feed on dung, rotting fruit or the honeydew excreted by aphids, while the larvae of several blue butterflies develop inside ant nests, for instance.



Hatching eggs from the family Pieridae.

10 | HUNT EGGS

Go on a butterfly egg hunt. Begin by looking for the eggs of common species and remember that females don't simply select the right larval foodplant – they may also deposit their eggs in a precise area, such as a stem junction or leaf underside. A magnifying glass helps, or turn your binoculars upside-down and look through the 'wrong' end.

in how butterflies are illustrated: "Instead of painting formal 'set' museum specimens, I show the insects in a more natural posture, using a combination of living colours as they appear in life."

Lewington mainly paints moths, beetles, bugs or bees in his studio, often using a binocular microscope to make out incredibly fine details. "But with butterflies it's different – I like to observe precisely how they hold their legs and wings," he explains. "Birders often talk about a particular bird having distinctive 'jizz'. It's the same with butterflies."

SOUL SENSATION

Our infatuation with butterflies is more than an aesthetic delight, however. And our need to nurture them is not simply a dispassionate desire to look after the environment. There is something about butterflies that transcends mere science. They transfix us, they inspire us, they haunt us, and this fascination has been with humans from the first.

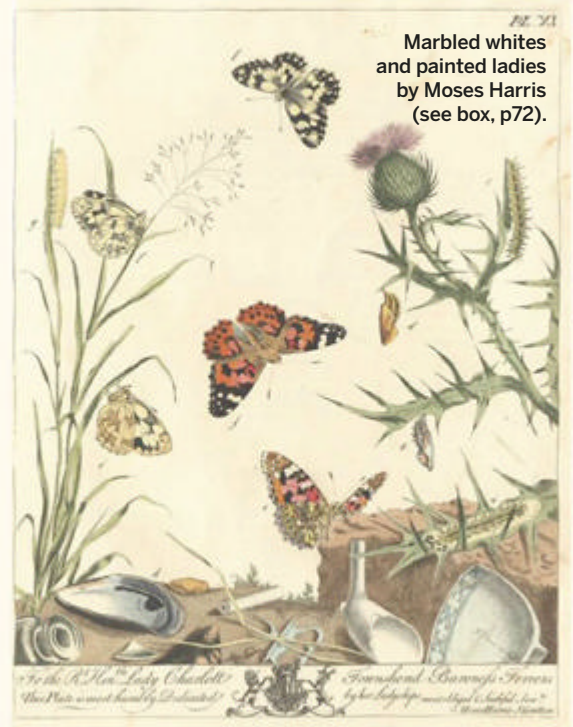
The ancient Greeks called the butterfly *psyche*, the same word that they used for the human soul; this they embodied in Psyche, the goddess of the soul. Our psychology continues to be aroused in a primordial

“BUTTERFLIES ARE FRIVOLOUS AND FREE – THE WAY WE SEE OURSELVES, OR HOPE TO SEE OURSELVES.”

way by butterflies – a process that we're still trying to understand.

Coincidentally, two avid butterflyers – naturalist and writer Peter Marren, and the National Trust's ecologist Matthew Oates – have this year each written books about their own personal journeys through private butterfly bewitchments. These are less about the biology of the insects than the emotional pilgrimages of the authors.

Marren recalls his butterfly arousal, aged about 10, calling it a Damascene moment. Funnily enough, it came about after he was given a copy of *The Observer's Book*



Marbled whites and painted ladies by Moses Harris (see box, p72).

Illustration: Plate XI/Natural History Museum/Bridgeman Images; large heath: Oliver Smart/Alamy

of *Larger British Moths*. Moths turned out to be too difficult to find, whereas butterflies were everywhere. "Kids in the village went through a brief craze of killing them with ammonia and then collecting them," he recalls. There genuinely was an element of the hunt about this youthful quest. "You really wanted that butterfly," Marren confesses. "You were willing to take risks, like charging through stands of stinging nettles and thistles."

Several decades later, these insects remain just as vital to Marren. "Butterflies evoke wild countryside, summer days, open air and sun. They capture an inner world of feelings, passions and excitements," he says. He contrasts our attitude towards butterflies with our opinion of bees: "Bees are busy, a metaphor for industry and ordered hierarchy. But butterflies are frivolous and free – the way we see ourselves, or hope to see ourselves. They follow no rules. It's just their pleasure – sunshine and nectar – and we feel a kind of envy."

No wonder he berates modern commerce for sweeping aside any reverential respect for these icons of nature. "Advertisers use butterflies to sell soap, cars, perfume, shoes, wine and even butter," he fumes.

"The presence of the creature in the logo or advert is not explained. What is it saying? They're not spelling it out. The butterfly in your mind goes beyond beauty and interest. The



An upland specialist, the large heath is a July prize on bogs and peat mosses.

If you're keen to spot a purple emperor – and who can blame you? – keep an eye on the treetops of larger woods in southern England.



Alex Hyde

BUTTERFLY MEN: THE AURELIANS

Early entomologists called themselves after aurelia, a poetic term for the gilded bronze of butterfly chrysalises, derived from *aurum* (Latin for gold). Meetings of the 'Old' Aurelian Society (c1742–48) were first held at the Swan Tavern, near the Bank of England. By 1762 Moses Harris was secretary of the successor Aurelian Society, which eventually folded. A series of societies struggled until, in 1833, the Entomological Society of London was formed. It became 'Royal' when Queen Victoria granted it a special charter in 1885.



An engraved plate from a 1742 book by society member Benjamin Wilkes.

advertisers are looking into the human soul for weaknesses to exploit.”

Oates, too, went through a youthful collecting phase. “But then I became too fond of them,” he says. “They collected me!” He admits, though, that there remains a frisson of excitement in the pursuit. “Butterfly people no longer carry nets and killing jars, but still seek glory moments. They seek discovery and freedom – freedom to exist purely within the moment of being.”

Some of Oates's fondest moments of 'butterfly glory' concern the purple emperor, Britain's largest and perhaps most enthralling species. Though his enchantment with butterflies started in his childhood, and a peak came on 3 July 1968 “when the white admiral entered my life”, he had to wait another three years until “His Imperial Majesty finally accepted me into his realm”. Oates has already selected his eight Desert Island butterflies: the purple emperor is at number one.

NUMBERS GAME

Butterfly watching is deeper than ticking off new species, not least because there are far fewer British butterflies than birds (about 70 species have been recorded here, of which roughly 60 breed), so it doesn't take as long to complete your list. “I have a very

low boredom threshold,” Oates admits, “yet I never tire of butterflying. No two days or weeks in the field are ever the same. Patterns are forever changing.”

Habitats are part of the appeal. “Butterflies take their devotees into the most wonderful places,” he says. “Chalk downlands, flowery meadows, lush fens, warm clifftops, dappled glades, limestone escarpments – landscapes at the zenith of their annual beauty.”

One thing that Oates, Marren, Lewington and other butterflyers (and here I include myself) have in common is they have never lost their childish glee in the wonder of nature. As Oates sums up, “Butterflies mean halcyon days of youth relived, an enthusiasm and a sheer joy that adults easily forget.”

RICHARD JONES is an entomologist and regular contributor to BBC Wildlife – see p93. His latest book is *House Guests, House Pests* (Bloomsbury, £16.99).

FIND OUT MORE

Peter Marren talks butterflies in *The History of Natural History*, starting Tuesday 2 June.

● *In Pursuit of Butterflies* by Matthew Oates (Bloomsbury, £18.99) is published in June.

● *Rainbow Dust* by Peter Marren (Square Peg, £14.99) is published in July.



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Birds of a feather

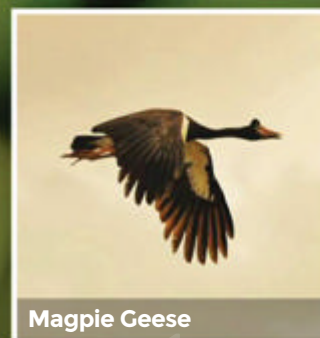
It's late October on Kangaroo Island, South Australia, and your binoculars are trained upon the Southern Ocean. Some 200m from the shore an endless line of birds stream past low over the waves, like rush-hour commuters exiting the subway. Small and dark, their stiff-winged flight identifies them as short-tailed shearwaters, known locally as mutton birds.

Occasionally the larger, whiter contours of a Shy Albatross angles through the masses. You start counting: fifty, one hundred, two hundred... In five minutes you reach a thousand. Already the birds have been passing for several hours, so imagine the total numbers: hundreds of thousands, perhaps millions. From your shelter, beneath the sculpted granite of Remarkable Rocks, you lower your binoculars and soak up the spectacle.

At the same time, a very different landscape 2,000km to the north is staging an equally impressive avian drama. Approaching the water's edge at Mamukala Wetlands you hear the spectacle before you see it: a low murmuring, like a distant crowd in animated conversation. Only when you get closer, peering through the window of the bird hide, do you realise that this is the collective honking of thousands of magpie geese. As the dry season begins to bite, these big black-and white waterfowl – which belong to an ancient family, unique to Australia – gather in ever-increasing numbers across the floodplains of Northern Territory's world heritage listed Kakadu National Park. Feeding on the roots of aquatic plants, they move from one wetland to another as the waters steadily shrink.

Scenes of such jaw-dropping scale remind the visitor that birding in Northern Territory and South Australia are not just about rare species and lists. In a big landscape, it is sometimes the big spectacle that provides the most memorable experience.

In a climate of boom-and-bust, big gatherings are seasonal events. Thus, after good rains and an exceptional grass-seed crop, Budgerigars form vast nomadic feeding flocks in the Outback. In 2012 residents of Alice Springs, in Northern Territory's Red Centre, watched budgie flocks 60,000-strong massing and twisting like aerial emerald sardine shoals as they swept



Magpie Geese



Letter-winged Kite

Main Image: Red Browed Finch, Adelaide



Kangaroo Island, South Australia



Ormiston Gorge, West MacDonnell Ranges

over the grasslands in search of food and water. Flocks of this size converge on dams and boreholes, growing ever bigger as the day goes on and drawing opportunist raptors, such as Brown Falcons. Up close, the shrill cheeping chorus and rush of wings is just as impressive as the sight.

Head southeast, into the arid outback of South Australia, and a similar seasonal spectacle awaits the visitor to Lake Eyre (Kati Thanda-Lake Eyre). When rains fill this vast, shallow desert basin – which has happened more regularly in recent years – it becomes Australia’s largest lake, drawing countless water birds almost overnight. These include major breeding colonies of Banded Stilts and Australian Pelicans, plus thousands of Red-necked Avocets, Sharp-tailed Sandpipers, Silver Gulls and Caspian Terns. During the flood

the enticing prospect of unearthing a rarity

of 1989–90 flood, an astonishing 200,000 pelicans turned up: that’s four-fifths of Australia’s total.

And quantity does not come without quality. Where birds flock together, there’s always the enticing prospect of unearthing a rarity. At Stockyard Plains in

South Australia’s mallee country, for example, birders should scrutinise carefully the large gatherings of wildfowl. Among the Pink-eared Teal, Grey Teal, Hardheads, Bluebills and Pacific Black Duck – not to mention the hundreds of Black Swans that fly in to roost with bugling calls and whistling wings – you may spy a party of the bizarre Musk Duck, with its stiff tail and bill lobe. Lucky birders may even find an elusive Freckled Duck.

And up in the Northern Territory, in the wild bush along the Stuart Highway, keep a close eye on the dry season finch flocks that visit outback waterholes. One minute you’re watching a procession of Masked,

Double-barred and Long-tailed Finches fluttering down to slake their thirst. The next, 300 Gouldian Finches arrive en masse, a blizzard of dazzling colour, before wheeling off again to goodness knows where.

Birdwatch Australia

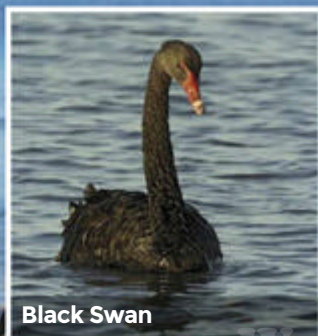
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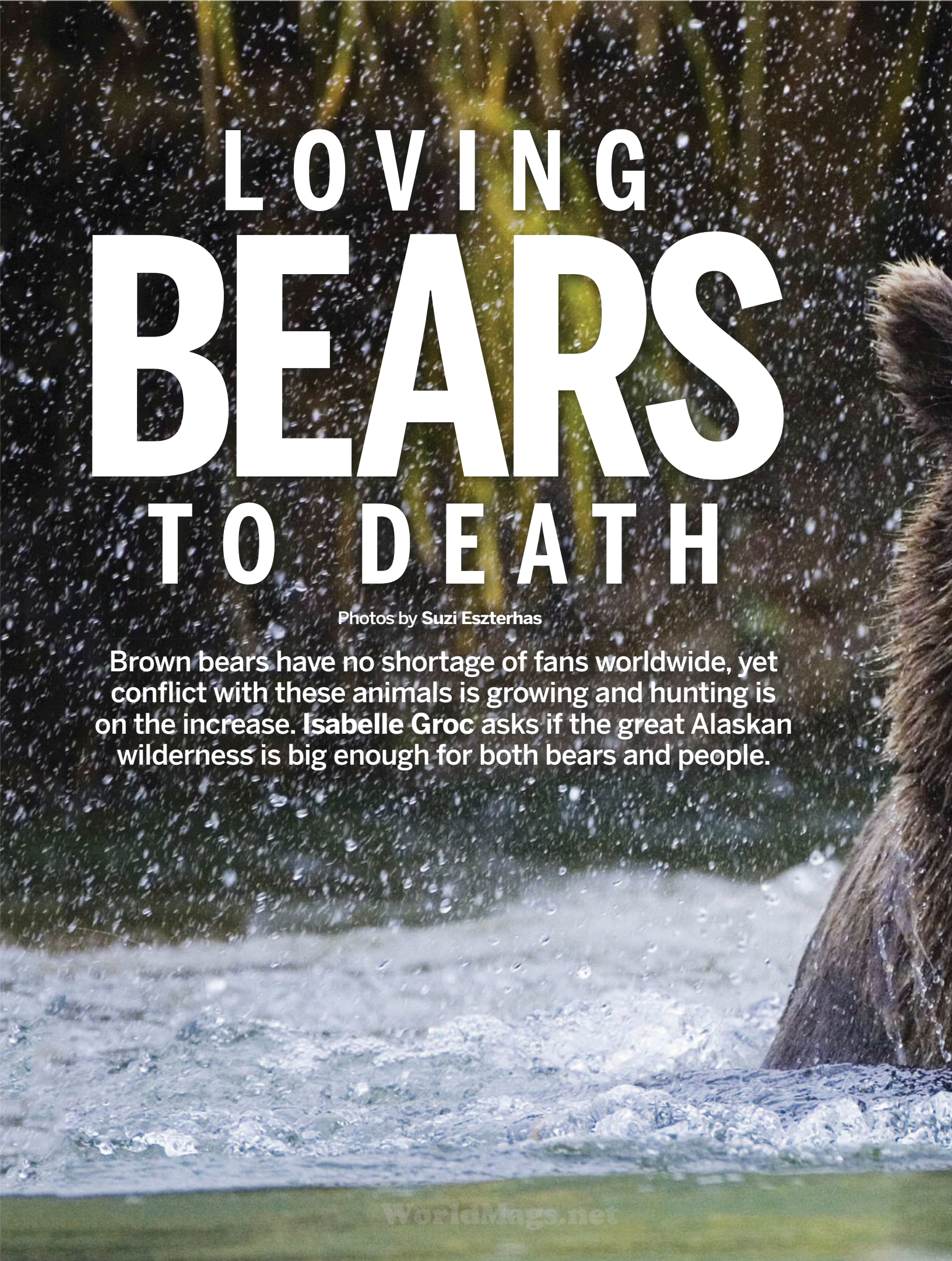
Blue Wren



Black Swan




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LOVING BEARS TO DEATH

Photos by Suzi Eszterhas

Brown bears have no shortage of fans worldwide, yet conflict with these animals is growing and hunting is on the increase. **Isabelle Groc** asks if the great Alaskan wilderness is big enough for both bears and people.

A close-up photograph of a brown bear swimming in water. The bear's head is the central focus, with its eyes looking directly at the camera. Its fur is dark brown and appears wet, with water droplets visible on its face and around its head. The background is a blurred mix of green and blue, suggesting a natural outdoor setting. The overall mood is serene and powerful.

Some of the world's largest brown bears live on the food-rich Alaskan coast, with the largest of all on islands in the Kodiak Archipelago. They are the main draw in a multi-million-dollar tourist industry.



Above: as bear cubs grow, their mother (here in Katmai) teaches them how to forage and fish, how to interact with humans, and who the 'good' and 'bad' bears in the area are. Right: a young cub. Brown bears enter their 'teenage' years between the ages of three and five.

Surrounded by wilderness, the 290,000 residents of Anchorage live in bear country as much as the bears live in human country. Sean Farley, who monitors these animals for the Alaska Department of Fish and Game (ADF&G), found that at least 35 individuals visit this urban area, heading into town to hunt moose calves in spring, and following city trails to salmon-spawning streams in local parks in summer.

"Brown bears blend into their habitat amazingly well," says Farley. "They move off a trail when somebody walks past with a pushchair, then will be back on the trail and continue on their way." Sometimes bears and people do run into each other, and recently the number of maulings has increased as the bear population grows and the boom in outdoor recreation continues. But most attacks occur when bikers or runners travel fast along a path and surprise a bear at close range.

Over the years ADF&G has culled only a handful of brown bears here – those which were repeatedly scavenging refuse and had become a public-safety issue. "We don't remove bears just for being bears," says Jessie Coltrane, the agency biologist responsible for the area.

Conflicts can be greatly reduced by encouraging residents to bear-proof their dustbins, install electric fences around chicken runs and use common sense.

"Going for a jog next to a salmon creek when the fish are running is high-risk," cautions Coltrane, though given the number of brown bears visiting the city, incidents are remarkably rare: "People tend to behave badly, not bears."

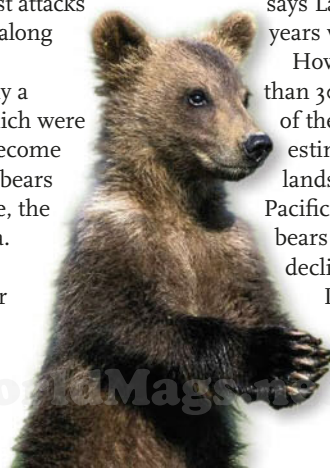
WILD NEIGHBOURS

Despite the potential dangers, when Anchorage residents were asked in 2010 for their opinions on bear and moose populations, they were generally tolerant of both. Most people thought that having large mammals in the city made life more interesting (there are also 250–300 black bears and four wolf packs in the area).

Indeed public attitudes towards brown bears in North America have changed dramatically. "People are realising that you can live with bears if you understand them," says Larry Van Daele, who has spent the past 30 years working with the animals for the ADF&G.

However, this was not always the case. With more than 30,000 brown bears, Alaska has 98 per cent of the US population, but in the early 1800s an estimated 50,000 individuals roamed the pristine landscapes between the Great Plains and the Pacific Ocean. As European pioneers moved in, the bears were persecuted. Their numbers and habitat declined drastically to the point of local extinction.

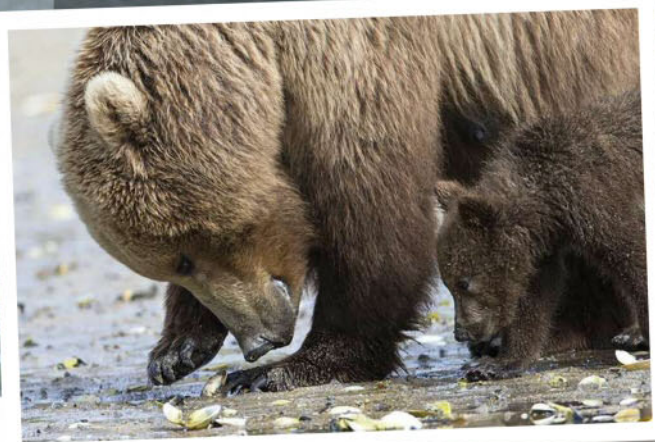
In 1975 the brown bear was finally listed as a threatened species under the US Endangered Species Act in the lower 48 states, where only



REARING CUBS: GOOD AND BAD MOTHERS

Brown bear cubs are born underground in January or February, and emerge in June. Two or three cubs is a typical litter, though four is not unusual in food-rich coastal areas. The family will stay and den together for the next two to three years, with the mother teaching her offspring everything she knows.

Researchers have noticed that while some bears are good mothers, others are never able to wean a litter successfully. "Bears have individual personalities – they're like people. Some are better parents than others," explains Sean Farley, who studies differential reproductive success among females. On the Kenai Peninsula, for example, he found that 80 per cent of the cubs that make it to weaning age are raised by 20 per cent of the females.



1,500–1,700 animals now persist in about 2 per cent of the former range. Of these, the two main populations are in the Northern Continental Divide ecosystem in north-west Montana and the Greater Yellowstone Area. The other surviving populations are very small and fragmented.

BEAR CELEBRITIES

Today people all over the USA, Canada and further afield have a newfound appreciation for the bears, and a desire to see them too. Each summer thousands of tourists make the pilgrimage to Alaska to watch them catch salmon at hotspots such as Brooks Falls in Katmai National Park or the McNeil River State Game Sanctuary, both on the Alaska Peninsula. By 2011 wildlife watching was injecting \$1.2 billion a year into the state economy.

But it's online that the American love affair with bears has really stepped up a gear. Live streaming from Brooks Camp in Katmai has transformed its residents into soap-opera stars, enabling viewers to make personal connections with bears without having to travel to remote forests, rivers and mountains. The extent of the national feeling for the animals was particularly apparent last July, when a seven-year-old female called Bear 130 or 'Tundra' was found dead, possibly killed by a rival. Tundra was well known, and fans worldwide mourned her death. "She was a bear with a story," says Troy

Top: a Kodiak bear ventures onto the streets of Larsen Bay from the surrounding wildlife refuge. Above right: tourists flock to see Katmai's bears in summer. Above left: a mother and her three-to-four-month-old cub forage for clams on Katmai's shoreline.

Hamon, the park's chief of natural resource management and research. "Connections like these can have a hugely positive impact, helping to develop a constituency for these animals and where they live."

Brad Josephs has led bear-viewing expeditions along the coast of Katmai for the past 14 years. "Bears are majestic and humbling, and I want to leave people with a much stronger sense of their value in the wild," he says. For Josephs, bear conservation goes beyond the animals themselves. "Brown bears symbolise wilderness," he adds.

But Josephs is disheartened by the fact that more love does not necessarily translate into a greater conservation effort. Over the years he has seen the nature and intensity of bear tourism change, particularly with day-trippers increasingly flying into the Katmai coast. "We have turned an area of critical bear habitat into an airport," he says. The animals are very sensitive to noise, and Hamon notes that they are shifting their routine. In Hallo Bay, for example,

the number of bears present in the meadow can double after the last plane leaves.

LIVE STREAMING FROM BROOKS CAMP IN KATMAI HAS TRANSFORMED ITS RESIDENTS INTO SOAP-OPERA STARS.

TOO CLOSE FOR COMFORT

Because bear viewing takes place where individuals gather at concentrated food sources, its impacts can be significant. Since 2000 Anthony Crupi, ▶

ALASKAN BEARS



a biologist with the ADF&G, has studied the interactions between people and bears on the Chilkoot River, a popular fishing and unregulated viewing site near the town of Haines. Easily accessible via the Alaska Highway, this narrow, 3km-long stretch of river attracts more than 80,000 visitors every summer.

Around 15–20 bears – adult females, cubs and sub-adults – congregate at the Chilkoot River to feast on migrating coho, pink, sockeye and chum salmon. Crupi's research has shown that when people are absent or at least room away, the bears spend more time at the river, capture two-and-a-half times as many fish, and catch greater proportions of live prey. Unfortunately, in the absence of regulation and management, visitors frequently approach the bears to within a few metres.

"It is sad for these animals," says Crupi. "They provide so much to the economy and enhance our sense of wilderness, but at the cost of their own success. Everybody wants to experience this place, but ultimately it is causing conservation concern for a keystone species."

For many years Crupi has been following the progress of Bear 443, a 26-year-old female considered to be the most dominant individual on the river. More tolerant of people than her peers, she caught more fish and was a highly successful breeder, raising 13 cubs in 16 years. But her strategy has come at a cost. Because their mother was willing to hunt in close proximity to humans, the cubs picked up bad habits. The youngsters learned that



Above: migrating salmon are a vital food source for brown bears. A dominant male can catch and eat up to 30 fish a day. **Above right:** sub-adult bears such as this one are independent, but have yet to reach sexual maturity.

fish carcasses were easy to obtain from anglers, leading to inevitable conflict with people from the surrounding neighbourhoods and, eventually, death by shotgun. "Only one cub survived long enough to have babies of her own," says Crupi. Brown bears are generally slow to reproduce – only one in three typically reaches maturity. In the Chilkoot River area, the survival rate is even lower.

HUNTERS VS TOURISTS

Then there is the vexed issue of hunting. North America's hunting lobby is undeniably powerful – according to a 2011 survey by the US Fish and Wildlife Service, 13.7 million people in the USA over 16 years old said they were



hunters. As in many other parts of Alaska, the same bears that are viewed by tourists on the Chilkoot River in summer are hunted for sport in autumn, a source of ongoing controversy.

Kodiak Island, which is home to about 3,500 bears belonging to the largest subspecies of brown bear in the world, has an active trophy hunt. “If you visit in July you will be watching bears; in November you will be shooting them,” says Van Daele. “Bears are a resource to be managed for the benefit of many groups of people. So who has priority – somebody who wants to watch a bear, or somebody who wants to harvest one?”

A paper published in 2011 in *The Journal of Wildlife Management* showed that regulations for hunting brown bears were liberalised and increasingly designed to reduce bear abundance between 1980 and 2010, resulting in longer hunting seasons and more kills. In 2007, for instance, roughly 1,900 Alaskan brown bears were harvested, the vast majority taken by sport hunters. In some regions the state also culls bears and wolves to protect moose and caribou populations.

There are only a handful of areas in Alaska where brown bears are not hunted, including Katmai National Park and McNeil River State Game Sanctuary. But the bears that ecotourists enjoy here are capable of travelling long distances, and are likely to be shot as trophies if they enter adjacent locations where hunting is allowed. This creates a moral dilemma: is it acceptable to hunt bears that trust humans?

Hunters and wildlife managers alike believe that bears are intelligent, adaptable animals that can distinguish

between a camera-wielding tourist and a gun-toting hunter, particularly because they utilise different locations at different times of year. “In summer, bears at salmon streams

KODIAK’S SAFE HAVEN

Alaska’s native peoples often have a different attitude to hunting, and in 2014 the Alutiiq people of Kodiak Island decided to exclude hunters from 14km² of prime bear-viewing land around the northern portion of Karluk Lake. This is the first and only area closed to bear hunting on Kodiak Island. “We felt it was needed because these bears have become acclimatised to our presence. Hunting them was not a fair deal,” says Edward Ward of the Kodiak Brown Bear Center, the native-owned organisation that runs bear-viewing tours. “Closing that land is a testament to our native culture, which respects the bears and gives them space.”

are highly tolerant of people and each other,” says Van Daele. “But if the same bear sees a person or another bear in autumn, they don’t want to be there.” Ultimately, however, it’s hard to prove whether individual bears can differentiate between dangerous and harmless humans.

Hunters argue that they have less impact on bears than wildlife watchers – and do more for conservation. Sam Rohrer, president of the Alaska Professional Hunters Association, guides both bear hunters and viewers on Kodiak Island. “When I am hunting, I observe from afar. I only interact with the one bear I kill,” he says. “When we are bear viewing, we’re up close and personal and can be interacting with as many as 20 individuals.”

THE DANGER OF COMPLACENCY

The justification for exploiting brown bears in multiple ways has long relied on the fact that Alaska has healthy bear numbers. But higher harvest rates, the state’s growing human population, oil and gas extraction, and the impacts of climate change are piling on the pressure. For example, noise and vibration from drilling in the North Slope region of the Brooks Range can disturb denning individuals.

Chris Morgan, one of America’s leading brown bear ecologists, sounds a note of concern. “Alaska has a lot ▶

“IF YOU ARE VISITING IN JULY YOU WILL BE WATCHING BEARS; IN NOVEMBER YOU WILL BE SHOOTING THEM.”



“ALASKA IS BIG AND REMOTE, SO WILL PROBABLY ALWAYS HAVE BROWN BEARS. BUT YOU CAN CAUSE LOCAL EXTINCTIONS.”

SNIFFING THE SNOW

In the coastal region of the North Slope, oil and gas exploration occurs in winter, when brown bears are in dens. Regulations require industry activities to keep 800m away from the dens, because disturbance may cause a female to emerge prematurely and affect cub survival. But locating a denning bear under several metres of packed snow is far from easy, even with infra-red technology. A few years ago biologist Richard Shideler brought his two Karelian bear dogs to the oil fields. They sniffed out 92 per cent of denning bears – a much better result than any other method of detection.



Dogs can locate bear dens hidden under the snow.

Above: bears can severely injure each other in a fight, so try to avoid conflict. Skirmishes are most likely to occur when in competition for food. These males are in Katmai NP.

FIND OUT MORE

Watch clips from BBC One's *Great Bear Stakeout* series at <http://bbc.in/1HA0SSe>, and view the Katmai bearcams at <http://1.usa.gov/1cCH0SY>

of bears. But as a result there is a false sense of security when it comes to managing them," he says. Complacency can be the enemy of conservation.

The vulnerability of Alaska's brown bears became apparent on the Kenai Peninsula after the Alaska Board of Game approved more liberal hunting regulations there in 2012. A record 184 animals were killed in 2012-14, including 42 valuable adult females of breeding age. In 2014 the high level of mortality – six-and-a-half times the annual average over the past 50 years – prompted a change of heart, and the federal government enacted a temporary sport-hunting ban at Kenai National Wildlife Refuge.

"Current levels of mortality are causing a substantial decline in Kenai's bears, and that is not consistent with our mandate of managing wildlife populations in their natural diversity," says Andy Loranger, manager of the refuge. Part of the problem is that the Kenai bear population is isolated and genetically less diverse than the brown bear population on the mainland. As Sean Farley says, "Alaska is big and remote, so will probably always have brown bears. But you can cause local extinctions if you're not careful."

Brown bears have been persecuted for centuries, yet Morgan remains optimistic. "More and more people are realising that bears represent something we need," he says. "They stand for vast landscapes full of fresh water and clean air. They are good for all of us." 🐾

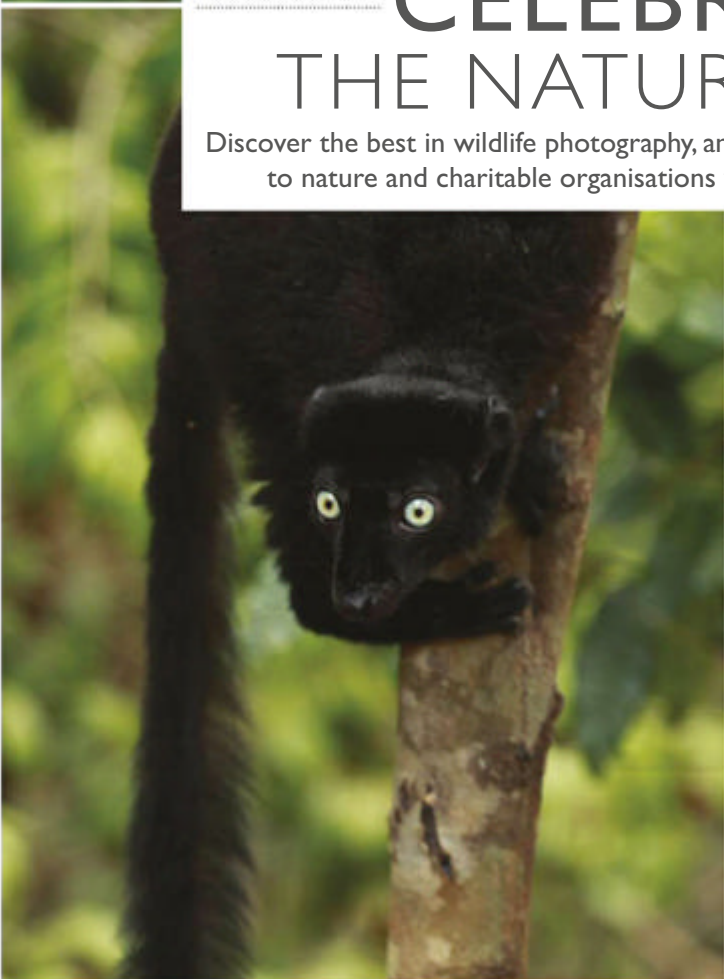
ISABELLE GROG is an environmental writer and wildlife photographer based in British Columbia (www.tidellife.ca).



BRIAN MCKAY

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JON DIXON



CHARLES HOOD



SUMATRAN TIGER: BRIAN MCKAY

SUPPORTING LOCAL HEROES TO SAVE THE SUMATRAN TIGER

International conservation is wrought with challenges. But Fauna & Flora International (FFI) has over a century of experience to draw upon, and has developed a long-term approach that really works

FFI works all over the world to protect threatened species and ecosystems, choosing solutions that are sustainable, based on sound science and take account of human needs – an approach that is perfectly exemplified by our work with the Critically Endangered Sumatran tiger.

14 years ago FFI started a programme to save Sumatran tigers in Kerinci Seblat National Park, which are coming under ever increasing threat from poachers due to rising demand for their pelts, bones and other body parts. By working at every level, from 'on the ground' patrols to engaging with local and regional government, the team in Sumatra have risen to meet the challenges they face. Here is just some of what they do:

- Forest patrol teams walked an amazing 1,100 miles in the National Park in 2014, removing deadly tiger snares as they went
- Undercover agents support law enforcement officials by covertly investigating suspected poachers and their networks
- Rapid response teams deal with wildlife emergencies – from dealing with human-tiger conflict situations to rescuing injured tigers

This essential work is carried out by teams of rangers, staffed by local people who are passionate about conservation. As a result of this work, tiger

numbers in Kerinci Seblat National Park appear to be recovering in areas where the patrol teams work.

In 2014, the FFI Sumatra programme took a huge step forward – helping to set up Indonesia's first Wildlife Crime Law Enforcement Network with local authorities to strengthen law enforcement across provincial borders by sharing information and resources. But the danger is far from gone, and FFI is prepared for a long struggle ahead – not just for tigers, but for the many other endangered species we work to protect.

Debbie Martyr, the project manager, has given over 15 years of unwavering dedication to tiger conservation – and was recently awarded an MBE in recognition of this.

This is just one of the 140-plus projects that FFI runs in more than 40 countries around the world. It's a huge job, and our work simply wouldn't be possible without our supporters standing by us. If you want to help us make a difference, please contact us today.



Web www.fauna-flora.org
Email appeals@fauna-flora.org
Tel 01223 431991

Red alert for the Sumatran tiger. Fauna & Flora International launches emergency appeal in response to 600% increase in poaching threat. Please respond by 10 June.

Photo: Evan Bowen-Jones/FFI



This Critically Endangered tiger has been pushed to the edge of extinction – maybe 500 remain. Give to stop the poachers at www.FFIsumatrantiger.org

One of the Sumatran tiger's final strongholds is under threat from a massive increase in poaching. Action is needed now.

- £83,131 is needed to help us fund more rangers and step up action against the poachers in Kerinci Seblat National Park.
- This is one of the final strongholds of the incredibly rare Sumatran tiger, a place where the battle to save the Sumatran tiger will be won or lost.
- FFI's work here could be all that stands between the Sumatran tiger and extinction.

A 600% increase in snares laid since 2011 has put FFI's anti poaching team on red alert. Habitat loss has already pushed the Sumatran tiger to the brink of extinction but now poachers have stepped up their efforts to snare these magnificent cats.

Fauna & Flora International (FFI) has put out an urgent call to the global community to save the last Sumatran tigers currently existing in the wild – and specifically to employ more rangers. There are now only around 500 Sumatran tigers left.

FFI is urgently seeking funds to step up their crucial conservation programme in Kerinci Seblat National Park, Sumatra, Indonesia. In order to safeguard the future existence of these magnificent creatures, it is vital that more rangers are employed

Right now, the Sumatran tiger faces a number of very serious threats, which are putting their very survival in jeopardy. And, sadly, they are all man-made threats.

Poaching is a constant danger for the elusive Sumatran tiger – and now poachers have **substantially** stepped up their efforts. Hunters make good money from the tiger's beautiful skin and demand is constantly growing. Also, its bones are illegally exported to use as ingredients in traditional Asian medicines.

What is really worrying now is that poachers have increased the number of tiger snares laid by 600% since 2011 and this year snares found have been at almost record levels.

This is against a backdrop of a very serious loss of habitat. In the last ten to 15 years, natural forest cover in Sumatra has been slashed by almost a staggering 40%. Now there is a newly emerging threat in 2014, discovered by tiger patrols - the growth of illegal coffee plantations in Kerinci Seblat National Park.

These majestic forest dwellers have been designated as Critically Endangered on the IUCN Red List, making the Sumatran tiger one of the most endangered tiger subspecies on the planet. This is a rating reserved for animals that face an extremely high risk of extinction in the wild.

Latest surveys have indicated that there may now be as few as 500 existing in the wild. Kerinci Seblat National Park is one of the last places on Earth where they can still be found.

Today, 170 tigers live in and around Kerinci Seblat National Park – the largest known population of tigers anywhere in Sumatra. Since 2007 the number of tigers in the park has stabilised and begun to slowly grow – largely thanks to the vital work of FFI's Tiger Protection and Conservation Programme. However, now the upsurge in poaching puts these gains under threat.

Debbie Martyr, FFI Team Leader of the Kerinci Tiger Project in Sumatra, says:

"So far this year our ranger teams walked almost 1100 miles on forest patrols in and bordering the national park and destroyed more than 60 active tiger snares - an increase of 600% since 2011. That is why we need to step up patrol regimes".

Tiger populations are dreadfully fragile. If FFI cannot recruit more rangers to protect the tigers against the increased efforts of the poachers all our good work could be undone.

For all of these reasons, it's now absolutely vital that we increase our patrols to protect tigers from poachers – and work towards greater protection for their delicate habitat.

If we're going to save the Critically Endangered Sumatran tiger from complete extinction, it's vital that we have the means to take action now.

FFI must raise £83,131. To do that, the charity is calling on readers to make an urgent contribution today.



Photo: Gill Shaw

"If you value the natural world – if you think it should be protected for its own sake as well as humanity's – then please support Fauna & Flora International."

**Sir David Attenborough, OM FRS
Fauna & Flora International vice-president**

Please send a gift, by no later than 10 June, to help safeguard the future survival of the last few remaining wild Sumatran tigers.

Together, we can save the Sumatran tiger from extinction – but only if we take action immediately.

To take action for the Sumatran tiger please go to www.FFIsumatrantiger.org or cut the coupon.

If the coupon to the bottom right is missing, please send your cheque (payable to FFI) to: FREEPOST RRHG-GBGG-CAGG, Fauna & Flora International, Sumatran Tiger Appeal, Jupiter House, Station Road, Cambridge, CB1 2JD by 10 June.



Photo: Debbie Martyr/FFI

Stop press - Poachers kill Tiger in Kerinci

"We knew this tiger, a large male. To see it reduced from a beautiful wild animal to a pile of meat and guts made us all very angry".

Yoan Dinata, Tiger Protection Team, Kerinci Seblat

Dear readers: Fauna & Flora International (FFI) has launched an emergency appeal, backed by Sir David Attenborough, to raise £83,131 to save the Critically Endangered Sumatran tiger.

These items are vital to help save the remaining Sumatran tigers from extinction.

£5,212 could help fund two new rangers posts and buy essential equipment – rucksacks, uniforms, sleeping bags, cooking equipment, field radios and compasses.

£2,500 could buy a pick-up van to help a patrol move around quickly to prevent poaching.

£400 could buy camping equipment and boots.

£72 could buy first aid kits to treat injured rangers whilst out on patrol.

£32 could help buy a field radio, essential to getting extra help if poachers are spotted.

Donations large or small will help us save the Critically Endangered Sumatran tiger from the 600% upsurge in the poaching threat.

Cut the coupon below and return it to FFI, together with your gift, to help save the Critically Endangered Sumatran tiger. Alternatively, go to www.FFIsumatrantiger.org. Thank you.

I want to help save the remaining 500 Sumatran tigers today, with a donation of £ _____



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Card No: _____

Start Date: _____ Expiry Date: _____

Issue Number (Maestro only): _____

3 digit security code: _____ (Last three digits next to the signature)

Please note: If Fauna & Flora International succeeds in raising more than £83,131 from this appeal, funds will be used wherever they are most needed.

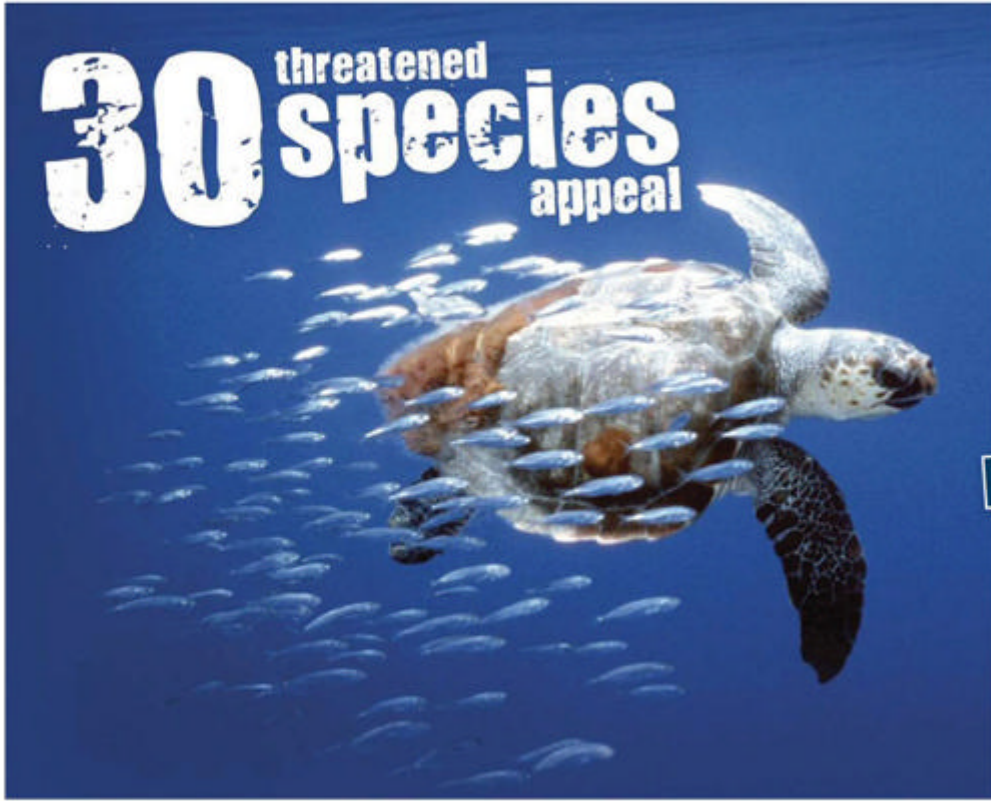
**Please return to: Sumatran Tiger Appeal,
FREEPOST RRHG-GBGG-CAGG,
Fauna & Flora International, Jupiter House,
Station Road, Cambridge, CB1 2JD.**

You can call 01223 431991 to donate now.

Or go to: www.FFIsumatrantiger.org to donate online.

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DOUG PERRINE



30 THREATENED SPECIES

The ones you have probably heard of:

Leatherback turtle, puffin, harbour seal, sperm whale, Atlantic cod, Eurasian otter, common eel, Atlantic halibut, basking shark, loggerhead turtle, harbour porpoise, common skate, bottlenose dolphin, blue shark, bluefin tuna, European sturgeon.

The ones you may not have heard of:

Undulate ray, porbeagle shark, angel shark, angular roughshark, thresher shark, frilled shark, short-snouted seahorse, long-snouted seahorse, sei whale, pink sea fan, velvet scoter, Balearic shearwater, tope shark, spiny dogfish.

URGENT APPEAL TO HELP SAVE OUR THREATENED MARINE WILDLIFE



The seas and coastline around the UK are home to some of the most colourful, fascinating and beautiful marine life in the world with well over 10,000 different species living in our seas and around our shoreline. From the enormous basking shark and the world's largest turtle, the leatherback, right down to the tiny short-snouted seahorse and the delicate pink sea fan – all can be found right here on our very own doorstep.

Yet our seas are losing biodiversity at an alarming rate. Previously familiar species such as the common skate, angel shark and European sturgeon are now classed as critically endangered. More and more rubbish is being dumped in our seas and ending washed up on our beaches. Fish stocks are being fished towards the brink of extinction. A tipping point has been reached and, if we don't act now, some of our marine animals may disappear forever.

The Marine Conservation Society (MCS), the UK charity that protects our seas, shores and wildlife, has, in its 30th year, launched the 30 Threatened Species Appeal to raise awareness of the plight of our marine life, and to raise at least £30,000. The 30 species which have been selected all have one main thing in common – they all appear on the IUCN Red List of Threatened Species. MCS wants to ensure that each of the 30 species is still around in 30 years' time.

DONATE TODAY

Support the Marine Conservation Society's 30 Threatened Species Appeal

How your gift can help protect our 30 Threatened Species

- £5 will help equip 2 volunteers with items needed to run a beach clean survey.
- £10 will mean 10 more people choosing fish from sustainable sources, reducing pressure on endangered fish species and other marine animals.
- £20 will buy an angling litter bin to help reduce dangerous fishing line left on our beaches.
- £50 will mean we can run a beach clean to remove litter from over a mile of coastline.
- £100 will help us fight for more Marine Protected Areas, as only 1% of UK seas are currently fully protected.

Donate by visiting www.mcsuk.org/30species or call the Marine Conservation Society on 0300 3300 704

DID YOU KNOW?

A few amazing facts about our 30 threatened species

- Basking sharks can grow to 11 metres long and weigh up to 7 tonnes. They were once hunted for their liver oil but thanks to legislation changes they are now protected in the UK.
- The leatherback turtle breathes on the surface but can stay underwater for over half an hour.
- The pink sea fan looks like a plant but is actually a colony of tiny anemone-like creatures.
- The sei whale is the ninth largest living animal on our planet, weighing up to 45 tons – roughly the weight of six adult African elephants!
- Elvers are so transparent that you can read a newspaper through them!
- The male seahorse carries the eggs and young in their bellies and birth contractions can last up to 12 hours.

To find out more, please visit: www.mcsuk.org/30species



BASKING SHARK: CHARLES HOOD; DOLPHIN: JOHN RAFFEY/MARINE PHOTOBANK; SHORT-SNOUDED SEAHORSE: PAUL NAYLOR



MALE BLUE-EYED BLACK LEMUR AT
SAHAMALAZA-ILES RADAMA NATIONAL PARK

JON DIXON

RAINBOW TOURS

Rainbow Tours is proud to be able to offer trips to a remote protected area in north-west Madagascar which as yet has been seen by very few westerners

Sahamalaza - Iles Radama National Park was initially created with lemur protection in mind, its flagship species being the charismatic Blue-eyed black lemur (*Eulemur flavifrons*). As its name implies, the Sclater's or Blue-eyed black lemur is the only non-human primate with blue eyes. Classified as critically endangered by the IUCN, there has been a catastrophic decline in the population of this species, which was rediscovered in 1983 after almost a century of uncertainty about its existence. Sahamalaza is also home to other extremely rare and range-restricted species such as the Sahamalaza sportive lemur (*Lepilemur sahamalazaensis*), also critically endangered and discovered in 2006.

Some long-term research projects are being conducted by the Bristol Conservation and Science Foundation in conjunction with two Malagasy universities. One of the key species under scrutiny is the Blue-eyed black lemur, which is best sought in forest fragments of Ankarafa. It is in this forest where a research base was established, and where there are basic facilities for visitors. So far, the research programmes have done wonders in promoting local awareness of the importance of conserving the forest ecosystem in the region and of protecting the wildlife in this little-known area.

Rainbow Tours clients Jon and Diane Dixon were among the first wildlife enthusiasts to visit Sahamalaza, in November 2014. They took the photograph of a male Blue-eyed black lemur, complimented enthusiastically

by Dr Christoph Schwitzer, (Director of Conservation at the Bristol Zoological Society) as one of the best he has seen of the species in the wild. Getting to the reserve was achieved by means of a motorised boat trip from the remote Anjajavy le Lodge, from where one has to depart before dawn. About three hours later, you will arrive at a beach from where there is a three hour walk to the research station in Sahamalaza. Here, fully equipped camping is carefully organised, using the research station as a base. Visitors are able to camp overnight under thatched shelters and during their well-guided forest walk, the Dixons enjoyed excellent sightings of both the critically endangered lemurs they had come to see. Another highlight was enjoying dinner prepared by the local Sakalava people. 'To us, the experience was precious', comments Jon Dixon.

For more information Bristol Conservation & Science's work in Sahamalaza, see <http://www.bcsf.org.uk/bcsf/madagascar>.

For details on getting to Sahamalaza and seeing its wonderful and critically endangered wildlife, contact Rainbow Tours.

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OUR EXPERTS



KAREN EMSLIE is a science and nature writer with a penchant for the curious and quirky.



STUART BLACKMAN is a science writer who is mildly obsessed with evolution.



RICHARD JONES is a writer and entomologist with a fondness for dung beetles.



PHIL GATES is a visiting lecturer in botany at the University of Durham.



BEN GARROD is an evolutionary biologist who specialises in both primates and skeletons.

DISCOVER WILDLIFE

MORE AMAZING FACTS AT DISCOVERWILDLIFE.COM

Q MARINE BIOLOGY

How do nesting sea turtles find their way home?

A Nesting sea turtles require a delicate ecological mix: the right sand, the correct temperature and an easily accessible beach with few predators. To be sure of laying their eggs in the best place, the turtles go back to the beach where they hatched themselves – if it worked for their mothers, so it should work for them. By studying nesting sites in Florida, a team from the University of North Carolina has discovered that the turtles seek out unique magnetic signatures along the coast. As

hatchlings, they imprint on the magnetic field of their natal beach and then use this information to return as adults. But exactly how they detect the geomagnetic field is still not known. The most likely way is via tiny magnetic particles in the brain that respond to the Earth's field and give the turtles a 'magnetic sense'. **Karen Emslie**



Jord Chas/naturep.com

EMAIL YOUR QUESTIONS TO

**wildquestions
@immediate.co.uk**

or post to Q&A, BBC Wildlife Magazine, Immediate Media Company, 2nd Floor, Tower House, Fairfax Street, Bristol BS1 3BN

How sea turtles find their way home has stumped scientists for decades.



Kestrels usually hover at a height of 10–20m, often over farmland.

Q FLIGHT DYNAMICS

How do kestrels hover?

A Kestrels, known as ‘wind-hoverers’, are often spotted above motorway verges, apparently hanging in the air while seeking out small mammal prey. To maintain this posture, the bird flies into, and at the same speed as, the oncoming wind – the current of air passing over its wings provides the lift it needs. To maintain the lift, it extends the tips of its wings and fans its tail feathers, and if the wind drops it will flap

its wings to increase air movement. A kestrel’s feathers are better able to withstand the effects of bending (by being stiffer) compared with other falcons, and research has shown that the birds cope with the energy demands of hovering by including tiny pauses, stretching their necks forwards to offset being blown backwards, while keeping their heads in position.

Sarah McPherson Section editor

3

THINGS YOU NEVER KNEW ABOUT THE...

Stag beetle



EMPTY THREATS

The males’ intimidating antler-like mandibles are designed for wrestling rivals rather than biting. The bite of the smaller-jawed females is more painful to human handlers.

HIGH-FIBRE DIET

Stag beetle larvae spend five to six years feeding on rotting wood. They leave behind a distinctive network of tunnels and C-shaped chambers.

PICKY PREDATORS

Magpies, major predators of adult stag beetles, eat only the nutritious, fat-filled abdomens. The corvids leave their victims to wander around, sometimes for days, before they die.

Stuart Blackman

➔ Visit www.discoverwildlife.com to find out more.

Q MARINE BIOLOGY

Do fish play?

A Play is a hard concept to define, and it is far easier to spot in animals we are able to empathise and identify with – chimps and dogs, for instance. Fish certainly aren’t famous for their sense of fun, but that may be because we haven’t looked at them closely enough.

There is evidence that at least one species – a cichlid from Lake Tanganyika called *Tropheus duboisi* – does have a playful side. Several captive males have been observed passing the time by knocking over a bottom-weighted thermometer, which bounces back upright again. This does appear to meet the criteria of an influential modern definition of play: a repetitive action, performed by a healthy, relaxed animal, that has no immediate benefit in the context in which it occurs. **SB**



Cichlid fish just want to have fun...

From top: Lolo Poldavin/NPL; deKleer net/A amy; Roberto N str /A amy

How long does a joey stay in the pouch?

A Unlike the young of most other mammals, baby kangaroos are highly underdeveloped and embryo-like at birth. After a gestation of up to 34 days, the jellybean-sized youngster makes the journey from birth canal to pouch by clambering up through its mother's fur. Once safely in the pouch, the joey suckles solidly for just over two months. At around six months, once the youngster is sufficiently well developed, it will leave the pouch for short periods, returning when it needs to feed. Red kangaroos leave the pouch for good at around eight months and continue to suckle for another three to four months; grey kangaroos leave at about 11 months, continuing to suckle until they are as old as 18 months.

Interestingly, female kangaroos are able to suckle two youngsters simultaneously – one in the pouch and one outside, offering two different types of milk, as well as having an egg ready for implantation. **SM**

As they grow, young kangaroos (here an eastern gray) are often seen hanging out of their mother's pouch.



WHERE CAN I SEE...

1 HARPY EAGLES
Gareno Lodge, Ecuador
The harpy eagle is the apex avian predator of the American tropics. Gareno Lodge gained fame among birders when a pair established a nest within sight of the cabins.

2 WILD DOGS
Botswana
With just 3,000 wild dogs left, sightings are rare. Lagoon Camp in the north of the Kwando Concession is reputed to be one of the best places for a sighting.

3 MUSK OXEN
Dovre fjell NP, Norway
Though not native to Norway, musk oxen were brought to Dovrefjell in the 1930s from Greenland. Walking safaris into the park to see these quarter-tonne behemoths run from June to September.



HOW TO

PHOTOGRAPHY

POND MINIBEASTS

It's often said that one of the most beneficial things you can do to attract wildlife to your garden is to create a pond. It needn't be particularly big – even some sort of water feature in a container will be seen as an oasis where everything from garden birds to foxes will almost immediately come to drink.

Later, as the pond becomes established, whole communities of aquatic life begin to form. Because you have regular access, you are in the perfect position to observe and document the changes as a steady variety of potential subjects find their way to your creation. In terms of minibeasts, these can be loosely divided into those that can be photographed on and above the surface, such as pond-skaters, whirligig beetles and damselflies, and those below, such as three-spined sticklebacks and caddis-fly larvae that require being photographed in a carefully prepared tank.

Getting acquainted with ponds and their diminutive inhabitants can open up a whole new world of photographic potential. There is a lot of fun to be had in sharing the experience by getting younger members of your family involved too, with a bit of pond dipping. **Laurie Campbell**

● Find out how to create a garden pond at www.discoverwildlife.com/british-wildlife



Wildlife

EXPERT TIP

“Rather than only taking photos that show all the identifying features of a species, work out which aspects have an aesthetic appeal too, then think how best to isolate and emphasise these.”

Laurie Campbell, wildlife photographer

FIND OUT MORE

Be inspired by Laurie's images in the Pro Photos section of www.discoverwildlife.com

1 DRAGONFLY

This was my first ever sighting of a southern hawker, and all the more exciting because it turned up in my garden pond. Normally I would choose a telephoto macro lens attached to a tripod and stalk the subject, but for this image I used a hand-held camera fitted with a fisheye lens.



Get down low

Crouching low down allowed me to compose the dragonfly against the sky, avoid casting my shadow over the scene and keep my subject at ease by appearing largely below the skyline.

2 GARDEN SNAIL

Taking photographs around water may give you the chance to work a reflection into the composition. For this image of a snail on a log, the low viewpoint and calm conditions with the sun low in the sky from behind created the perfect combination. Virtually any subject would look good in this situation.



3 x photos: Laurie Campbell

Keep it cool

Insects are less likely to flee from your approach when the air is cooler. I took this photo in mid-October, but in warmer months try early or late in the day.

Set the scene

With the dragonfly less than 15cm away, the 180-degree angle of view of the fisheye lens allowed me to show it within its surroundings. The inclusion of the summerhouse points to a garden setting.

Use the correct support

It's hard to use tripods with fisheye lenses because of the problem of including the legs in the picture, so I supported the camera for the 1/40-sec shutter speed by resting both my elbows on the ground.



3 GREAT DIVING BEETLE



The only way to capture this beetle was to place it in a small glass tank with some pondweed and photograph it through the side, indoors and in subdued lighting to avoid reflections from the glass. The scene was lit by a single electronic flash that was fitted with a diffuser and positioned to fire directly down into the water from above.

Q INSECTS

How did harlequins get to Britain?



A Ladybirds, like most beetles, fly readily and this is how the harlequin *Harmonia axyridis* has spread so rapidly across England and Wales (now into Scotland and Ireland). It is unlikely to have crossed the English Channel, because its first landfall was not along the south coast but in Essex in 2004. But whether specimens flew across the North Sea is still a matter of conjecture.

Mass flights of ladybirds are well known, but usually end at the water's edge, where air currents either blow them back onto land or dunk them into the sea. On the other hand, a few harlequins may have been wafted here from Belgium one fine day, while the species' arrival by human agency is equally plausible



– it is chiefly a garden insect, after all, and a wealth of horticultural material is brought into the UK every single year. **RJ**

The invasive harlequin is a threat to our native ladybirds.

Q BOTANY

Are any wild-growing flowers black?

A There are no truly black flowers. The biological purpose of petals is usually to attract pollinators, using coloured pigments that reflect one wavelength of light and absorb all others. A few flowers may seem black or have black petal patches (opium poppies, for example) because they contain high concentrations of anthocyanin pigments that only reflect purple wavelengths, whose hue is further deepened by the surface microstructure of the petal cells.

It's important to remember that many pollinators can see reflected ultraviolet light that is invisible to us – photographing flowers under ultraviolet light often reveals patterns that are hidden from human eyes. **PG**



A dark variant of the opium poppy.

From top: x3Alamy (Redmond Durrell); imagebroker; flowerphotos

BIRDS

Why don't baby birds make less noise to avoid attracting predators?

A The competition between nestlings for food is so intense that they tend to use everything at their disposal to attract their parents' attention – noisy begging calls, colourful gapes and plumage. However, experiments show that broadcasting recordings of chicks' begging calls does indeed attract predators, and that beyond a certain noise level the dangers outweigh the benefits.

Great tit chicks, for example, stop begging in response to a parent's alarm call. And a recent study of blackcaps found that under very high predation pressure chicks completely refrain from chirping until they fledge, relying instead on visual begging strategies. **SB**



A great tit feeds caterpillars to a hungry brood of begging mouths.



This frog fossil dates from the Miocene period 23–5 million years ago.

From efit: Dom nique De l'ino/B espino/FL/PA: A bert L eal/Moden P ctures/FL/PA

PALAEONTOLOGY

What are the differences between a bone and a fossil?

A When you see dinosaur skeletons in a museum, you're not actually looking at their bones but their geologically based replacements. Bones are made from a composite of organic components, such as collagen and fats, and inorganic minerals such as calcium. After an animal dies, the organic parts of the bone break down over millions of years and leave only the fragile and porous inorganic components, which maintain the shape of the original bones. Water in the sediment surrounding the animal seeps into its bones, carrying with it minerals such as calcium carbonate and iron. These are deposited into the bones' microscopic pores, making them more and more rocklike while the physical structure remains the same. **Ben Garrod**

HOW TO

MAKE YOUR OWN BIRD SPLASH

Offer your birds a vital source of water at which to drink and preen.



1 Dig a hole and sink a plastic bucket so the rim is just protruding above ground level.



2 Fill the bucket with bricks, then place pebbles on the top for the birds to perch on.



3 Plant ivy or another type of evergreen around the rim of the bucket to conceal it.

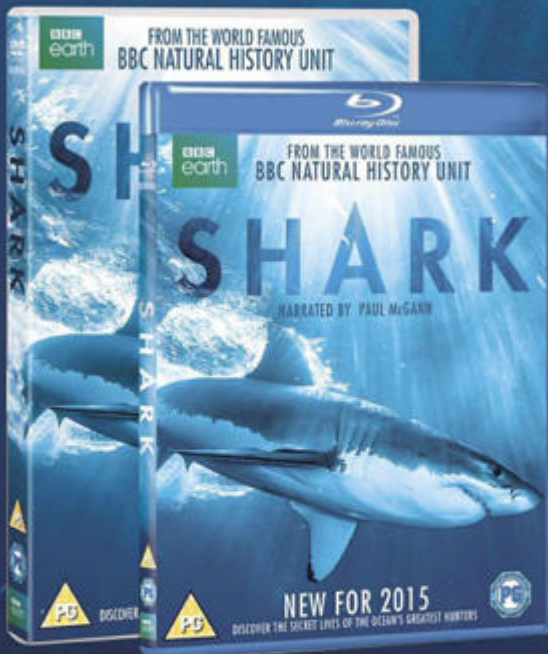


4 Fill the bucket with clean water, and enjoy watching your birds splashing around.

Illustrations by Alan Batley

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Look out for curlews (pictured), sandpipers, avocets, stints, passage migrants and the BBC Wildlife editorial team at Levenhall Links.

■ EVENT

FAMILY FUN AT A BIRDING HOTSPOT

SCOTLAND'S BIG NATURE FESTIVAL

Levenhall Links, Musselburgh, East Lothian, 23 and 24 May 2015

Celebrate the wonderful wildlife Scotland has to offer at this nature festival, which includes the Scottish Bird Fair. Now in its fourth year, this RSPB Scotland event is taking place at a new venue where more than 100 exhibitors will be providing entertainment for families and natural-history enthusiasts, such as wildlife walks and nature talks. RSPB Scotland's Ian Thomson says, "Visitors to the festival will have the chance to see a wide selection of bird species." Come and find BBC Wildlife staff at Moorland Marquee to say hello.

Jo Price Staff writer

● You can buy tickets online at www.bignaturefestival.org.uk



Curlew: Andrew Parkinson; woodmouse: Robin Chittenden/NPL; wolf: Lassi Rautainen/NPL

DON'T MISS



The Wood Mice of Wytham

How these small mammals play a vital role in the ecology of the woodland. <http://bbc.in/1OCyM5y>



In Search of Giant Fungus

A quest to find bracket mushrooms, which grow on tree trunks and fallen logs. <http://bbc.in/1CUnqtT>

Sharing Our Lives With Wolves

How our attitudes have shaped wolves' destiny. <http://bbc.in/1ufEsej>



The hare is described as “a dashing wild rover of an animal” with a hint of the supernatural in Michael McCarthy’s *The Moth Snowstorm*.



BOOK OF THE MONTH



THE DELIGHT OF NATURE

Discover how joy can help us defend our threatened natural world.

THE MOTH SNOWSTORM

By Michael McCarthy
John Murray £20.00

We all know that nature is in crisis. Yet if another book came out warning of more animals becoming extinct, most people would surely switch off. We have heard it all before, and more than once. This is why Michael McCarthy’s new book is so important. The former environment editor of the *Independent* turns the argument around from despair to joy. Instead of focusing on what we have lost, he celebrates the brimstone butterflies and spectacular snowdrops we have left.

The “moth snowstorm” in the title refers to insects flying into a car’s headlights like a blizzard. Sadly it is something we seldom see now because of the fall in invertebrate numbers. This book is a passionate call to appreciate such wonderful natural phenomena, as it is surely only by loving them that we can fight to protect them.

By being brave enough to reveal his own childhood trauma and ultimate recovery through letting nature “enter his soul”, McCarthy shows the greatest power of nature: the capacity to heal. He writes: “our utter dependence on nature is its best possible defence”.

Louise Gray Environmental journalist



THE NEW WILD

By Fred Pearce
Icon Books £16.99

Whether crossing oceans on floating vegetation or catching a lift in a bird’s digestive system, alien species have always found ingenious ways to gate-crash established ecosystems. The figure quoted for dealing with ‘alien invasive species’ is an eye-watering \$1.4 trillion globally, but this challenging book suggests that the claim doesn’t hold water – few alien species do any real damage. And, in an era of climate change, ecological damage and habitat loss, it seems that these feisty immigrants might even be our best bet of boosting biodiversity and healing habitats.

Matt Swaine Editor

● Read more about invasive species in our June issue, on sale 10 June.



WEEDS

By Nina Edwards
Reaktion £16.00

This latest in Reaktion’s *Botanical* series, which is an engaging amalgam of natural and cultural history, is well suited to such treatment because it focuses on plants that have been our companions since our species first began to leave its mark on the planet, such as goosegrass and darnel (the ‘tares’ mentioned in the Bible). Reading Nina Edwards’ entertaining account of their place in our fields, cities, art and even diet gave me a new respect for these resilient plants. There’s even a recipe for ground elder quiche for those who, like me, have been defeated by that irrepressible invader. If you can’t beat them, eat them!

Phil Gates Botanist

■ EXPERT HELEN ROY

GUIDE TO INVASIVE SPECIES

FIND OUT information on non-native plants by visiting www.nonnativespecies.org. In May and June Himalayan balsam and the harlequin ladybird (right) are key invasive species that can be easily identified and reported.



using the *PlantTracker* and *AquaInvaders* apps.

LOOK FOR 'alert species' that are beginning to get a foothold in Britain (water primrose) or are considered a threat (the American bullfrog).

CREATE HABITATS in your garden that benefit wildlife to enhance biodiversity. Then help the Biological Records Centre: visit www.brc.ac.uk/irecord and log any species that you see. You can also record species

BE AWARE of biosecurity methods that help protect native species. For example, check, clean and dry equipment used in freshwater habitats to limit the spread of invaders.



● **HELEN ROY**, Olaf Booy and Max Wade are the authors of *Field Guide to Invasive Plants and Animals in Britain* (Bloomsbury, £24.99). www.bloomsbury.com



ELEPHANT DON

By Caitlin O'Connell
University of Chicago Press £18.00

This is a brilliant study of male elephant society away from the matriarchal herds. Based on 20 years of research in Namibia's Etosha National Park, it revolves around 'Greg', a charismatic bull whose complex web of relationships weaves together the lives of dozens of other males. Dung diaries, chemical analysis of faeces, monitor not just the testosterone rushes of *musth* but all the other hormonal peaks and troughs involved during tiffs and reconciliations. At the end of the book Greg disappears and the other males search for him daily. Order deteriorates. Will he return or can a new 'Don' mature into his role? It's fascinating stuff.
Stephen Mills Naturalist



TWEET OF THE DAY

By Stephen Moss & Brett Westwood
Bloomsbury £14.99

This paperback edition of the companion to the BBC Radio 4 series takes us through a year of Britain's birds. Like the two-minute broadcasts, each 'tweet' tells the story of a different species: its calls, character and connection with our own lives. The title begins in May with insights into the cuckoo, a quintet of warblers, our most celebrated songster the nightingale and, less predictably, three seabirds, two waders and a duck. The engaging prose is suffused with a palpable passion for birdwatching and complemented by Carry Akroyd's evocative cut-paper illustrations.
Pete Dommett Nature writer
● Visit <http://bbc.in/1ffQ4cO> to catch up with episodes of Tweet of the Day.

MEET THE AUTHOR

JAMES TEW

James was given two colonies by an uncle in 1973, and since then he has never been without honeybees.



What can readers learn from your book?

Wisdom for Beekeepers provides information on beekeeping management schemes and the challenges of nurturing beneficial honeybees. Even the more experienced beekeeper may learn different techniques.

Why do you keep bees?

While training to become a professional entomologist, I was exposed to the biological ways of the honeybee and got hooked. Throughout my beekeeping years I have been intrigued by the adaptability and biological complexity of the honeybee colony.

How do you become a beekeeper?

Attending a course is a good way to prepare, so explore your community for beekeeping organisations. It's a great chance to gain essential information and meet other beekeepers.

What is the best time of year to get started?

Spring through to early summer, when nectar and pollen are abundant, is ideal, so a small colony will be able to grow and store enough food to survive the winter. But you can start later with a larger colony that has more stored food. Remember not to be intimidated by all the new terminology, or the occasional setback.

Can you keep honeybees in a small garden?

Yes, with the correct qualifications and experience, but smaller colonies are more appropriate. Check for local restrictions first, such as any concerns from neighbours. And be aware that during hot, dry periods, or when there is a lack of nectar and pollen, the bees may become feisty.

How do you avoid a sting?

Proper training and suitable protective gear reduce the risk. It becomes possible to 'read' bees, too. If they

“ **BE AWARE THAT DURING HOT, DRY PERIODS, BEES MAY BE FEISTY**”

are particularly defensive then either I'm doing something wrong or it's due to weather, a lack of food or colony genetics.

How do honeybees help other species?

Foraging honeybees pollinate plants that are food sources for wildlife. They are 'indicator species' – their presence is a sign of environmental health because they help provide ecological diversity.



● **WISDOM FOR BEEKEEPERS: 500 TIPS FOR SUCCESSFUL BEEKEEPING** is packed with advice from a lifelong beekeeper covering all aspects of the field (Bloomsbury, £14.99). www.bloomsbury.com

TV
CHOICE

NEW-WORLD WILDLIFE

Discover the wild and natural treasures of the north-west corner of Latin America.

NAT GEO WILD DESTINATION WILD: COLOMBIA
Three episodes, starting 17 May, 6pm

Think of Colombia and drugs, guns and gangs possibly come to mind before wildlife. Indeed, as far as natural history is concerned, this corner of the globe is rather elbowed out of the limelight by its South and Central American neighbours.

Yet, despite its relatively small size, Colombia is the second most biologically diverse country in the world (after Brazil). It's home to more species of bird and amphibian than anywhere else on Earth, and boasts a staggering array of habitats. This three-parter for Nat Geo Wild uncovers the wild side of this lesser-trodden country, focusing on three key ecological hotspots: the Chocó Rainforest – a wet, jungly corridor that snakes down the west coast from Panama to northern Ecuador, cut off from the Amazon by the Andes and brimming with endemics and exotics; the Serranía de la Macarena, an isolated mountain range in the heart of the country; and Chiribiquete, Colombia's largest national park. Here are endemic cotton-top tamarins, 1,800 types of bird, enchanting gliding leaf frogs, jaguars, 5,000 species of orchid, migrating humpback whales, scalloped hammerheads and much, much more.

Sarah McPherson Section editor

TOP FACT

Chocó is home to 350 species of amphibian, including over 200 endemics, together with 210 types of reptile, of which 63 are endemic.



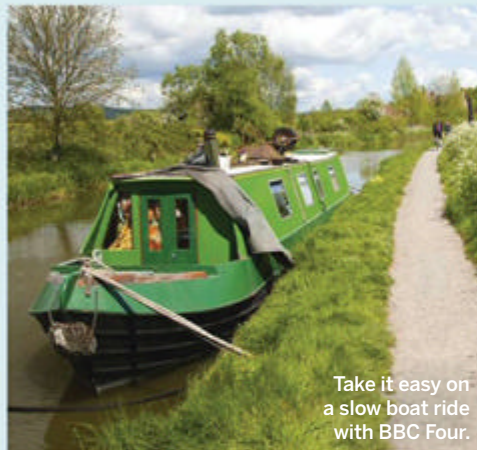
TV NEW SERIES

ON A SLOW BOAT TO NATURE

THE CANAL
Catch up on iPlayer

If you ever feel that daily life can be a wee bit fast and furious, tune into *The Canal*, part of the new BBC Four *Goes Slow* season. Inspired by the 'Slow TV' movement that originated in Norway (other films in the genre include a seven-hour train ride and an 18-hour bout of salmon fishing), it's both a bold and intriguing premise – a real-time, uninterrupted two-hour recording of a jaunt down a stretch of the Kennet and Avon Canal on a sunny day in April. There's no music, no voiceover and, aside from the occasional pan and infographic, no cutaway shots whatsoever.

The soundtrack is made up of birdsong, the gentle hum of the engine, the wind and the lapping water, while the action peaks with cyclists and dog walkers passing on the towpath. "It's the total opposite of the frenetic white



Take it easy on a slow boat ride with BBC Four.

noise of modern life," says executive producer Emma Tutty. "We are bombarded with so much information all the time, but here you are merely passing slowly through nature, almost as if you are moving through a painting. It's quite meditative." You might love it or hate it, but I'm curious to know whether I have the concentration to go the whole distance.

RADIO QUOTE OF THE MONTH



LOTS OF PEOPLE THINK OF THE MALLARD AS 'THE DUCK'... IT'S ONE OF BRITAIN'S MOST FAMILIAR BIRDS.

Richard Hearn, WWT Slimbridge



Living World: Dabbling Ducks
www.bbc.co.uk/podcasts/series/nathistory



A white-fronted capuchin on Gorgona Island, off the coast of Colombia.



Badgers feature in *Springwatch* 2015.

TV FIRST LOOK

SPRING HAS SPRUNG

The seasonal wildlife spectacular returns for 2015, with badgers taking centre stage.

spring TWO **SPRINGWATCH**

From 25 May, 8pm (Mon to Thurs); *Unsprung* airs Weds

DVD NEW RELEASE

RULERS OF THE DEEP

SHARK

Out 25 May, RRP £20/£25 DVD/Blu-ray. Order from www.bbcshop.com

If you missed *Shark* when it aired on BBC One earlier this month, worry not – it's now available on DVD and Blu-ray. This fresh, exciting three-part series aims to change attitudes by 'rebranding' these much-maligned creatures, revealing the predatory prowess, diversity and breeding behaviour of 30 species across the globe, as well as examining the future of shark science. Not to be missed.

The oceanic whitetip shark – now a rarity due to overfishing.



The BBC's annual British wildlife extravaganza is nearly here, with Chris (see p23), Michaela and Martin bringing us three weeks of spring wildlife. Broadcast once again from RSPB Minsmere, this year's show casts badgers in the starring role, GPS-tagged for the first time to enable both team and viewers to follow their every move. Other species that should be beamed into your living room include marsh harriers, with particular focus on how their diet varies according to the weather; an array of rodents, who will be taking to a watery assault course to determine which is the most aquatic; arctic terns, which will be tagged in a new study to learn more about their mysterious

migratory journeys; and sticklebacks, with live cameras filming their nests for the first time.

Meanwhile roving reporter Iolo Williams will spend the duration of transmission heading north from John o' Groats to Unst, Shetland, the most northerly point of the British Isles, sharing his wildlife encounters along the way, while Martin will be dispatched on various missions around the home ground, including a crack at bog snorkelling.

"We're excited to be back at Minsmere – it has such an incredibly diverse landscape and an astonishing array of wildlife," says series producer James Smith. "As ever, our mission is to explore every nook and cranny of the reserve to uncover the best new wildlife stories." SM

NATURE RESERVE SPOTLIGHT

RANSCOMBE FARM



WHERE? Ranscombe Farm Nature Reserve, Cuxton, Kent, ME2 1LA
PROJECT MANAGER Richard Moyses

WHY YOU SHOULD VISIT

Ranscombe Farm is Plantlife's largest nature reserve in England, and one of the best places in the UK to spot rare plants of arable farmland.

WHAT YOU CAN SEE

Look out for wild columbine and white helleborine in the woods, and meadow clary, pyramidal orchid and horseshoe vetch in the grasslands. The common poppy and opium poppy are abundant at the reserve, and with luck you may see the rare prickly poppy.

TOP WILDLIFE SPOT

At Kitchen Field in the reserve you can find rare plants, such as fly orchid and ground pine, alongside commoner species like the bee orchid and wild liquorice.

JOIN ITS EVENT

On Saturday 4 July, from 11am to 3pm, we will be holding a free, family-friendly open day to celebrate National Meadows Day. Visit www.wildaboutplants.org.uk/events to find out more.

HOW TO VOLUNTEER

We're on the lookout for people with good plant-identification skills who can survey wildflowers. Email ranscombe@plantlife.org.uk for more information.



Visit this beautiful nature reserve in the summer to see common poppies.

Common poppies: Bob Gibbons/Plantlife; R. Moyses/Plantlife; P. Anderson

MAY WILDLIFE EVENTS

EVENT CHOICE



30-31 May

GARDEN BIOBLITZ 2015

Discover wild plants and animals in your garden by joining in this fun event and recording what you see. Download a form and a handy list of 20 species you are likely to find at the website below, and share your photos on the iRecord website to identify your finds (see p99). www.gardenbioblitz.org

May - August

SWIFTS RETURN

Oxford Natural History Museum is noted for many famous features, including swifts nesting in ventilation flues in its tower. Track the progress of these summer visitors as they rear their chicks via the museum's webcam. www.oum.ox.ac.uk/swifts.htm



2-7 June

CHELTENHAM SCIENCE FESTIVAL

This exciting festival has a stellar line-up of speakers. Find out how wildlife supports the UK, what happens to plants after dark and how an Omani owl (left) was rediscovered. Visit the website for ticket information. www.cheltenhamfestivals.com

Until 31 Aug

SOMETHING GOING ON ABOVE MY HEAD

For five years artist Oswaldo Maciá collected bird calls from archives and reworked them into a symphony. Carefully positioned speakers at this new Tate Britain display allow you to experience a captivating chorus. www.tate.org.uk/visit



SPEAKERS' CORNER COLIN BELL



WHAT TOFTigers 10th Anniversary Event
WHEN 6.30pm on 21 May
WHERE The Royal Geographical Society

Conservationist Colin Bell will be discussing how we can keep iconic species in their natural habitats at this gala to celebrate the 10th anniversary of Travel Operators for Tigers (TOFT).

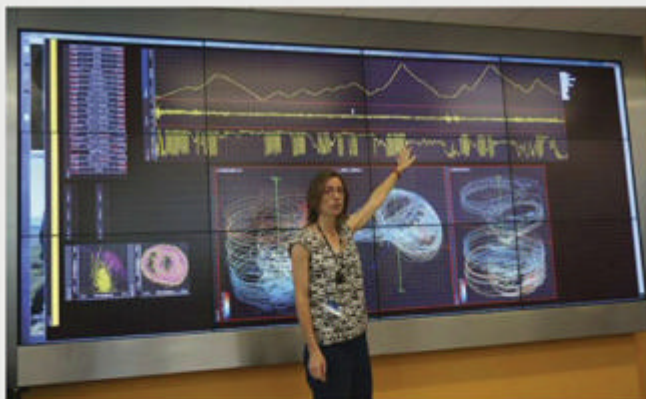
The co-founder of tour operator Wilderness Safaris will lay down a challenge to the tourism community to do more to fund nature's protection.

Other speakers include naturalist Julian Matthews, who will be discussing wildlife tourism in India, and WWF-US's Jeffrey Parrish, who will be explaining the charity's new model for wilderness funding.

Tickets cost £15.00. Visit www.toftigersanniversary.eventbrite.co.uk to book.

Colin Bell is the author of *Africa's Finest*, a book highlighting lodges that make a difference to wildlife.

Bioblitz: Rob Scott; Omani owl: Arnaud B van den Berg; swift: Alan Williams/NPL; Tate Britain rotunda: Helene Binet



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Swansea's Department of Biosciences is where the Animal Diary tag was invented by Professor Rory Wilson (Head of Department, Rolex Laureate and Chief Scientific Consultant on National Geographic's Great Migrations). Other internationally renowned academics include Professor Tariq Butt (bio-control of crops) and Professor Kevin Flynn (ocean acidification, renewable algal energy).

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POLAR BEAR



CHEETAH



ORANGUTAN



BLACK RHINO



TIGER



BUTTERFLY



GORILLA



LION



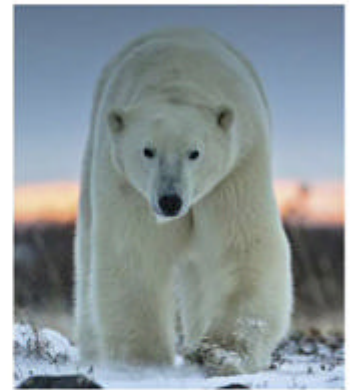
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www.infotour-africa.com

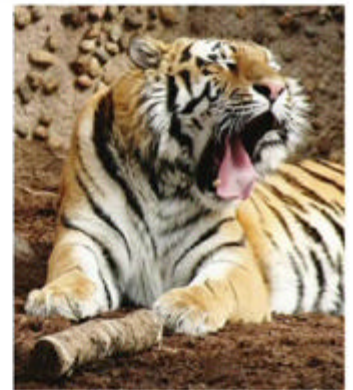
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Credit: Colin Beall

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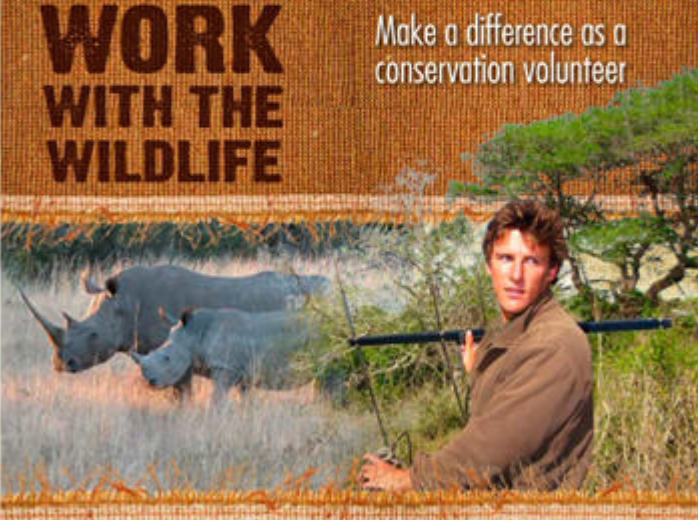
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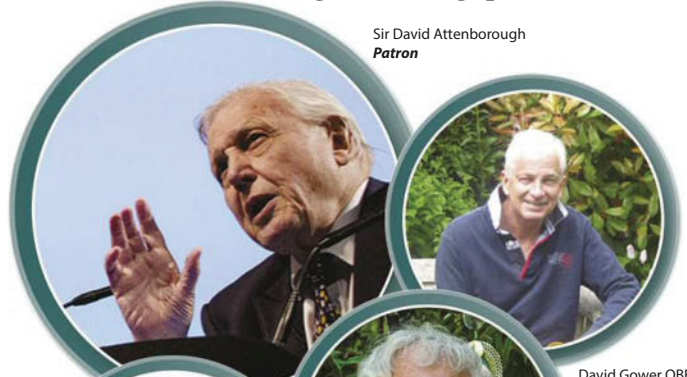
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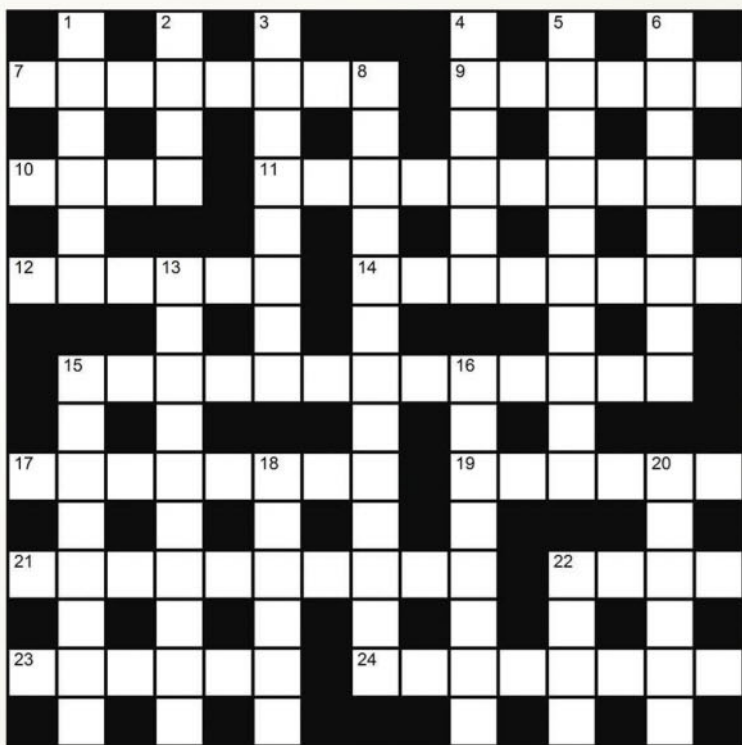
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Compiled by RICHARD SMYTH



Answers in our July issue

APRIL ANSWERS

Across: 1 Pebble, 4 Scops, 9 Jura, 10 Vietnamese, 11 Catkin, 12 Slovenia, 13 Seashells, 15 Onion, 17 Stoop, 19 Broadleaf, 22 Creepers, 24 Musk ox, 26 Hen harrier, 27 Ibis, 28 Otter, 29 Gentle

Down: 1 Plumage, 2 Black, 3 Lavender, 5 Congo, 6 Pimpernel, 7 Weasel, 8 Eskimo, 14 Stonechat, 16 Palm tree, 18 Turkey, 20 Russia, 21 Aconite, 23 Eyrie, 25 Stilt

APRIL PRIZE WINNER:
Don Good Newhall

ACROSS

- 6 Henry David ___ was a 19th-century American nature writer well known for his book *Walden* (7)
- 7 Large, thick-trunked tree with edible fruit; the lemur on p113 is in one (6)
- 9 Insects such as the barred hook-tip, garden tiger and drab looper (5)
- 10 White-flowered plant of the family Fabaceae, used in curry powder (9)
- 11 The arctic fox is the only indigenous land mammal in this island country (7)
- 13 Protective covering of silk spun by an insect larva, such as a caterpillar (6)
- 15 The ___ gull has a distinctive black head in summer (13)
- 19 East ___ is a region of England known for its fens and marshes (6)
- 20 ___ wrack is common brown seaweed found on UK coastlines (7)
- 23 Deadly poisonous fungi of the genus *Amanita* that can be

- found across Europe (5, 4)
- 24 Australian bird also known as the rose-breasted cockatoo (5)
- 26 Small falcon of moorland and heath; also the name of a magician in Arthurian legend (6)
- 27 The Falkland ___ were once home to the extinct wolf known as the warrah (7)

DOWN

- 1 Black waterbird with a white facial shield; belongs to the rail family (4)
- 2 Popular scuba-diving location in the Middle East due to its coral reefs (3, 3)
- 3 Venomous African viper that inflates the upper part of its body and hisses loudly when under threat (4, 5)
- 4 Type of beetles featured in this month's Three Of A Kind on p11 (8)
- 5 Archaic name for a giraffe (10)
- 6 The blue tit is also known as a ___ (6)
- 7 The Northern European poisonous

- plant wolfs ___ has hooded pink or purple flowers; belongs to the buttercup family (4)
- 8 Burrowing lizard that may resemble a small snake with legs (5)
- 12 Big area of tropical wetlands in Florida, home to the snail kite, roseate spoonbill and American alligator (10)
- 14 The ___ monkey gets its name from its prominent fleshy nose (9)
- 16 Huge deer, now extinct, once found throughout Europe (5, 3)
- 17 Bedfordshire town, home to the headquarters of the RSPB (5)
- 18 Genus of flowering plants to which the lady orchid, monkey orchid and Spitzel's orchid belong (6)
- 21 The biggest of all wild sheep; inhabits Asian mountains (6)
- 22 Young deer in its first year (4)
- 25 The ___ crab is a terrestrial crustacean that lives in burrows (4)

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2 VIBRANT DISPLAY

This photo of a male common green forest lizard was taken during the breeding season at Manjulai Tea Estate, Western Ghats, India. The species is usually very shy, but by slowly moving towards the reptile I was able to capture its bright coloration as it tried to attract a mate.
Gladwin John, Tamil Nadu, India



1 CORNISH BLUE

I encountered five blue sharks during an eight-hour boat trip 30km off the coast of Penzance, Cornwall, last summer. The fish were attracted by dead mackerel bait. We had the opportunity to take photos from the side of the vessel and snorkel with the sharks. It was amazing to see the species in British waters.
Nicholas More, Leicestershire

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3 FLIGHTPATH

Seeing a barn owl in the wild has to be the best experience in the English countryside. After spending many weeks getting to know local owls' flight patterns and times, I was finally ready to photograph them in flight. This image was captured from a throw-over hide, and required a lot of patience!
Simon Wantling, Northants

4 SNIPE SPOT

My speculative shot was taken in March at RSPB Old Moor, Barnsley. I followed the snipe until it was camouflaged effectively against the reedbed before taking this picture. Many of my friends have struggled to see the bird in the photo, and I thought *BBC Wildlife* readers would enjoy trying.
Richard Tadman, Huddersfield





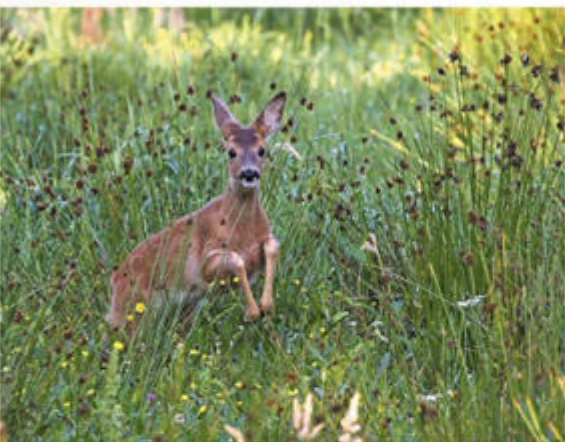
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5 JUMPING FOR JOY

On early summer mornings roe deer and their fawns feed on a common called Gässlingekroken (The Goslings' Fold), Skanör, Sweden. I love to visit it several times a week to see the deer, and sometimes foxes and pine martens. The grazing animals did not notice me as I quietly watched the playful youngsters and took my pictures. I believe that the fawn in this photo is about two months old. *Jan Hillarp, Skanör, Sweden*



6 SUNSET SIGHTING

I live on a sailing boat and travel around the world with my parents. While visiting Moramba Bay, Madagascar, I spotted Coquerel's sifakas in baobab trees. They're my favourite lemur because they are beautiful and I love their expressions. It was magical to photograph the Endangered primate as the sun was setting. *Jonathan Jagot, 14°53.358' S, 47°20.213' E*

Tales from the bush

A WILD WORLD OF
RIPPING YARNS

WHO?



GARETH KETT

was a forest manager in Madagascar from 2004 to 2008. He is now a ranger with the

Loch Lomond and The Trossachs National Park Authority.

WHAT?

FOSA

WHERE?

BETAMPONA, MADAGASCAR



A male fosa climbs a female's chosen 'mating tree', where he will find her high in the canopy.

THE RESCUE OF A LOST TOY SHEEP LED TO THE FIRST RECORDING OF WILD FOSAS MATING IN BETAMPONA.

"Look behind you!" Karen exclaimed as I crept up on a butterfly on the riverside rocks in an attempt to add to Betampona's Lepidoptera list. I spun round in time to see a large, reddish-brown, half-panther/half-dog glide across the rocks and up the steep bank on the opposite side of the river, before bounding effortlessly up the trunk and into the canopy of a huge tree.

Unbelievably it was a large male fosa, a fearsome predator found in Madagascar and nowhere else on Earth. I had often wondered how the animal was able to catch lemurs. I was no longer in any doubt.

Only minutes before, we had been puzzled by low, cat-like murmurings from the canopy while looking for a toy sheep belonging to our three-year-old son Tristan. In 10 years of visiting and working in Betampona Strict Nature Reserve, a 2,200ha primary rainforest fragment in eastern Madagascar, a single footprint was as close as we had ever come to seeing a fosa in the wild. Now we watched the lithe,

graceful animal in wide-eyed amazement, Tristan just as awestruck as we were.

My wife, Karen, directs the research programme for the Madagascar Fauna and Flora Group, and it was during one of her rare breaks from working at the field station in Rendrirendry that we found ourselves face to face with this extraordinary creature.

Despite its cat- or dog-like looks, and the retractable claws, the fosa is closely related to the mongoose. The species also has reversible ankles, pads extending almost to the heel and an extremely long tail to enable its highly arboreal lifestyle.

We heard the sound again. Straining our necks we caught sight of a second fosa, smaller and lighter in colour – a female. Judging from her behaviour, we guessed that she was in oestrus but not quite ready

to mate – the male would have to wait another day or two to get his reward.

The next day Karen was back at work. So, with Tristan in his customary position on my shoulders, I set off back down the rocky 2km path through the degraded palm, wild ginger and bramble vegetation bordering the reserve, into the primary forest until we got to the spot by the river where we'd seen the fosas.

Tristan liked to look for amphibians and reptiles down here, but it wasn't long before we saw the amorous pair again, and this time the female was ready. Mating took place on a branch high up in the canopy, as it apparently always does, and was surprisingly tender and playful for such fierce animals. Not only that, but it was the first time it had been recorded in Betampona. What an experience for us and a three-year-old boy from Scotland.

In years to come, perhaps we won't talk to Tristan about the birds and the bees, but the fosas and the frogs! 🐸

"UNBELIEVABLY IT WAS A LARGE MALE FOSA, A FEARSOME PREDATOR FOUND IN MADAGASCAR AND NOWHERE ELSE ON EARTH."

Do you have a tale that you would like to share? If so, please email a synopsis of your idea to james.fair@immediate.co.uk

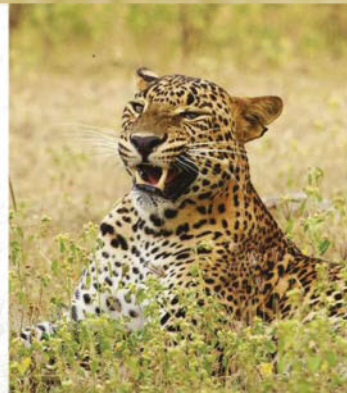


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