

TIMES  
EVOKE

MAKING LIFE EXTINCT

Humans have long had a visceral fear of monsters — which is deeply ironic, because judging by the havoc that we as a species have wreaked on Earth and its inhabitants, there is no more destructive beast than Homo Sapiens.

The figures are shocking — and heart-rending. Since the 16th century, humans have driven at least 680 vertebrate species to extinction. Worse, the pace of catastrophic change is quickening. According to a study by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), about 25% of mammals, more than 40% of amphibian species, and 25% of plant groups are threatened with extinction.

This will not occur at some point in the distant future — it is happening here and now. The bushfires in Australia have wiped out millions of acres of vegetation. Ecologists at the University of Sydney estimate that nearly half a billion animals have been impacted by the fires in New South Wales alone, with millions potentially dead.

Scientific research concludes that there have been five major extinction events in the past, which may have wiped out up to 99% of the species that ever lived. The prospect of a Sixth Extinction is now becoming terrifyingly likely. Unlike the past five extinctions, which were mainly due to volcanic eruptions and asteroid impact, the blame for a sixth one would rest squarely upon human activity.

The foundations of our economies — food security, health and quality of life — all rest on a glorious and complex web of interactions between animals, plants, humans and the environment. Every time the last member of a species perishes, another strand in the web snaps, and we move a step closer to an abrupt, apocalyptic collapse. Having stretched the gossamer-thin ecosystem that binds all living things together to breaking point, it is incumbent upon us to restore it to some semblance of health. If not out of compassion, then at least out of self-preservation. We need to start today. Tomorrow will be too late.

## ‘Climate change warnings went unheeded, now Australia has lost billions of species’

**Christopher Dickman** is Professor of Terrestrial Ecology at the School of Life and Environmental Sciences, the University of Sydney. A Fellow of the Australian Academy of Science, the renowned ecologist estimates that over a billion species of animals and birds have perished in the Australian bushfires. Speaking to *Times Evoke*, Dickman discussed why this number could be even higher, the implications for human beings — and how climate change has brought on this loss:

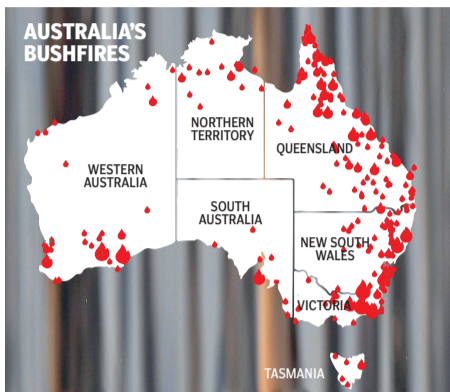
## What are your current estimates of the animal and bird species lost in Australia's fires?

At the moment, the estimate is above one billion — but it will certainly rise well above this. The reason the precise number is uncertain right now is because the data is strongest for the states of New South Wales and Victoria. The density of information we have is the strongest for those states. However, there are larger areas burnt in other states, like Queensland and South Australia. But we don't have the same quality of density information for those areas yet. So, we know that many, many more animals will have been killed by the fires, but the numbers are still an estimate.



Which species have been impacted most seriously?

Several — one is the Long-Footed Potoroo. It's a member of the kangaroo family. It is found in a small area in far south-eastern Australia, in places where the fires have been burning really intensely. There are two other small marsupials that occur in northern New South Wales, on the border with Queensland. One is called the Black-Tailed Antechinus and the other is the Silver-Headed Antechinus. So, that is three marsupial species lost straight away. Several other species have been impacted very badly. Among the birds, the Kangaroo Island Glossy



Black Cockatoo, which occurs only on Kangaroo Island, has suffered the fires. These have also burnt out its habitat. There's another marsupial called the Kangaroo Island Dunnart. Its habitat has been entirely burnt.

The estimates for koalas are around 30% of this marsupial's population being killed in central and northern New South Wales. This assessment is based on studies of suitable habitat, which indicate that more than 80,000 koalas have been lost in these fires. However, these numbers could be much higher if we include the areas burnt in southern New South Wales and Victoria. At the moment, these are the best available estimates.

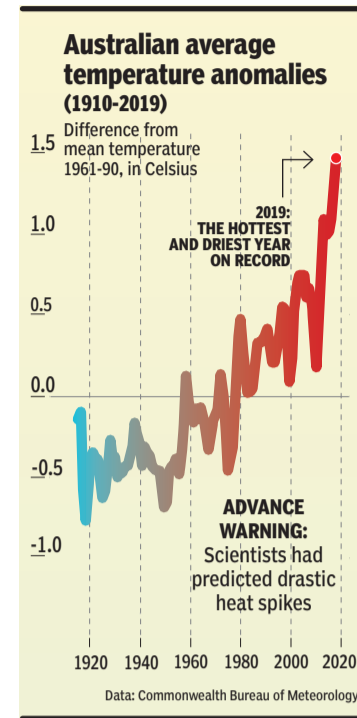
## What about small species and plants?

There are lots of narrow-range plants, with a small geographical range, that have been affected by the fires — some orchid species come in that category. Commercial bees have also been lost as the bee-keeping industry is located on the East Coast and many bee species there have been killed and their food sources destroyed.

I am still working out estimates but the invertebrate numbers lost will certainly be in the hundreds of billions. There is absolutely no doubt.

## How does the loss of such biodiversity impact human beings?

In multiple ways. Many of these potentially lost species were found



only in Australia. So, the loss of these species here means global losses because they occur nowhere else.

This impacts food production as well. For instance, the loss of pollinator species, like the bees, impacts crops. Some of these species are very important as they carry out seed dispersal and spore dispersal. Some contribute to soil health, digging in the top layers of soil and allowing rainwater in. They distribute nutrients and enrich the soil. Losing such species means it's going to be much harder for ecosystems to recover after the fires.

Really important plant species are damaged as well — we're seeing

eucalyptus killed in the most severe fires. Many species, like the koalas, use the eucalyptus forests for their leaves. Other species depend on eucalyptus for its tree hollows, like parrots and cockatoos and the marsupial gliders and possums. With the fires killing large areas of these trees, and the trees falling over, it will be a hundred years before the tree hollows grow again — trees take one hundred years to grow big enough to acquire hollows.

## How is all this devastation linked to climate change?

We have actually known for some time now that through climate change, southern Australia in particular would become hotter and drier. There would be many more extremes, of very hot and very cold weather, with drought and sudden rains.

But in 2019, we had the hottest and driest year on record across all of Australia. A drought began in 2018, which went on through all of 2019. There were also really hot conditions towards the end of 2019, which meant that everywhere was just tinder-dry. Lightning strikes then just allowed the bush to burn really quickly.

Those effects were predicted by several climate change models, including one particular model in 2008, which predicted exactly the drying effect with the increased heat conditions. It even predicted fires of considerable severity would start to be seen in 2020 — that's where we are now.

## How much attention was paid to such warnings of climate change?

Very little. In fact, we had a carbon tax, for instance, that was in place for a short while. The new government removed it. And Australia's emissions went up again from that time.

## ‘Humans will finally find themselves all alone’



**Elizabeth Kolbert** won the Pulitzer Prize in 2015 for her book *The Sixth Extinction: An Unnatural History*. The *New Yorker* magazine journalist spoke to *Times Evoke* about why *The Sixth Extinction* could be the deadliest mass extinction yet, how this could impact human life — and whether women would approach Earth with greater respect than men:

## What are the defining characteristics of 'The Sixth Extinction'?

Very high — much higher than normal — extinction rates of multiple species. In the history of life, people have worked out what the normal extinction rate of species was. It was generally quite low. The defining characteristic of our time is extinction rates across pretty much all groups of organisms are way higher than normal — perhaps up to a thousand times higher.

## How does a mass species extinction affect human life?

We are all products of the natural world — everything we eat literally emerges from photosynthesis. Our very oxygen is produced by the biological world. We are intimately connected with the natural world.

One possibility now is, we rip through different species, saying, oh, we don't need this one or that one — but eventually, we will lose the one we do need, without even realising it. So, that is one reason to be extremely careful.

Another way to look at it is as an ethical issue — what even gives humanity the right to do in all these other species? At some point, if there are humans left to look back at this moment, they will say, we were really arrogant fools.

## Which regions did you find the worst affected?

Well, Australia has been called the extinction

capital of the world. But there's effort there to combat that. However, there's also a lot of business as usual. That's seen globally — there's concern. But there's also continuity of the same things people know are causes of the problem.

In the developing world, one of the most alarming losses of biodiversity is in the tropical rainforests being cut down at a very high rate. Many people in Brazil and Indonesia are working on this. But the trend continues — everyone knows the source of the problem. Very few stop it.

## You write that if such extinction carries on, human beings could enter 'an age of loneliness'?

That's EO Wilson's phrase where he's referring to this idea that humans will recklessly — and we are already doing a good job at eliminating our closest relatives, the great apes — rip through our fellow creatures. We will finally find ourselves alone. And no, we're not going to like the impact of that.

## It's often felt that such degradation comes from a very male approach — would women have managed Earth with greater respect?

That's an interesting question. Sadly, we can't run history backwards, so we can't know for sure. But women do bring a very different perspective. We are also 50% of the population and yes, we need to assert ourselves now.

## ‘We're actually saving ourselves when we save other species from extinction’

Renowned wildlife photographer **Joel Sartore** has spent 25 years creating the National Geographic's Photo Ark, photographing multiple species around the world. His pictures mirror, as Sartore told *Times Evoke*, the terrible threat of extinction many of these species face:

## How does climate change especially aggravate the threat of extinction several species face today?

Millions of species are facing new challenges because of climate change. A very simple example would be the polar bear — they need sea ice to hunt seals, and as that sea ice melts away, they and their babies starve to death.

## Climate change wreaks havoc on species already struggling to survive.

## What is the connection of multiple species with each other and with planet Earth?

Well, we need pollinating insects like bees and butterflies to give us fruits and vegetables. And plants count too — in a big way. We need healthy rainforests both to keep the planet cool and help regulate global rainfall patterns, which enable our crops to dependably grow.

What an impoverished planet ours would be without the other species we share it with. When we save other species, we're actually

saving ourselves — we're all connected. It's folly to think we can doom millions of plant and animal species to extinction but we'll be just fine — it won't work that way.

## What inspired you to work on National Geographic's Photo Ark project?

My wife had cancer years ago and I stayed home to take care of her. During that time, I reflected on what to do if we made it through. Once she had recovered, I decided to focus on one big project, to really try to move the needle of conservation.

I went to the Lincoln Children's Zoo to take photos. I asked the staff if they had a small animal that would hold fairly still — they brought out a Naked mole-rat and put it on a white cutting board from their kitchen. He didn't hold still very well, but I was intrigued by how well I could see his face against the clean white background. That helped me appreciate the animal in a whole new way. That's how Photo Ark started.



**THE LAST OF ITS KIND:** The Bornean Orangutan is on the brink of extinction. The Rabbits' Treefrog (right) is gone

## Have you witnessed the threat of extinction increase for some species?

I would likely never have the opportunity to photograph some endangered species featured in the Photo Ark because certain animals are simply no longer present in the wild. They only exist under human care. There are animals so rare now, I rush to get them photographed.

I've actually photographed animals that have gone extinct, such as the Columbia Basin pygmy rabbit and the Rabbits' fringe-

limbed treefrog. Most animals I photograph have a real impact on me. They're all like children to me because I'm the only voice most will ever have.

One animal that had a huge impact on me was Nabire — one of the last northern white rhinos at the Dvur Kralove Zoo in the Czech Republic. She was the sweetest. She passed away of complications caused by old age, less than two weeks after our visit.

Now the world just has two left, a mother and a daughter.

## WHAT IS A MASS EXTINCTION?

A huge ecological disruption, with the annihilation of multiple species, is called a mass extinction. Apart from external factors (like an asteroid impact), major changes in the carbon cycle can alter the planet's ecology. In the last 540 million years of Earth's life (3.5 billion years), five mass extinctions have destroyed billions of species

| TIME | EXTINCTION     | SPECIES LOST         | LIKELY CAUSE |   |
|------|----------------|----------------------|--------------|---|
| 1    | 444m years ago | Ordovician-Silurian  | 85%          | Intense ice age, falling sea levels               |
| 2    | 383m           | Late Devonian        | 70%          | Volcanic activity, drastic drop in oxygen levels  |
| 3    | 252m           | Permian-Triassic     | 96%          | Intensive volcanic activity at the Siberian Traps |
| 4    | 201m           | Triassic-Jurassic    | 80%          | Increase in greenhouse gases, global warming      |
| 5    | 66m            | Cretaceous-Paleogene | 76%          | Asteroid hit near Mexico's Yucatan Peninsula      |

Also known as the 'Anthropocene defaunation', we are currently at the brink of a sixth mass extinction — and the only one to have been brought on by human beings. The Earth is experiencing the end of multiple species, caused by climate change and unyielding human activity

Research: National Geographic, Harvard Magazine, Scientific American, The Guardian, MIT News

## FRIENDS WE HAVE LOST FOREVER

Climate change, brutal hunting and relentless habitat destruction have taken these beings away from Earth for all time

## THE GOLDEN TOAD

Found once in the cloud forests of northern Costa Rica, this tiny creature, also known as *Iniculus perigenes*, went extinct in 1989. Famed for its glowing skin, the toad reportedly died out as air pollution and climate change impacted rainfall in its habitat. The 1986-87 El Niño phenomenon caused a drought across the region, drying up all the moisture the Golden Toad needed to both burrow and survive.



## PINTA GIANT TORTOISE

Found abundantly in Ecuador, the *Chelonoidis abingdonii* or the giant Galapagos tortoise went extinct in 2012. The large, shy creature is said to have been driven to extinction by increasingly polluted waters, habitat destruction, consumption of plastic waste, hunting and trapping in trawler fishing nets.



## ORANGE UPPERWING MOTH

The vibrantly coloured, lightly speckled *Jodia croceago* moth was once found in abundance across Britain. However, growing industrialisation over meadow and pasture lands, and the use of chemical pesticides drove the species reportedly into extinction by the 2000s.



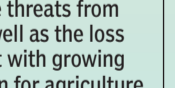
## CHINESE PADDLEFISH

One of the largest fish in the world, the *Psephurus gladius* could grow up to 23 feet in length, swimming in the freshwaters of the Yangtze River in China. However, this remarkable looking species, with a sword-like snout used for scouting the river bed and seeking prey, was driven to extinction by the mid-2000s as its habitat was destroyed by the construction of the Gezhouba Dam, barricading the fish from their only spawning grounds upstream.



## GLAUCOUS MACAW

Once emblazoning the skies of Argentina, Uruguay and Brazil with its beautiful blue plumage, the *Anodorhynchus glaucus* was pushed into extinction by the 1990s. It faced severe threats from hunters as well as the loss of its habitat with growing deforestation for agriculture and cattle farming, human beings persistently cutting down the Yatay palm trees which provided nourishment in the form of nuts eaten by this bird species.



## CATARINA PUFFIN

Abundant in the wetlands of Nuevo Leon, Mexico, the *Megascopus aporus* went extinct in 2012. Its habitat was destroyed by the extraction of groundwater for industry and farming and ecological changes caused by the building of dams and the diversion of streams.



## JAPANESE SEA LION

Once found in the ocean around Japan and Korea, the *Zalophus japonicus* was driven to extinction by the 1980s due to relentless hunting for its skin, internal organs, whiskers and oil.



## WEST AFRICAN BLACK RHINOCEROS

Once abundant across southeast Africa, the grand rhino, also called *Diceros bicornis longipes*, weighed about 1,200 kg and sported two horns. The hunt for these horns, believed to have medicinal properties, led to the species being ground out, finally succumbing to extinction in 2011.



## BISHOP'S OO

The glossy black *Moho bishopi* bird, once found in the forestlands of Hawaii, was famous for its two-note 'took-took' sound which could be heard over miles. Confronted by hunting and the destruction of its forest habitat for commercial building, the Bishop's Oo died out by the 1980s, jazz composer John Zorn apparently naming an album *O'o* after the musical bird.



## JAVA LAPWING

The long-legged *Vanellus macropterus* wading bird, sporting a remarkable plumage, was once found across the marshes and deltas of Java, Sumatra and Timor. Its habitat destroyed due to land clearance for industrial activities, the bird, pursued by hunters, died out by the mid-1900s.

Research: IUCN, National Geographic, Scientific American, Birdlife International, *The Sixth Extinction* (2015) by Elizabeth Kolbert