Global Biodiversity Festival

The Book

“

Fortunately, nature is amazingly resilient:
places we have destroyed, given time and help,
can once again support life, and endangered
species can be given a second chance.
And there is a growing number of people,
especially young people who are aware
of these problems and are fighting for the survival
of our only home, Planet Earth.
We must all join that fight before it is too late.

”

Jane Goodall
PhD, DBE

Founder — The Jane Goodall Institute
UN Messenger of Peace

Foreword

Elizabeth Maruma Mrema

Executive Secretary, Secretariat of the Convention on Biological Diversity

cbd.int

The International Day for Biological Diversity gives us the chance to celebrate the incredible variety of life on Earth, to appreciate nature's innumerable contributions to our everyday lives and to reflect on how it connects us all.

This year's theme 'Our solutions are in nature' highlights that biodiversity remains the answer to sustainable development challenges. From nature-based solutions to climate change, food, water security and sustainable livelihood, biodiversity remains the basis for a sustainable future.

The COVID-19 pandemic serves as a blatant reminder that we need urgent, sweeping international cooperation to preserve nature, conserve biodiversity and protect human health for generations to come. Communities are facing the danger of even more unprecedented negative, economic, social and human consequences if we do not act now and adopt a way of life in balance with nature.

Biodiversity loss is a direct result of short-sighted human activities, including uncontrolled mining and infrastructure development, unsustainable farming and deforestation. All these have degraded ecosystems and have created the conditions that lead to events like pandemics.

We all need to take urgent actions to build a resilient and sustainable global economy that incorporates nature at its heart, even as we build back from the crisis. Millions of jobs in sectors such as forestry, fisheries, agriculture, tourism and pharmaceuticals are heavily dependent on nature. Recovery plans that build a transition to biodiversity-friendly economies will create more jobs and provide decent livelihoods.

GLOBAL BIODIVERSITY FESTIVAL

About one billion people live in extreme poverty in rural areas. Their household income is based on ecosystems and natural goods that make up between 50% and 90% of the so-called GDP of the poor. Governments should use the occasion of comprehensive recovery plans to build economies founded on the conservation and sustainable use of nature in the equitable sharing of its benefits. This will help all, including the most vulnerable.

We need the world to continue to work towards an ambitious and effective post-2020 global biodiversity framework to be agreed at our next Conference of the Parties. This framework can contribute to increasing nature's benefits for the people. The results will be extensive, including improved global nutrition and access to drinking water, resilience to natural disasters and nature-based solutions to achieve the Paris Agreement on climate change.

All of this is integral to the Sustainable Development Goals, which risk being undermined as the result of the pandemic. This pandemic has shown in clear terms that international cooperation is paramount for the health of our nature, our economies and our people.

"Let us work together and support solutions that are in nature."

Foreword

Sylvia Earle
President and Chairman
of Mission Blue

mission-blue.org

When speaking about biodiversity, the action is mostly in the ocean.

The ocean contains most of the water and 99% of the biosphere. No wonder it is where the greatest biodiversity is. As a terrestrial species, we have explored most of the land and have yet to explore most of the ocean.

Based on our current knowledge, more species have been described from land. But I think the jury is still out on how many species are where on Earth. Considering how much we do not know about the ocean, I place the odds on the ocean ultimately being where the action truly is. We do know that the major divisions of life are all out there, either in current existing form or in the fossil record, and that only about half of them have representation on the land in any form.

The ocean makes all the rest of life on Earth possible. If you take it away, we are left with an unfriendly, inhospitable place for life as we know it.

We haven't done a good job of calculating the loss of life in the sea and are much better equipped to look at the loss of biodiversity on land. But let's not forget, as we take action to try and protect what remains of the wild on land, that we could be the last generation to be able to save species we know and care about, to embrace the diversity of life with sufficient care to ensure that we have the ingredients for resilience on the planet.

When we see the devastation caused in vibrant, diverse ecosystems such as coral reefs, kelp forests or even sandy places, we don't know what we have lost because we have not yet explored it all. But knowing the biodiversity and the endemism within coral reefs globally, we need to catch a breath and think: why are we letting this happen? On our watch, in our time?

GLOBAL BIODIVERSITY FESTIVAL

This year in particular, deep sea mining and the high seas are critical issues. Decisions will be made about biodiversity in the high seas. Let's take this moment in time and be really thoughtful about scaling up protection, putting a 10-year moratorium on extracting minerals from the high seas while we figure out what is really down there. It could be that the greatest thing that we extract from the ocean is life itself!

"We need to give back to the ocean and take care of the natural world, land and sea, wherever it is, as if our lives depended on it. Because they do."

Speakers

In order of appearance at the Global Biodiversity Festival

Madagascar Bright-eyed Frog (*Boophis pyrrhus*).

Welcome to a unique global snapshot of our planet.

In three days, 68 scientists, explorers, conservationists and filmmakers working on the front line of conservation presented their work to an audience of thousands joining us from 80 countries. This was the Global Biodiversity Festival 2020.

Each presenter is featured here with background on their work and a personal perspective – a 'view from here' helping us all to understand, support and celebrate these vital efforts.

The talks are available free online via globalbiofest.com

This book is also available as a free PDF download on paulrose.org

Amy Dickman

Founder and Director of
Ruaha Carnivore Project,
National Geographic Explorer

Cats, Cows and Camera-traps: Community Conservation in Tanzania

Ruaha Carnivore Project works to reduce human-wildlife conflict and empower local communities through conservation. Our aim is to protect lions by engaging remote tribal communities, and to build a better future for both people and big cats.

People are so aware now of the issues facing the world, including climate change, biodiversity loss, poverty and social injustice, among many others. It can be easy to feel overwhelmed and helpless, as if nothing you do will make a difference. I think most people feel this way, particularly in many developing countries where these problems are often most acute. One of the biggest challenges is to come together, achieve voice and power, and recognize that individual actions are extremely important in creating a better future. Events like the Global Biodiversity Festival add to that voice by highlighting to a worldwide audience the importance of the fantastic diversity which exists on this planet. We can all help change perceptions about wildlife and the benefits it brings to communities, if we are well informed and work together to put relationships and local people at the heart of what we do.

Lion defender.
© Ruaha Carnivore Project

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Felix Lankester

Professor at Paul G. Allen School for Global Animal Health, Washington State University.
Director of Rabies Free Tanzania and the Serengeti Health Initiative

Wildlife Disease: A Serengeti Case Study

Infectious diseases have an impact on wildlife, and on public and domestic animal health, with consequences on welfare, economic systems and conservation. In my talk I describe the impact that rabies has had in recent years on endangered carnivores in the Serengeti ecosystem and the research efforts that have led to the local elimination of this lethal disease.

As areas of wilderness become fragmented by human activity and contact between wildlife species and humans and their animals increases, the likelihood of transmission of pathogens rises. Enhanced surveillance is required to provide rapid detection of new disease outbreaks. As the world becomes increasingly interconnected, a One Health approach, in which ecosystem health, public health and animal health are viewed through a single lens, will be essential, if we are to protect vulnerable ecosystems and populations from infectious disease.

Vaccinating a dog against rabies.
© Felix Lankester

Rabid domestic dog attacks a lion in Serengeti.
© Ingela Jansson

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João Vitor Campos-Silva

Conservationist,
Norwegian University of
Earth Sciences (NMBU),
Rolex Awards Laureate

Community-based Conservation of Amazonian Megafauna

Since 2008 I have been working on biodiversity conservation, sustainable-use protected areas and community-based arrangements in Amazonia. In my talk I show two impressive community-based conservation arrangements that have been strongly contributing to the conservation of biodiversity and well-being of indigenous and local communities in Brazilian Amazonia.

Anthropogenic factors have been transforming and degrading natural landscapes worldwide. The rapid disruption of natural environments is propelled by ascending levels of human dominance, related to hunting, fishing, shifting cultivation, permanent agriculture, industrial logging and fragmentation. This scenario launches contemporary society in a herculean challenge to create a new paradigm, conciliating biodiversity conservation and human needs. This is even more imperative in tropical developing countries that host huge biodiversity, but also large social problems, including inequality and poverty.

To achieve a safer, fairer and greener world, we need to move from a doom and gloom narrative to a hope paradigm. In this context, the Global Biodiversity Festival was an astonishing event that brought together in the same package a myriad of conservation subjects. By putting in the spotlight the breathtaking beauty of global biodiversity and positive stories showing that conservation and human needs can be aligned, the festival has helped to create optimism, which is fundamental to keep engagement and commitment on the front line.

Holding an average-sized arapaima of about 60 kg. These fish weigh up to 200 kg.
© Rolex / Marc Latzel

INSTITUTO JURUÁ

institutojurua.org.br

Asha de Vos

Marine biologist
and ocean educator.
Founder of Oceanswell,
Pew Marine Fellow, National
Geographic Explorer,
TED Senior Fellow

The Secret Lives of Sri Lanka's Giants

As Sri Lanka's first marine conservation research and education organization, Oceanswell is home to the well-known Sri Lankan Blue Whale Project, the first long-term study on blue whales in the northern Indian Ocean region.

"Oceanswell works to change the trajectory for the world's oceans by educating the next generation of diverse ocean heroes, equipping students from underrepresented nations to conduct marine conservation research, and engaging everybody in conversations about the magic of our world's oceans.

"If we truly want to save our oceans, every coastline needs a local hero."

If we acknowledged that working anywhere other than our own home country is a privilege and not a right, and if we all looked to learn and share equally and were equally equipped to do research based on the needs on the ground, then we would be better off than we are right now. Seventy percent of our coastlines are in the developing world, but representation at the global stage is disproportional. The harsh truth is, if we aren't being inclusive and equitable, we aren't going to move the needle on the things that really matter, the things that are integral to our very existence, and we will continue to fail."

de Vos, A. 2020. The problem with 'colonial science', Scientific American.

Oceanswell
Oceans for all, forever

oceanswell.org

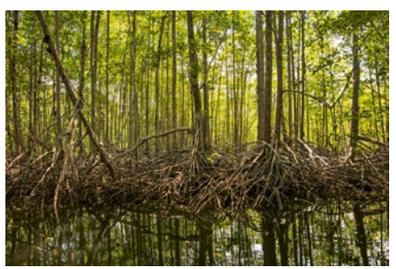
Daisy Hessenberger

Nature-based Solutions Programme Officer, IUCN

Nature-based Solutions for the Next Generation - How Can You Help?

We face an array of societal challenges, which in the past we have tried to solve in a way that has led to worldwide biodiversity and climate crises, increased inequalities and global human vulnerability. Truly sustainable solutions are nature-based. The IUCN defines nature-based solutions as actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

To ensure that these vital solutions reach their full potential I have been focusing on preparing the Global Standard for nature-based solutions by engaging young people in a global collaborative effort. My current aim is not necessarily to 'get everyone on the same page' about nature-based solutions, but rather to write that page together. We have an opportunity right now, to redefine our relationship with nature. For this to happen, for us to realize a sustainable future, we need everyone to take action.



Mangroves are a perfect nature-based solution investment. Costa Rica mangroves. © Enric Sala

Galapagos mangroves. © Enric Sala

IUCN

iucn.org

Richard Kock

Wildlife veterinary ecologist, infectious disease researcher and conservationist

COVID-19 and Biodiversity

Biodiversity is a big word and most people don't really understand it, beyond what can be found in the information plaques at the zoo. This is the tragedy of humanity and reflects our ignorance of our own world. I have worked in the field of health and biodiversity, as a veterinary scientist and conservationist for over 40 years, and in the last 20 I have focused on promoting One Health or Ecohealth or Planetary Health – take your pick. What I know is that disease is not accidental, it has a cause and, in some ways a purpose. It reminds us of our mortality, and how small we truly are in the biological world.

Richard Kock examining a buffalo in his work on the eradication of rinderpest from Africa which was confirmed in 2011. This virus was a pandemic virus that caused untold hardship to both people and animals including death in wildlife populations. Its elimination was a boost to species survival with enough to contend with from persecution from human species and habitat destruction. © Gala Adichari

Indeed biodiversity includes all things, from the microbes to the whales. And we are foolishly calling our enemy SARS-CoV-2! It is just a virus and its presence is more about us than it is about nature. Events like this are teaching even the most arrogant amongst us and the most developed and technologically advanced that we need to respect our biodiversity, nurture it and degrade it at our peril. The one certainty about COVID-19 is that it is, in one way or another, a direct result of human activity and actions and not a spontaneous thing. I hope also that the conservation community will move on from being obsessed with a few species, to really understanding the whole, including microbes, and focusing on reintegrating nature back into human landscapes far beyond our present dependence on protected areas and national parks. Wonderful though these areas are for our health and well-being, they are too inadequate to stop a crisis in the all-too-present time. The urgency now is to restore whole ecosystems, bring stability back into the biological world, so that evolution can continue to produce the wonder of life that we have inherited but are fast losing.

RVC Royal Veterinary College University of London

rvc.ac.uk

Iris Berger recording data during her 500-km Sumatra Megatransect expedition, in 2016. The tangled montane forests meant that the team would sometimes walk for 12 hours and cover no more than two kilometers. © Oli Broadhead

Our team in March 2020, wearing face masks while working amongst, yet socially distanced from, wild chimpanzees (standard protocol to prevent transmission of readily exchanged viruses/diseases with our great ape relatives), and substantially distanced such that, as the only individuals within this massive forest, we were oblivious to the international pandemic spreading. © Peter Houlihan

Paul Rose

Paul Rose reporting from the submarine on Pristine Seas Clipperton Atoll expedition. © Dave McAloney

Rodrigo Medellin

Senior Professor of Ecology
at the Institute of Ecology,
University of Mexico.
Founding Director of
the Latin American Network
for Bat Conservation.
Co-Chair of the Bat Specialist
Group of IUCN.
National Geographic Explorer,
Rolex Awards Laureate

Do Not Be Deceived: Bats in Real Life Are Your True Friends

Having worked on the ecology and conservation of bats for over 40 years, I can assure you that bats are not to blame for the current pandemic. Instead, they provide crucial services and benefits to us and to ecosystem functioning. Let's celebrate bats!

We are at an unprecedented crossroads. On the one hand, we know more about the world now than ever before in human history. On the other, we face unparalleled circumstances in which the world is launching a message, loud and clear, that we must heed: take care of your world, establish a new harmonic, congruent, respectful relationship with nature. The future of humanity and the world itself is at stake. I invite you to celebrate and appreciate biodiversity, the plants and animals we share the planet with and which provide countless benefits, products and services to us and to each ecosystem on Earth.

> "Unsung heroes such as bats are responsible for your cotton clothes, your coffee, your corn chips, your rice: they protect these and many other crops from insect pests!"

Unsung heroes such as bats are responsible for your cotton clothes, your coffee, your corn chips, your rice: they protect these and many other crops from insect pests! If you have tropical fruits like sapodilla, pitaya, white zapote, or even tropical plums and capulin cherries, you have the bats to thank for the dispersal of the seeds of these and hundreds of other plants! And of course, this evening toast bats with a silky, aromatic, tequila or mezcal, given that they are responsible for the pollination of agaves, the source plant. The table is set!

INSTITUTO DE ECOLOGIA UNAM

web.ecologia.unam.mx/medellin

Carl Gustaf Lundin

Principal Scientist,
Global Marine and Polar
Programme (GMPP), IUCN

Wonders of Marine Biodiversity

In my presentation, I tell the story of my own love for the ocean and my journey of discovery, growing up in marine biological stations. I give a sense of the many forms of marine biodiversity around the globe, with a special emphasis on coral reefs and polar regions. I explain why the oceans are home to much more diverse organisms than the terrestrial areas due to a much longer period of evolution in the sea. I talk about how climate shifts are impacting nature and give some examples from areas that I have recently visited like Indonesia and Antarctica. In particular, I talk about how much of the excess heat from our burning of fossil fuels is ending up in the ocean and that is having significant effects in many places. I also discuss how marine protected areas can help protect the ocean and what IUCN is doing to help expand the network to 30% of the whole ocean by 2030. I end by encouraging young people who are looking for a new career to consider exploring and taking care of the ocean.

Mangrove forest in Western Papua.
© Carl Gustaf Lundin

Triton Bay walking shark.
© Carl Gustaf Lundin

IUCN

iucn.org/theme/marine-and-polar

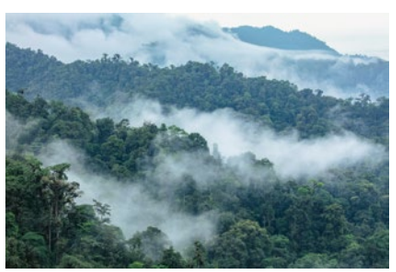
Peter Houlihan

Technical Lead,
Rainforest XPRIZE.
Adjunct Professor,
Johns Hopkins University.
Senior Research Fellow, UCLA
Center for Tropical Research.
National Geographic Explorer
and Photographer

Rainforest Conservation in the 21st Century: The $10 Million Rainforest XPRIZE

A tropical ecologist and conservation scientist by training, I plan and lead expeditions into understudied and threatened rainforests all over the world for conservation, regularly operating in more than 20 countries across Africa, the Americas, and Asia. I have lived and worked extensively throughout the tropics, where I have led nearly 50 large-scale expeditions and managed long-term conservation programmes, particularly in Borneo, Madagascar, the Amazon, Central America, and the Congo Basin. My passion is about working with local scientists and communities, and inspiring others to learn about our natural world.

The $10 Million Rainforest XPRIZE is a global, five-year competition challenging innovators to develop novel technologies to rapidly and comprehensively survey rainforest biodiversity and use data to deliver new insights that promote the health and conservation of this vital ecosystem. An improved understanding of these ecosystems will support the sustainable use and well-being of standing rainforests and their inhabitants, leading to new scientific discoveries, technological innovations, and to just and sustainable bioeconomies. Register or join a team today!



Peter Houlihan climbing a tree on Coiba Island. © Ken Pelletier

Ecuador. © Peter Houlihan

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Rachel Butler Scott

BBC Natural History Unit

Filming in Our Blue Planet

Travelling the world to reveal little-known animal behaviours, I have recently contributed to BBC Series – *Shark, Blue Planet 2* and *IMAX: Oceans* and am currently exploring the Arctic for *Frozen Planet 2*. From behind-the-lens we bring back a unique perspective into the lives of extraordinary animals and intricate ecosystems.

"Now more than ever I appreciate the wonderful diversity of our oceans and the stories we have been able to bring to people's screens over the years."

Now more than ever I appreciate the wonderful diversity of our oceans and the stories we have been able to bring to people's screens over the years. I hope we have all been able to connect with our natural world a little more during lockdown and can return to normal life with renewed stewardship and respect for our precious planet.

Minke whale. © Huw Griffiths

Sea ice, Antarctica. © Huw Griffiths

bbcearth.com/oceans

John Scanlon AO

Special Envoy African Parks.
Special Adviser and Acting
CEO, Elephant Protection
Initiative Foundation

Time has Come for Bold Changes to Wildlife Trade and Wildlife Crime Laws

International wildlife trade laws (CITES) do not take into account the public health risks of wildlife trade and are generally directed towards avoiding over-exploitation. Wildlife crime is shifting thousands of tonnes of contraband, worth billions of dollars, and leaving death, destruction and instability in its wake, yet there is no global legal agreement on wildlife crime.

The COVID-19 pandemic reminds us in a devastating way of the interconnected nature of things, between economies, the environment, human and wildlife health and welfare. Our international laws, programmes and funds do not yet reflect this reality, which is also largely the case at the national level. The most likely explanation for COVID-19 is that the virus jumped from bats to humans, perhaps via another animal such as a pangolin, at a wet market in Wuhan. While no firm conclusions can yet be drawn, the links between wildlife and previous epidemics and pandemics are well known, as are the conditions that make spillover from animals to humans more likely.

The risks are real, and the stakes are high. Risks to public health through wildlife-related zoonotic diseases can come from unregulated, regulated, and illegal wildlife trade. We need to draw on experts to identify the wildlife markets, trade and consumption that pose a health risk.

The international regime for regulating wildlife trade and combating wildlife crime is inadequate for regulating wildlife trade, markets and consumption that pose a risk to public health, as well as for ending wildlife crime. Left as it is our system is not going to prevent the next pandemic. It could, in fact, be raising our potential exposure to zoonotic diseases.

© Peter Houlihan

africanparks.org
endwildlifecrime.org

Rolph Payet

Executive Secretary for
the Basel, Rotterdam and
Stockholm Convention
in the United Nations,
former Minister of Environment
and Energy in the Seychelles

Making the Invisible Visible

Rolph Payet, born in the remote archipelago of the Seychelles, has been passionate about the oceans and the environment since in primary school, when he first heard about the declining populations of sea turtles in his homeland and globally. He went on to become a strong advocate for the protection of turtles, including contributing to the establishment of the Seychelles' largest marine protected area, equivalent to 30% of the archipelago's vast EEZ.

Rolph has always been fascinated by the delicate balance of nature and how ecological cycles are critical for human survival on our planet. Understanding how our planet works, and how different cycles can be affected by human intervention is a vital tool for change in human behaviour and responsibility.

> "Recycling needs to start now, and begin in our homes, our schools and in our communities."

As Executive Secretary for the Basel, Rotterdam and Stockholm Convention in the United Nations, he is keen to share the linkages between human consumption and waste, and how a human approach to the life cycle of products can present the solution to some of our largest planetary challenges – such as the global plastic crisis in the oceans.

brsmeas.org

Barely 5000 black rhinos remain in the wild. Many end their lives like this bull in South Africa's Hluhluwe Imfolozi Park, shot dead by poachers who hacked off his horns and fled during the night.

Mariasole Bianco

President of Worldrise,
Vice Chair IUCN WCPA Young Professionals

The Future of the Ocean

Our planet is changing and humankind is at a crossroads. The importance of caring for nature has never been greater – the challenges ahead are bigger than anything we have faced before. Now more than ever it is our responsibility and obligation to take the bold and transformative steps which are urgently needed to catalyse the appreciation and conservation of nature.

Our mission with Worldrise is to invest in youth and young leaders who have the potential to advance the future of conservation, give back as global citizens, rise to the challenges of their generation and facilitate large-scale behavioural change.

It is not too late to turn the tide and protect and restore the natural world, together across all generations and sectors of society we share the responsibility to make the right choices in this crucial time because they will determine the future of our planet for centuries to come.

Beach cleaning with a message. Building awareness about plastic pollution in the sailing school of Saint-Tropez. ©Worldrise

mariasolebianco.com
worldrise.org

Joe Smith

Director,
Royal Geographical Society

How to Stay Safe and Enjoy Your Stay on Campsite Earth

After having spent 25 years writing about environmental history, policy and politics at the University of Cambridge and the Open University, I am now Director of the Royal Geographical Society. My talk charts the past, present and future of environmental ideas and actions, and argues that if we make the most of our best characteristics – of creativity, generosity and determination – then this could be humanity's best century yet.

Rather than thinking of these in terms of environmentalism trying to put together a driving manual for 'Spaceship Earth', we might be better off thinking in terms of the need to work together to build a practical guide to setting up a temporary campsite here. Campers on vacation or expedition tend to know the code: this is a place you pass through, leaving little trace. If everyone follows a few simple rules you can expect to pick up treasured memories during your necessarily time-limited stay on campsite Earth. But to make this humanity's best century yet we must stop talking about surviving and focus instead on us, and our fellow species thriving!

> "If we make the most of our best characteristics – of creativity, generosity and determination – then this could be humanity's best century yet."

rgs.org
Director@rgs.org

Nachamada Geoffrey

Landscape Director for WCS at Yankari Game Reserve, Finalist of the Tusk Award for Conservation in Africa, 2017

Saving Nigeria's Largest Elephant Population

The Wildlife Conservation Society (WCS) has supported the conservation of Yankari since 2009 by establishing good working relationships with local communities, developed essential partnerships with key government agencies, and gained a thorough understanding of the local ecology, and the political and legal landscape. Our work in Yankari – one of only two sites with lions and other wildlife remaining in Nigeria – has focused on helping both the surrounding communities and the state government to protect the largest remaining elephant population in the country. In 2014 WCS signed a co-management agreement with Bauchi State Government and since then levels of protection have improved dramatically. Prior to 2014, an average of 20 elephants were killed each year for their ivory. Thankfully, zero elephant poaching has been recorded since May 2015 due to the sustained efforts of WCS and the Yankari rangers; it is likely that elephants would be locally extinct in Yankari now if not for the timely intervention of WCS. Our approach is holistic, involving dialogue with different groups from the surrounding communities to understand their problems from their perspective, in addition to establishing a properly trained and motivated ranger force providing constant anti-poaching patrols.

Nachamada Geoffrey, Andrew and rangers.
© Wildlife Conservation Society/Natalie Ingle

Yankari elephants.
© Wildlife Conservation Society/Musa Ahmad

Wildlife Conservation Society

nigeria.wcs.org

Dominique Gonçalves

Manager of Elephant Ecology Project, National Geographic Explorer

Gorongosa Map of Life

My work focuses on elephant conservation in Gorongosa National Park in Mozambique.

To protect biodiversity and ecosystems, we need more than to just secure the integrity of the boundaries of the landscape. We need to know what we have, to see the value of comprehensive biodiversity knowledge and to create a detailed picture of life for the management and protection of biodiversity. It is important to have local champions of biodiversity, local champions who look at everything regardless of size and role in the ecosystem, simply because everything is interconnected.

The training and support of a new generation of local Mozambican biodiversity specialists, researchers and conservationists is of outmost importance, because they are the ones who will make sure biodiversity survives. Working in partnership with communities to jointly implement solutions to our challenges, helping break the cycle of poverty and protect the biodiversity and ecosystems on which we all depend for a safe and healthy future, are vital steps towards a better future.

Dominique Gonçalves and Mércia collect fresh dung samples to analyse diet from an immobilised elephant during a GPS collaring operation in Gorongosa National Park, Mozambique.
© Charlie Hamilton-James

PARQUE NACIONAL DA GORONGOSA

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Elephant caressing baby.
© Carlton Ward

Rosamira Guillen

Co-founder and Executive Director of Fundación Proyecto Titi, National Geographic Explorer

Proyecto Titi: Securing a Future for a Critically Endangered Little Primate

Cotton-top tamarins are one-pound monkeys, only found in the tropical forests of northwest Colombia in South America. They are severely threatened by deforestation and the illegal pet trade of wildlife species. Trained as a landscape architect, I fell in love with cotton-tops when I first saw them while remodeling the zoo in my hometown. Knowing they were only found in my country, and not too many people knew about how special they were, motivated me to do something about it. I joined Proyecto Titi 16 years ago and made it my mission to secure a future for these cute crazy-haired little primates. Proyecto Titi combines field research and forest protection and restoration with environmental education and community development, to reduce the use and exploitation of forest resources for subsistence by local communities.

Proyecto Titi plush toy artisans.
© Mia Kennel

When you work in conservation, it is easy to get discouraged by the many challenges we all face to secure a long-term future for all these amazing creatures and places, and even for ourselves. Even though we are aware that our conservation work surely contributes to a better world, sometimes we wonder about the scale and impact of our actions from our little corners of the world. But then you look out, and you discover a lot of amazing individuals and organizations doing the same from their own little corners of the world. And you realize that you are just one of the many pieces of a large conservation puzzle coming together to protect life on this planet.

As we connect with each other we are becoming stronger. Then the view from here looks better, it looks hopeful, promising and encouraging, thanks to all the amazing conservationists out there protecting our wildlife and our wild places.

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Philippe and Ashlan Cousteau

Explorers, filmmakers and ardent advocates for the ocean

EarthEcho International

Our ocean is responsible for every second breath we take, it regulates our climate and feeds billions of people. The ocean and coastal zones provide critical habitat for 700,000 – 1 million species, not including the millions of microorganisms, and up to 2,000 new species that are described annually. Despite its vital importance to all life on Earth, humanity continues to actively contribute to its destruction. From disappearing coral reefs, catastrophic pollution and collapsing fisheries to disastrous changes in chemistry and temperature that threaten life on Earth as we know it, there seems to be an endless laundry list of bad news.

Ashlan and Philippe Jr working with kids.
© EarthEcho International

However, the good news is that solutions exist and nature has a remarkable ability to renew itself if we give it a chance. This recognition has led to urgent calls to protect 30% of the ocean by 2030 in order to stop the global decline in biodiversity that is advancing rapidly. In support of this goal, Philippe and Ashlan Cousteau are building a youth movement for the ocean that can foster the kind of social and cultural change needed to enable urgent global action. They are focused on building that movement through their non-profit EarthEcho International as well as creating documentaries, books, social impact businesses and more.

earthecho.org

Anne Pringle

Mary Herman Rubinstein Professor of Botany and Bacteriology, University of Wisconsin–Madison. National Geographic Explorer

Are Lichens Organisms?

For more than a decade I have been collecting data on lichens growing in a New England cemetery. Over the years I have watched individuals fragment, grow back, and reproduce. Lichens are complex symbioses of fungi, algae, and bacteria. Working with a team of physicists, I have explored the physics of air moving over lichen bodies and generated a formal theory to explain lichen behavior. I have developed strong ideas about the 'organismality' of these fascinating, diverse creatures. Are lichens organisms? Yes.

Most species of fungi are undescribed, and many undescribed fungi are known only from the DNA sequence data generated from habitats and samples ranging from the familiar (soil and leaves) to mundane and bizarre (shower curtains and sloth fur). Undescribed species are difficult to protect. While I race to collect basic natural history data, different questions are more or less constantly in my mind. How should we count or even think about lichens and fungi? Lichens may be organisms, but lichens are also ecosystems. And so what is lichen conservation? How do we protect a DNA sequence? The conversation seems very different from conversations about lions or whales, but is it? I don't have clear answers to my questions. Discovering the undiscovered is a privilege. I care about my work and I know it is important. I also know that practically, my questions need answers, and we need answers sooner rather than later, because the world has changed and continues to change. A key to effective conservation is to explain what we are protecting.

Chicken Fungus. © Anne Pringle

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Jonathan Kolby

National Geographic Explorer, Conservation Director of the Honduras Amphibian Rescue and Conservation Center

Hope in the Midst of the Amphibian Extinction Crisis

In my presentation, I talk about my work in the cloud forest of Cusuco National Park, where I have been studying frogs and helping to protect them for the past 15 years.

In a world rapidly changing and becoming more globally connected with each passing day, diseases previously locked into discreet areas are being catapulted around the globe faster than they can be described by science. In my work, I have been studying how the spread of emerging diseases through the wildlife trade may become the greatest long-term conservation challenge in modern times. This is because diseases such as the amphibian chytrid fungus which is now fueling a global amphibian extinction crisis, can no longer be controlled even if the habitat is protected from destruction. Normally, habitat protection is the key to protecting species from extinction, but this no longer holds true. Hundreds of species are already at risk of extinction due to chytrid fungus, and this is just the first pandemic threatening global biodiversity. Combining my fieldwork, applied conservation, and science communication, I hope to show how closely the health of people, animals, and the environment are all connected. By improving these relationships, we can protect a healthier future for the planet, and I'm starting with the frogs.

Exquisite Spike-thumb Frog (*Plectrohyla exquisita*), critically endangered and endemic to Cusuco National Park, Honduras. ©Jonathan E. Kolby

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frogrescue.com

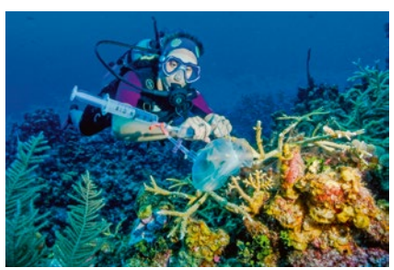
Emma Camp

Marine biologist, University of Technology Sydney.
United Nations Young Leader for the Sustainable Development Goals, National Geographic Explorer, Rolex Associate Laureate

Valuing Extreme Corals for the Future of Reefs

An advocate for the world's marine life and ocean explorer, I have discovered natural populations of super tolerant corals, which I research to better understand how corals may survive into the future.

Coral reefs are one of the most biodiverse ecosystems on the planet; covering less than 1% of the ocean floor, they house over 25% of marine biodiversity. Coral reefs can also be considered a 'canary in the coal mine' – providing us with an early warning sign when we are detrimentally impacting the chemistry, biology and ecology of the Earth. Global degradation of coral reefs and loss of their biodiversity is a sign from mother nature of the larger impacts that we as humans are having on nature. Importantly, it is not too late to right the damage that has been caused, but time is critical. The decisions we make now, and how quickly we act on issues like reliance on fossil fuels and habitat degradation, will determine not only the future for habitats like coral reefs, but also our very survival as a human race. Our health and well-being are inextricably linked to the health of the environment and my hope is that people can reconnect with nature to re-establish this inseparable link. I hope that my work can contribute to some of the solutions required to conserve coral reefs, but more importantly, I hope to inspire current and future generations to lead the charge in environmental protection. I remain an Ocean Optimist, because our underwater world is too important to give up on!



Working underwater. © Michiel Neethling

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Enric Sala

Marine ecologist,
National Geographic
Explorer-in-Residence

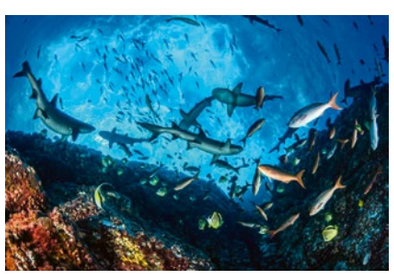
Why We Need a Wild Ocean

Ocean life makes it possible for us to survive on Earth, but because of our over-exploitation and global warming, we have been destroying the ability of the ocean to provide for us. The good news is that if we give the ocean space, it can recover spectacularly, restore all the essential services we need and benefit people living off it.

"We can bring the richness of the ocean back with protected areas."

The ocean has become less wild because of our relentless pressure. Two thirds of the fish populations that people eat are overfished, 9% of the large fish are gone, coral reefs are dying because of ocean warming, and salt marshes are drowning, incapable to cope with sea level rise. But we can bring the richness of the ocean back with protected areas where fishing and other extractive activities are banned. Marine life recovers spectacularly within them, alongside all the benefits it provides for our well-being. We need an ocean to be able to produce the food we need to eat, the oxygen we breathe, and a stable climate. The ocean provides all of these – and more – for free, but we cannot recreate them. For the sake of all life on our planet, we need a wild ocean.

Pitcairn Islands. © Enric Sala



Roca Partida. © Enric Sala

NATIONAL GEOGRAPHIC
PRISTINE SEAS

pristineseas.org

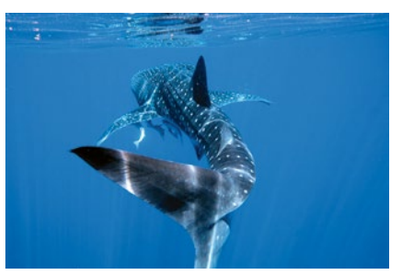
Brad Norman

Research Fellow, Murdoch University.
Lead Scientist, ECOCEAN Inc.
Collaborating Scientist, The University of Queensland.
Adjunct Associate Professor, University of Western Australia.
Rolex Awards Laureate

Whale Sharks: Biggest Fish in the Sea Inspires Respect for Our Oceans

Whale sharks are truly magnificent. The biggest fish in the sea, they can reach the size of a bus. And they are known as 'gentle giants' – and no danger to humans. As a filter-feeder, this species is dependent on the smallest organisms – and healthy oceans overall. Yet largely because of human pressure, whale sharks are endangered. We have the potential to bring this species back from the brink. The first step is to respect our oceans – and work to maintain the health of this amazing resource. And at the same time, enjoy swimming alongside an ocean giant.

I have been researching whale sharks for over 25 years. In that time, I have seen the conservation status of this charismatic ocean giant decline from 'Vulnerable' to 'Endangered' mostly due to human activities such as hunting, by-catch, pollution and ship-strike. My work has taken me to some of the most remote and beautiful locations in the world including the Maldives, Tokelau and the Galapagos, where I have witnessed the impacts we are having on these ocean paradises. Plastic pollution, climate change and overfishing are impacting what should be pristine and bountiful places. The view of the future from here looks bleak if we continue down the path we are on, but I am optimistic that we can turn things around. With education and inspiration, we can make a difference and help to preserve our planet and all its incredible biodiversity, including whale sharks, for future generations.



Brad Norman with team at Ningaloo. © Andre Rerekura

Whale shark. © Paul Wags

ECOCEAN

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Joe Cutler

Freshwater ecologist, ichthyologist and conservation biologist, National Geographic Explorer

Fantastic Fishes and their Future

From fishes that sing with electricity to volcanic crater lake cichlids, freshwater ecosystems are home to some incredible biodiversity.

I believe that the future of conservation lies in freshwater. Freshwater ecosystems – our lakes, streams and wetlands – cover less than 1% of Earth's surface but are home to approximately 25% of the world's vertebrate biodiversity. Much of this diversity is concentrated in large tropical rivers, including the Amazon (961 fish species), Mekong (309 species), Congo (375 species), and the Ogooué River in Gabon (351 species), which are increasingly threatened by humans. Development, in particular dam construction, has changed the morphology, hydrology, and functioning of rivers, subsequently impacting biological communities and ecosystem services. These impacts have made freshwater ecosystems among the most threatened in the world, and 36% of freshwater fish species qualify as endangered by the IUCN. If we intend to protect global biodiversity and the services that a healthy freshwater ecosystem provides, we must focus our conservation efforts on freshwaters.

> "Freshwater ecosystems – our lakes, streams and wetlands – cover less than 1% of Earth's surface but are home to approximately 25% of the world's vertebrate biodiversity."

Ogooué Megatransect

africaslastwildriver.com
jscutler1@gmail.com

Stumpy the whale shark.
© Leith Holtzman

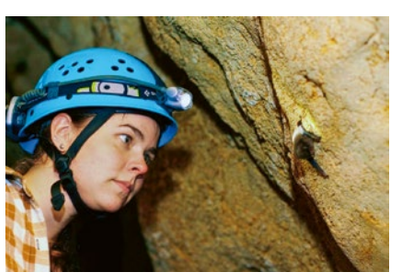
Kristen Lear

Bat conservationist and educator, National Geographic Explorer

The Wonderful World of Bats

As a bat conservation scientist, I work on conservation, research, and education projects to protect bat species around the world. In my presentation, I share the amazing world of bats and how they support ecosystems and people through services such as insect pest control, pollination, and seed dispersal.

Working in bat conservation opens your eyes not only to the great benefits of bats, but also the immense challenges they face and the often deep-seated fear and misunderstanding that many people have towards them. These challenges also bring opportunity. Opportunity to connect with diverse people to hear their stories and share the importance of bats. Opportunity to study bats and gain an ever-deeper understanding of the role they play in the world. Opportunity to learn how we can coexist and mutually benefit each other. This is what excites me about being a bat conservationist, and keeps my passion ignited and keeps me sharing the wonderful world of bats!



Studying the critically endangered Southern bent-wing bat in Australia. © Steve Bourne

The threatened Mexican long-tongued bat (left) and endangered Mexican long-nosed bat, critical pollinators of agave plants in Mexico. © Kristen Lear

kristenlear.wixsite.com/batconservation

Imogene Cancellare

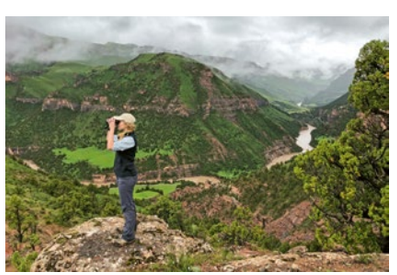
Conservation biologist, National Geographic Explorer

Snow Leopards and Carnivore Conservation

A conservation biologist and National Geographic Explorer, I conduct research on rare and elusive wildlife. My background is in landscape and conservation genetics, population ecology, and wildlife management, primarily with carnivores and amphibians. Currently a PhD student at the University of Delaware, I work with Panthera to research the phylogeography and genetic structure of snow leopards across High Asia.

We are on the front line, fighting to stop poaching, prevent conflict with people, conserve wild cat habitats, and reduce unsustainable legal hunting. These proven strategies don't just protect wild cats, they also protect their vast landscapes and the endless variety of life within them. These wild places are crucial to our planet's health – and our own.

My research is, at its core, highly collaborative. As an American scientist working in Central Asia, it is incredibly important to note that I am a guest researcher. The snow leopards do not belong to me. However, the herders living alongside these great cats have taught me what it means to belong to an ecosystem where people live in harmony with wildlife. I take pride in my work not only because I love the field work, and not just because I find the lab work utterly fascinating. I am proud, and honored, to work alongside phenomenal conservationists from all over the world. I love that I can celebrate summits and appreciate science with so many compassionate, talented humans. My research is about snow leopards, but, at its core, it's also about people. Just like human health and snow leopard health are inextricably linked, so too is conservation success linked to people.



Angsai, China. © Imogene Cancellare

biologistimogene.com

Joe Grabowski

Founder of Exploring by the Seat of Your Pants, National Geographic Explorer

Exploring by the Seat of Your Pants

I have never met a student who is not excited and inspired when learning about the natural world. I have never met better teachers than scientists and explorers, whose passion for their chosen field is ridiculously contagious.

Yet, in my first years as an educator, I observed a growing disconnect between both. So I launched Exploring by the Seat of Your Pants, to bring scientists, explorers, adventurers and conservationists from all over the world, live into classrooms everywhere. They bring students to the front line of exploration and the battle to protect what we have left by exposing them to challenging issues, exciting places, strong role models and new career paths. They spark tiny 'aha' moments that ignite lifelong passions. Although COVID-19 has taken students out of the classroom and disrupted our daily lives, it is also an opportunity to reassess what is important. Biodiversity is our insurance policy, its loss makes our ecosystems vulnerable.

"Tiny 'aha' moments ignite lifelong passions."

Students and the general public need to be introduced to the weird and the wonderful, the challenges biodiversity faces and the good news conservation stories from around the world. That's where the inspiration for the Global Biodiversity Festival came from and that's why I will continue to use my career as an educator and explorer to bridge the gap between scientists and explorers and students around the world.

EXPLORING BY THE SEAT OF YOUR PANTS

exploringbytheseat.com

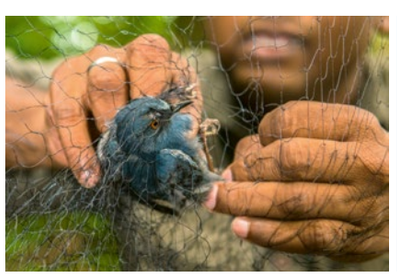
Prasenjeet Yadav

National Geographic Explorer and Photographer

Stories from the Sky Islands of India

As a molecular ecologist, National Geographic Explorer and science photographer, I realized that my real passion lay in storytelling and so I now combine my experience in research with photography to popularize ecological and conservation sciences in the wider society.

The sky islands of the Western Ghats in South India are unique both in their geography and biodiversity. The sholas, as these islands are locally known, remain one of the most pristine and relatively unexplored areas. They are a global biodiversity hotspot and a newly formed UNESCO World Heritage Site. Sholas comprise a natural mosaic of grasslands and forest patches, with forests in the valleys. They host almost 50 species of endemic plants and 50% of India's amphibian endemics. Bird ecologist, Dr. Robin Vijayan, and I, explored this landscape to understand the role these mountains play in the formation of new species, with a focus on the shortwing, a small bird endemic to the sky islands.



Mist netting. © Prasenjeet Yadav

Sky islands. © Prasenjeet Yadav

prasanjeetyadav.com

Field sampling in Gabon.
© Roshni Lohdi

Eunice Jingmei Tan

Assistant Professor of Environmental Studies, Yale-NUS College, Singapore

Beyond Looking Like a Stick - A Peek Into the Lives of Stick and Leaf Insects

Recent studies suggest a worldwide decline of insects, and this is of great concern, as the ecosystem services that these insects provide are being lost. It is vital that we understand the diverse insects around us before it is too late. Stick and leaf insects are well known for their remarkable resemblance to vegetation. They are especially abundant in tropical regions, but little is known about the ecological interactions of this group of charismatic insects.

Plant-mimicking stick and leaf insects have existed for at least 47 million years, attesting to the success of this phenotype and this group of insects. Currently, more than 3,000 species of stick and leaf insects are known globally. An extraordinary diversity of more than 600 species of stick and leaf insects have recently been documented in Southeast Asia, a biodiversity hotspot that remains surprisingly under-explored. Protective colour patterns such as those of stick and leaf insects, which resemble the insect's background or mask its outline, reduce their detection by predators. This may explain the unusual longevity (lifespan of 1-5 years) and size (~ 0.5 m) of these insects. While the adaptive significance of such protective colour patterns are reasonably well documented, how their evolution has been shaped by ecological and life history factors is less clearly understood.

We search for leaf and stick insects in their natural habitats in various forests in Singapore, Malaysia and Brunei, combining field observations and laboratory experiments to understand how the evolution of stick and leaf insects have been shaped by their ecological and life history factors.

Stick insect. © Sebastian Pohl

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Sugoto Roy

Conservation biologist, Manager of the IUCN Tiger Programme

Ensuring Tiger Conservation Works for the Good of Species, Habitats and People

The Integrated Tiger Habitat Conservation Programme (ITHCP) was established in 2014, financed by the German government through KfW and implemented by IUCN. The initial 5-year programme had a value of €20 million. It has now been extended with further funding to 2023. The programme operates through a grant-making mechanism where organizations apply for grants through open competition. We currently have 12 projects across 6 countries, focusing on species conservation in the form of population monitoring, anti-poaching and conflict mitigation; habitat management through training and equipping front-line staff, developing park management infrastructure and long-term land use planning; working with local communities to ensure they use forest resources sustainably and have access to alternative resources and incomes.

© Sugoto Roy

As the programme moves into its second phase, a preliminary analysis has shown that while some activities can be undertaken relatively quickly, such as population monitoring through camera trapping, some aspects need time to become established. In particular, working with local communities requires trust building, awareness raising and outreach.

The fate of the tiger epitomizes that of many large species, where fragmented populations are threatened by poaching, isolation through habitat loss or degradation, and conflict with local, often impoverished communities who are competing for space and resources. Conservation at landscape scales for this and other such species needs to incorporate the elements of species monitoring and protection, habitat management and the engagement of local communities.

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by:

IUCN KFW

nature.org
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Traffic calming road sign, Nepal.

Huw Griffiths

Marine biogeographer

Biodiversity in the Deep Freeze: Antarctica

In sharp contrast to the icy desert at the surface, the bottom of the Southern Ocean is teaming with thousands of species, most of which are found nowhere else on Earth.

The Environmental Protocol of the Antarctic Treaty describes Antarctica as a natural reserve, devoted to peace and science. Working in Antarctica always feels like an enormous privilege but at the same time a huge responsibility. Very few people get to experience this spectacular wilderness and even fewer get to explore the hidden underwater world beneath the ice. Getting the opportunity to help discover new species in an unexplored region in extreme conditions never gets old. The frozen continent of Antarctica might seem remote and isolated but our actions have direct consequences for this unique habitat. The polar regions are often where the global effects of human impacts are felt first, including climate change, ozone depletion and ocean acidification. Recording and predicting the effects of global change on the Antarctic ecosystem is crucial if we are going to minimize the impacts on the native flora and fauna. As well as understanding the ecology and biodiversity of this sub-zero habitat, I feel that an important part of my job is to share what we find with people back home so that they can understand why we should care about what happens at the end of the Earth.

The *James Clark Ross*, Antarctica.
© Huw Griffiths

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Helena Sims

Project Manager Seychelles, Marine Spatial Plan initiative

Developing a Marine Spatial Plan for a 30% Conservation Goal in Seychelles

The Seychelles is an archipelagic nation in the rich, tropical marine waters of the Western Indian Ocean. Encompassing 1.35 million square kilometres and 115 islands, biodiversity is Seychelles' most important natural asset, supporting a luxury tourism industry and over 10 fisheries. Conservation and the sustainable use of marine resources are very important to Seychelles' way of life and in 2012 the government made a bold commitment to increase marine protection from 0.03% to 30% using a debt-for-conservation deal. The Seychelles Marine Spatial Plan (SMSP) initiative began in 2014 and is a public and transparent process to achieve the 30% marine conservation goal and meet other conditions of the debt swap. The final SMSP milestone was achieved in March 2020 after more than 200 consultations. This approach resulted in over 400,000 square kilometres or 30% of Seychelles' waters in marine protection and sustainable use areas.

© Jason Houston

The marine spatial plan is for the Seychelles' entire EEZ and is expected to be completed in 2020. Managing, monitoring, and protecting the EEZ, has proven financially and technically challenging not only for Seychelles but for many other Small Island Developing States. This is now further exacerbated by the economic impacts of a global pandemic.

The Nature Conservancy

nature.org
seymsp.com

Amphipods. © Huw J. Griffiths

Scaleworm. © Huw J. Griffiths

Richard Vigne

Conservationist and
Managing Director
of Ol Pejeta Conservancy

Ol Pejeta Conservancy
Live with the Last Northern White Rhinos

Ol Pejeta Conservancy is a 90,000-acre conservancy located in central Kenya, home to the largest black rhino population in East and Central Africa, the last two northern white rhinos and a safe haven for endangered species including rescued chimpanzees and the Big Five. It has some of the highest predator densities in Kenya, and still manages a very successful livestock programme. Ol Pejeta also seeks to support the people living around its borders, to ensure that wildlife conservation translates into better education, healthcare and infrastructure for the next generation of wildlife guardians.

© Ol Pejeta Conservancy

Biodiversity is now recognized as critically important for maintaining ecosystem services such as soil fertility and crop pollination. And importantly the maintenance of ecologically biodiverse systems is no longer seen as a natural impediment to systems of production, like the production of food for a growing human population. Indeed there are now spectacular examples of how biodiversity enhances farming resilience and profitability, without the need to resort to destructive factory farming methods.

All of that said there is another clear and obvious reason for protecting biodiversity, and that is the role it plays in enriching human existence. Imagine what a boring place planet Earth would be without the vast plethora of different species and life forms that live alongside us humans. That is not a place that I would like to live, and should be enough reason for the proper environmental stewardship of planet Earth without the need for further justification.

OL PEJETA CONSERVANCY

olpejetaconservancy.org

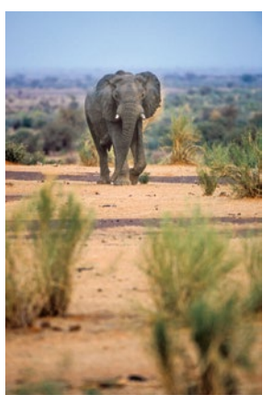
Susan Canney

Director of the
Mali Elephant Project

Elephant Conservation in Times of War and Peace: Why Do the Local People Protect the Elephants?

The desert-adapted elephants of the Gourma region of Mali make a vast annual migration through the harsh, open, populated landscape of Central Mali. They have managed to survive despite the multiple threats to their continued existence. These include the concurrence of human and elephant needs, poaching and the lawlessness and conflict associated with a terrorist insurgency.

While strictly protected areas are the vital cornerstone of conservation policy, there are other valuable areas for conservation that contain people – such as landscapes with wide-ranging species – where the challenge is to find models to conserve biodiversity in the face of competing demands. The Mali Elephant Project attempts to find inherently sustainable ways for elephants and people to thrive together. It is founded on two key aspects of local attitudes: 1) an understanding that the loss of elephants is an indicator that the ecosystem is impoverished and less able to support life, and 2) an understanding that human impact must occur within the physical limits of nature. Working with the local population to adapt local governance systems to become inclusive and transparent has been the vehicle to develop 'elephant-centred natural resource management'. This makes space for elephants, restores habitat and improves local livelihoods. It is a dynamic process that has evolved over the years in response to challenges, but works because it brings a range of local benefits. In the process we discover more about the nexus between elephants, humans and their environment, and the fundamental links between environmental degradation, poverty, compromised governance, inequality, war and terrorist insurgency.



© Carlton Ward

WILD FOUNDATION

wild.org/mali-elephants
icfcanada.org/our-projects/-projects/mali_elephants

Susan Canney

Women collecting medicinal plants.
© WILD Foundation / Nomba Ganame

Martin Wikelski

Managing Director, Max-Planck Institute of Animal Behavior, Department of Migration, 'Vogelwarte Radolfzell'

The Internet of Animals - Capitalizing on the Wisdom of Animals Will Help Protect Them

My specialization is the study of global animal movement. The collective wisdom of the Earth's animals provides an immense bio-treasure of unprecedented information for humankind. The evolved senses of animals as well as technical sensors on animal-borne tracking tags enable local Earth observations at the highest spatial and temporal resolution. To protect and understand the ecosystem services provided by animals, we need to monitor individual animals seamlessly on a global scale.

The ICARUS initiative, an international bottom-up, science-driven technology development of small, cheap and autonomous sensing devices for animal movement and behaviour is aiming towards this: wearables for wildlife. The resulting big data available in the open source database Movebank help understand, monitor, predict and protect life on our planet. By outfitting animals with communication devices, we have started to give animals a better voice on our planet: their representatives can tell us what they experience where, and if they have problems or die. Learning from animals in the 'Internet of Animals' can help us predict natural catastrophies, forecast global zoonotic disease spread or safeguard food resources while monitoring in situ every corner of the planet.

Martin Wikelski and Rony Garcia tag a captive-bred scarlet macaw with an ICARUS satellite tag to protect it during rewildening in the Selva Maya rainforest park. © Sergio Izquierdo

Tagging a migratory green darner dragonfly with a radio tag to track it from a Cessna plane. © Christian Ziegler

MAX PLANCK INSTITUTE OF ANIMAL BEHAVIOR

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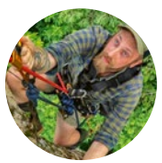
Arianna Basto

Osa Conservation wildlife monitoring technician



Andy Whitworth

Wildlife conservationist, National Geographic Explorer, Executive Director of Costa Rican non-profit Osa Conservation

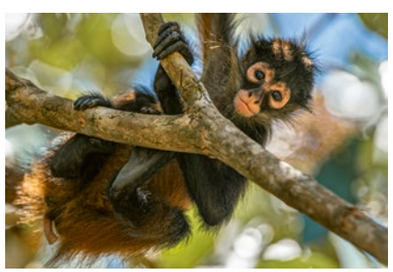
Osa Conservation: Live from the Rainforest Canopy

The Osa Conservation wildlife team utilizes camera trapping technology in the Costa Rican canopy to better understand wildlife in one of the wildest places on Earth.

The team climbs high above the rainforest floor to set camera traps and gather photos and videos of the elusive species that spend their lives in the canopy, including threatened or endangered species such as the Geoffroy's spider monkey (*Ateles geoffroyi*). We are excited to share our talk live from the top of the jungle canopy!

The Osa Peninsula is rich in biodiversity – it is home to half of all the species in Costa Rica in an area just 3.5% of the country's land surface.

Osa Conservation wildlife monitoring programme coordinator Eleanor Flatt adjusts cell-enabled camera trap. © Federico Pardo



Geoffroy's spider monkey *(Ateles geoffroyi)* near the Osa Conservation Biological Station. © Andrew Whitworth

CONSERVACIÓN osa

osaconservation.org

Richard Vigne

The world's very last two surviving white rhinoceroses – "Najin" and "Fatu".
© Ol Pejeta Conservancy

Pablo Borboroglu

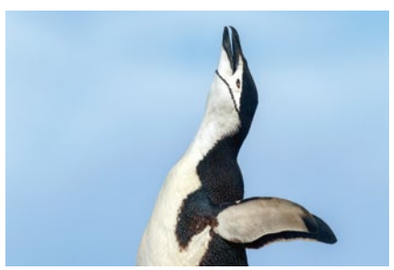
Founder and President
of the Global Penguin Society,
National Geographic Explorer,
Rolex Awards Laureate

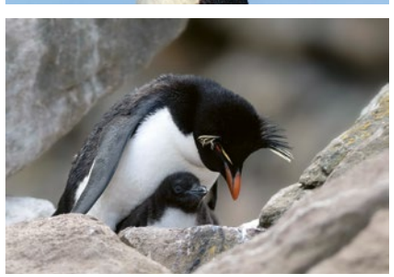
The Penguins: Ocean Conservation Game Changers

With 31 years in the field of marine conservation focusing on protected areas and seabird ecology, my presentation shows why penguins' fragile conservation status reflects the condition of the ocean and coasts they inhabit. Penguins are particularly vulnerable to the main threats they are facing: climate change, mismanagement of fisheries and pollution at sea, and human disturbance and introduced predators on land. Penguins, as keystone umbrella species, can catalyse integrated ocean conservation allowing for the protection of vast environments and many other species they coexist with. Finally, penguins are the perfect tool to inspire behaviour changes in the international community while they help to garner political support to accomplish long-term conservation benefits.

Biodiversity is the outcome of over 3,000 million years of evolution. Unfortunately, it is rapidly decreasing worldwide. In particular, seabirds are the most threatened bird group, and penguins are one of the most threatened seabird taxa.

I work and I live by the sea in Patagonia, Argentina, and my field work with penguins takes me across islands and shores throughout the southern hemisphere. For me the ocean embodies powerful concepts: life, remoteness, unfathomable mystery, energy and hope. Our planet keeps on sending us messages. The COVID-19 pandemic is one of the wake-up calls that shows how much we abuse nature and emphasizes the importance of our work in conservation. I have no doubt that a positive, long-lasting change will take place once this is over. I am convinced that we still have a chance to save our planet. So my work is inspired by my vision to have a humanity with a strong conservation culture.





Male chinstrap penguin (*Pygoscelis antarctica*) calling a partner, South Shetland Island. ©Jacqueline Deely

Southern rockhopper penguin (*Eudyptes chrysocome*) guarding his chick on its nest. ©Jacqueline Deely

GPS
Global Penguin Society

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Marco Lambertini

Director General,
WWF International

We Need a New Deal for Nature and People

The way we currently produce and consume is causing nature to decline at a rate unprecedented in human history. This matters. Nature underpins our society, our economies, our health and well-being. Never has it been more clear – in the midst of a global pandemic – that we urgently need to transform our relationship with nature.

While the critical decisions world leaders were scheduled to take on the environment, climate and development have been postponed until 2021, they remain a momentous opportunity to secure a New Deal for Nature and People that places nature on the path to recovery by 2030 and safeguards long-term human health, well-being and prosperity.

"We urgently need a New Deal for Nature and People."

Nature is in the red. We are destroying it faster than it can replenish itself. We have already lost half our forests and coral reefs, along with more than 80% of our wetlands. In the last 40 years alone, wildlife populations have declined globally by 60%. The incredible pressure human activities are placing on the natural world is undermining its ability to support us and, at the same time, increasing our vulnerability to pandemics.
We have to change course. As we emerge from this pandemic, world leaders must ensure we build back better. This must start by delivering a green and just recovery as part of our wider transformation of our relationship with nature.
We urgently need a New Deal for Nature and People that places nature in the heart of our economic, political and social systems. Together, we can create a nature-positive world by 2030, and secure a sustainable future for people and planet.

WWF

panda.org

Asher Jay

Creative Director,
Yoke and Anchor LLC.
National Geographic
Explorer

Core Communications

Asher's laterally associative vision delivers on a client's commitment to offer a product of service in alignment with ensuring a healthy planet and a collective wild future. Harnessing the effective application of the arts to address simple disconnects that prevent individuals from understanding the complexity of the whole, her work is the nexus of storytelling, marketing, public relations, corporate social responsibility, non-profit impact, and philanthropy.

We live in an unprecedented age of concealment. Whether intentionally or not, there has long been a breakdown in communication between politicians and voters, corporations and consumers, and scientists and the public. The system cannot be reimagined yet retained, the time to build something that is solution focused and not problem fixated, is upon us. This means empowering conduits for inclusive dialogue between stakeholders, seeding a paradigm of transparency that democratizes the access to and the use of information. It also means working, as I do, on communications that explore the nexus between conservation, community and commerce.

The Space In Between.
© Asher Jay

YOKE+ANCHOR

yokeandanchor.com
asherjay.com

Teresa Ryan

Marine scientist,
Education Manager at
The Turtle Hospital

Live from The Turtle Hospital

Join in as we head to the Florida Keys to visit The Turtle Hospital to meet some of the patients and check out the conservation work we do to rehabilitate injured sea turtles and return them to the wild. The hospital opened its doors in 1986 with four main goals: 1) rehabilitate injured sea turtles and return them to their natural habitat, 2) educate the public through outreach programmes and visit local schools, 3) conduct and assist with research aiding sea turtles (in conjunction with state universities), and 4) work towards environmental legislation making the beaches and water safe and clean for sea turtles.

The Turtle Hospital contains up-to-date equipment needed to perform a variety of surgeries on different species and sizes of sea turtles. There are 7 species of sea turtles throughout the entire world. Five of the seven are found in Florida: Green, Loggerhead, Leatherback, Hawksbill, and Kemp's Ridley.

I have been working with sea turtles for 16 years and releasing turtles is the best part of the job, but it is an emotional challenge as we do become attached to these beautiful creatures!

Green turtle surfacing. © The Turtle Hospital

Loggerhead being examined. © The Turtle Hospital

turtlehospital.org

Pablo Borboroglu

Pablo checking nests at 3 am to recover tracking devices from adult Magellanic penguins (*Spheniscus magellanicus*) that breed at a remote penguin colony along the Atlantic coast of Patagonia. © R. Digilio

Nicole Stott

Veteran NASA Astronaut,
artist, Earthling

eARTh From Space

A veteran NASA Astronaut, I have been fortunate to experience two spaceflights, 104 days living and working in space on both the Space Shuttle and the International Space Station (ISS), and one spacewalk. One of my personal highlights was painting the first watercolor in space.

As an artist, and now retired from NASA, I combine my artwork and spaceflight experience to inspire creative thinking about solutions to our planetary challenges and to promote the amazing work being done every day in space to improve life right here on Earth.

I am so thankful to have experienced the view of our precious planet from the special vantage point of space. In all the complexity of spaceflight, I came back to Earth with three simple lessons to share: We live on a planet. We are all Earthlings. The only border that matters is the thin blue line of atmosphere that blankets and protects us all.

We have been gifted with a life support system like none other to be discovered in the universe. Respect for the interconnectivity and interdependence of the amazing diversity of life and resources that we share our planet with is key not only to our survival, but our opportunity to thrive.

Through the awe and wonder of our planet that surrounds each of us every day, I am hopeful that we can all appreciate the perspective of the three simple, yet profound, lessons of planet Earthlings, thin blue line; and that we will all accept our role as the crew of Spaceship Earth.

Painting on the International Space Station.
© NASA (was actually taken by Canadian astronaut Bob Thirsk) Oct 2009

SPACE FOR ART FOUNDATION

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Sven Lindblad

Owner of Lindblad Expeditions

Kristin Hettermann

Adventurer, photographer

Tourism and Biodiversity - Essential Partners

The effect of COVID-19 on tourism was immediate: nothing was gradual, nothing could be planned for – it just happened from one day to the next. 100 to zero. Seventy-five to 100 million people working in the tourism industry are projected to lose their jobs. And trillions of dollars will evaporate from global economies. The overall picture is beyond stunning.

We live in a world which is totally dominated by humans. Conservation, therefore, is now widely acknowledged to be more than purely supporting biodiversity. Today's conservation strategies must overtly maximize both biodiversity and the improvement of human well-being simultaneously.

> "Our responsibility is to change people's behaviour, educating everyone that the environment is an essential partner, not some alien creation that is merely tolerated."
>
> Sven Lindblad

So, bottom line – 100 to zero is a big, big problem. Tourism is far from being a perfect industry and can do much more than it has done to date. But now the implications of zero tourism are more obvious to all of us. Perhaps as we build up the sector again, we can find solutions to do it in a wiser, more sustainable way. If we were to succeed, this crisis would have fulfilled the second part of its definition paired with danger – opportunity.

Tourism while by no means perfect is a necessary ingredient if wildlife and habitats are to be protected. Too much tourism is a problem, too little is a catastrophe.

Lindblad Expeditions

world.expeditions.com

Zara Palmer

Marketing Manager,
Fundraising and Education
Supervisor

Maria Jose Salazar

Enrichment Coordinator
Tour Guide

Live from the Toucan Rescue Ranch

The Toucan Rescue Ranch in Costa Rica works with a model that focuses on conservation, education and research to ensure a brighter tomorrow for native wildlife. Founded in 2004, the centre provides sanctuary while giving premier medical treatment, rehabilitation, and eventual reintroduction of rehabilitated wildlife.

We rescue because animals need our help. We rehabilitate to give them life. We love to give meaning to life. We liberate because they are meant to be wild. All we have to do to inspire change far and wide is tell their stories – their truths speak for themselves. It is when we can share these stories that we create real change.

An integral part of our work at the Toucan Rescue Ranch is to educate people on methods for protecting wildlife in Costa Rica and beyond. It is through storytelling, education, and most of all, passion, that we truly save lives.

Wildlife rescue and rehabilitation go beyond saving animals – it drives every one of us to save each other and to protect our home. Today and every day we stand for wildlife. Thank you to those of you who stand with us, and to those new to the cause, thank you too. We hope you will join us to fight for a better tomorrow – not just for you or me, but for nature – for us.

Tamandua getting surgery by Zara Palmer at Toucan Rescue Ranch. © Toucan Rescue Ranch

THE TOUCAN RESCUE RANCH
Since 2004

toucanrescueranch.org

Enric Sala

Founder of Pristine Seas

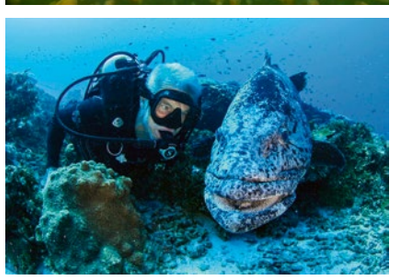
Paul Rose

Expedition Leader Pristine Seas

Pristine Seas

Enric Sala and Paul Rose recount the amazing success they have had leading expeditions to the most pristine areas left in our oceans and how it has lead to the protection of over 5 million sq km of ocean. They share the inside secrets of protecting the ocean's wild places and a life at, in, on and under the sea.

Enric: As a university professor, I felt that I was simply writing the obituary of the ocean. I was describing with more and more precision how ocean life was dying, but not offering a cure. I felt like the doctor who was telling the patient how she was going to die, but not offering a solution. So, I quit academia and assembled a team with the aim to explore, document and help to protect the last wild places in the ocean.



Enric Sala (top) and Paul Rose.
© Manu San Felix

Paul: A dream job – leading a high performing team and diving in the ocean's wildest and most pristine places in order to help get them protected. Our team is a multi-national combination of local scientists, National Geographic Pristine Seas science and media teams, engineers and technical staff. We have a 'laser focus' on ocean conservation with every decision based on the single question 'Will this help to protect this part of the ocean?'

NATIONAL GEOGRAPHIC
PRISTINE SEAS

pristineseas.org

Pitcairn Islands.
© Enric Sala

David de Rothschild

Explorer, environmentalist, eternal optimist

Plastiki

In March 2010, explorer David de Rothschild and a small crew of adventurers left San Francisco on a catamaran that floated on 12,500 recycled plastic bottles. They sailed across the Pacific Ocean to sound the alarm on plastic pollution and become an example of future-forward design. Four months later they made landfall in Sydney. Along the way, they shared their discoveries and life aboard the boat with followers around the world. On the 10-year anniversary of its voyage, the Plastiki is re-emerging to rekindle the spirit of the journey and share a new message that once again captures imaginations and becomes a symbol of hope.

"It's not man versus nature, it's man *with* nature."

Plastiki off the coast of Sydney.
© David de Rothschild

PLASTIKI

VOICE FOR NATURE FOUNDATION

voicefornaturefoundation.org

Wangechi Kiongo

Environmental scientist, co-founder of the Save Lake Turkana Movement and founder of EcoPhilia Kenya, National Geographic Explorer

Local Communities and Conservation

I am Wangechi Kiongo, an environmental biologist and activist from Kenya. For the past five years, I have focused my energy on working to protect threatened ecosystems, for I believe that our future advertently depends on how good we protect our biodiversity. Currently, I am running a project around Kenya's Lake Turkana which is the world's largest permanent desert lake and a UNESCO World Heritage Site in danger.

Biodiversity supports life. Over 300,000 people depend on Lake Turkana for survival. We need to understand the importance of ecosystem goods and services and in this way be able to appreciate the vital role played by biodiversity around us. The Turkana community has a rich culture and traditional values which greatly accommodate preservation and protection of biodiversity in and around Lake Turkana. Working closely with the community has brought forth the realization that it is impossible to separate biodiversity and people and, in any case, they are all one. Biodiversity represents the knowledge learned by evolving species over millions of years about how to survive through the vastly varying environmental conditions the Earth has experienced, and this is not something we are prepared to lose.

"Working closely with the community has brought forth the realization that it is impossible to separate biodiversity and people and, in any case, they are all one."

The Lake Turkana ecosystem has experienced a lot of changes over the past few decades including reduction in water levels, pollution, and intense fishing. But, working with the communities, we have a chance to restore this. With the Earth experiencing more dramatic change at the hands of human activity, and with no immediate knowledge of how much biodiversity the world has lost so far, giving nature the space and protection it needs is the only answer.

Pia Ve Dahlen

Marine biologist,
co-founder of Passion for
Ocean and Rent a Biologist

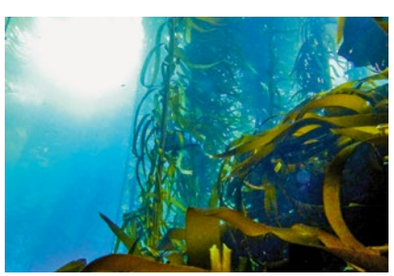
Journey to the Centre of the Kelp Forest

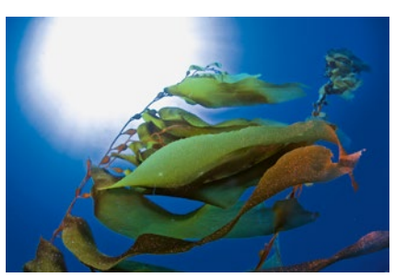
I invite you to join me on a dive into the kelp forest of the North Atlantic, to befriend a barnacle, talk to seals, crabs and anemones, swim with bioluminescent sharks, and explore the wonderful biodiversity you find under the surface.

Norwegian waters are very nutrient rich and have some of the strongest tidal currents in the world which make for extraordinary levels of biodiversity. A dive through the kelp forest is a terrific, breathtaking experience – almost like a science fiction trip.

The ecosystem I study here in these cold, pristine waters is an example of nature at its very best – powerful, exciting, beautiful and vital. The best way to enjoy and understand it is to stay in one place for as long as you can and let your natural curiosity take over as you relax and watch what happens around you.

"Jump in the sea! Because maybe the most important thing we can do for the sea is to love it."





Atlantic kelp. © Dave McAloney

Rent a biologist

passionforocean.no

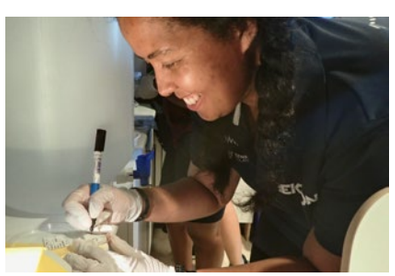
Sheena Talma

Marine biologist with
a postgraduate degree
in ichthyology and fisheries
science

A Journey from the Sandy Shores to the Deep

I am a science programme manager with the Nekton Foundation, a charity focused on equitable science research between 0-300 metres. I have also worked for the Ministry of Environment Energy and Climate Change in Seychelles contributing towards environmental sustainability. From the sandy Seychelles shores to its surrounding deep sea, the country reveals a unique biodiversity.

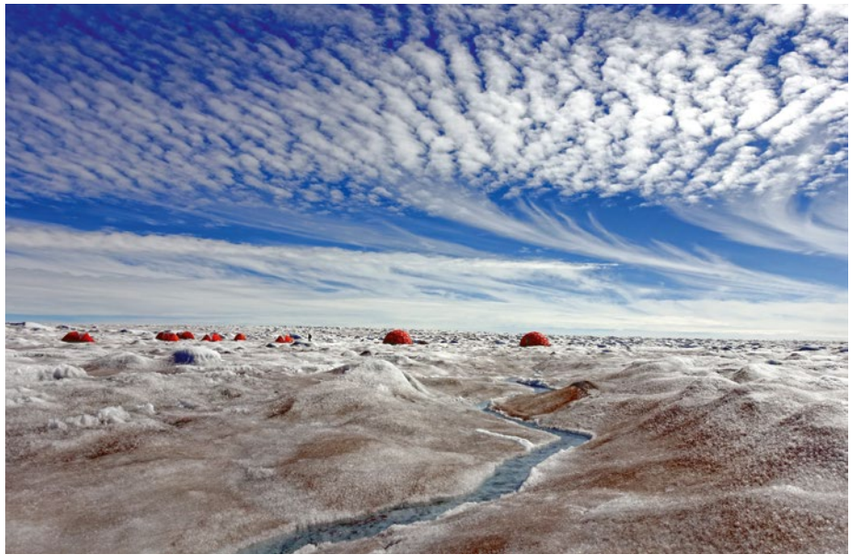
Turquoise blue against a backdrop of emerald green. Mountain tops and deep seas. The Seychelles has been blessed with abundance and beauty and I have been privileged to have been sheltered by this large ocean state for the duration of my short existence. The view from here is one of hope. Hope that we will cease to take our Earth for granted. Hope that we can be better at working collaboratively. Hope that our fields of science, conservation and exploration become increasingly transformed and inclusive. Hope that we continue to strive to be better, for the sake of our own existence.



Talma in the lab. © Nekton / Jeanne Mortimer

NEKTON
DEEP OCEAN EXPLORATION

sheenatalma@gmail.com



Field camp on the Greenland ice sheet (38 km inland from Kangerlussuaq, SW Greenland), in July 2016. ©Joseph Cook (@tothepoles)

Art spacesuits Unity and Hope with friend, Susie, strolling on the simulated Mars-scape at NASA Johnson Space Center, Houston, TX. ©Ian Cion, artistic creator of the art spacesuits, co-founder and director Space for Art Foundation.

Ami Vitale

Thomas Starnes

Key Biodiversity Areas Programme Officer, IUCN

Amazing Maps for Nature Conservation

My work in the IUCN Key Biodiversity Areas Programme harnesses the power of maps to identify the most important sites globally for the persistence of freshwater biodiversity. Chair of the Conservation GIS Group, I contribute to humanitarian relief mapping and explore and make maps of caves. With a passion for maps and spatial data, in my presentation I share some of my favourite applications of GIS in nature conservation, and explore the use of traditional cartography and modern technology including GPS, data loggers, drones and satellite Earth observation.

Flying drones in Madagascar to monitor forest edge effect. ©James Borrell

The use of maps and technology goes back to the roots of civilization. The power of maps to help us understand our place in the universe cannot be overstated. From early navigational charts plotting newly discovered lands and seas, to complete 3D models of futuristic sustainable cities and maps of the stars to which we dream of venturing one day, maps have the power to inspire and inform us. Technology is pervasive throughout our society. Implicated in many global problems, it is also the solution to many of these problems. Technology has the potential to distract us from nature, or to connect us to it. Today, maps and technology allow us to monitor deforestation from space, fishing activity around marine protected areas, and birds as they migrate thousands of kilometres around the globe. We can even see phytoplankton blooms from space!

As conservationists, I believe it is our duty to ensure that these incredible technologies are used responsibly and equitably, harnessing the power of maps to tell compelling stories about our place within nature and the life support systems of our planet.

IUCN

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Callie Broaddus

Founder and Executive Director, Reserva: The Youth Land Trust

Youth-led Biodiversity Conservation and How You Can Help

I founded Reserva: The Youth Land Trust to empower young people around the world to take solution-based action towards solving our climate and biodiversity crises. We are currently working to create the world's first entirely youth-funded nature reserve, in partnership with Rainforest Trust and Fundación EcoMinga.

> "Young people don't just speak. They act. And if they can succeed, the rest of the world certainly can."

I lead a 56-person international team of overachievers who all get along and work for free. That may sound like an executive's version of 'two truths and a lie', but this is our team – 56 people between the ages of 7 and 26 currently working together to fundraise $178,000 for an unprecedented, entirely youth-funded land purchase in one of Earth's most biodiverse and threatened landscapes. They are scholars, TEDx speakers, zoologists, journalists, explorers, activists, entrepreneurs, and pianists. Four of them have already discovered new species. They are each connected by a shared biophilia, a belief in solution-based optimism for the planet, and a commitment to demonstrate the financial power of youth.

In addition to the conservation impact of this and any subsequent reserve projects we undertake, these young conservationists also set an example for their governments. Despite scorching words from youth around the globe, most world leaders have produced a tepid response to the parallel biodiversity and climate crises. Youth-led biodiversity conservation complements youth activism with a solution-oriented response, showing that young people don't just speak. They act. And if they can succeed, the rest of the world certainly can.

RESERVA
THE YOUTH LAND TRUST

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Jeneria Lekilelei

Director of Community Conservation, Ewaso Lions.
National Geographic Explorer

Cultures of Coexistence: Mentoring a New Generation of Lion Warriors

A Samburu moran (warrior), soon to transition to an elder in 2020, I come from the Westgate Community Conservancy in Samburu, northern Kenya and first joined Ewaso Lions in 2008 at just 19 years old.

I conceived Ewaso Lion's flagship outreach programme, Warrior Watch, and have been responsible for engaging dozens of Samburu warriors in lion conservation. The Ewaso Lions programme promotes a sustainable human-carnivore coexistence, reduces human-lion conflict, and ensures a future for Kenya's lions. As a result of engaging local people, lions have started to make a comeback in the community areas where Ewaso Lions operates.

I really love lions. I have a passion for them, since I came to learn about their situation and how they are threatened. They are my life and that cannot let me stop. The lions are my driving force. If the lions need help, I can't say 'I will do it tomorrow.' This is the day I will help them – immediately. If I stop, and conflict happens, it would be very hard. This pushes me on. I am a Samburu and this is my land and this is my wildlife. I will always find a way to protect this beautiful land, its wildlife, my communities and their livestock. I know there is a balance here and everything I do is about finding this balance. It is my responsibility to do this. I don't do it with force – everything I do is through talking calmly with my community. We have to save these lions – lions are now in my blood and I have to do everything I can.

Jeneria Lekilelei and the team observe an injured lion. ©Ewaso Lions

EWASO LIONS

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Gladys Kalema-Zikusoka

Founder and Chief Executive Officer of Conservation Through Public Health (CTPH), National Geographic Explorer

COVID-19 and Gorilla Conservation

I really enjoyed the Global Biodiversity Festival. It was special to be able to connect virtually with so many explorers, scientists, conservationists and nature lovers from around the world right from my home in Entebbe, Uganda. I was glad to be able to share my BackyardBio photo of the Black-and-white-casqued hornbill. It is rare to see them at home, so it was amazing when our 15-year-old son, Ndhego spotted the hornbill in the tree, and I took a photo before he flew away. I was thrilled to share the work that we do with the endangered mountain gorillas and local communities living around Bwindi Impenetrable National Park. We are currently working hard to prevent COVID-19 spreading among the park edge communities, and from people to gorillas with whom we share 98.4% of genetic material and can easily make each other sick.

It was a wonderful surprise when Paul Rose held up a bag of our Gorilla Conservation Coffee just before my talk. Paul introduced our work so well, that I felt a strong connection with the audience as I spoke. The highlight of the festival was when Joe Grabowski announced me as the Backyard Bio Champion for the hornbill photo! We are also very grateful for the donation to Conservation Through Public Health through this festival.

Village Health and Conservation Team Batwa meeting during visit of Tusk Trust. ©CTPH

Vincent, Dr Gladys and Sam Karibwende in the coffee garden. ©Jo-Anne McArthur, Unbound

CONSERVATION through PUBLIC HEALTH

ctph.org
gccoffee.org
gladys@ctph.org

Jeneria Lekilelei.
© David Chancellor

Eleanor Drinkwater
Animal behavior researcher

Searching for Giants

Passionate about the weird and wonderful world of insects, my recent work focused on tracking one of the biggest and most elusive beetles on the planet, the titan beetle. Tackling tropical rainstorms, nocturnal work and dense forest, we were able to gain rare insights into the behaviour of these incredible beetles as well as some understanding of the threats they face in the wild.

It is an exciting time to be studying invertebrates, with new species being discovered on an almost daily basis and ground-breaking discoveries like tool-use by insects, evidence for pain perception in crustaceans, and personality in spiders. However, these exciting findings are tinged with a backdrop of decline and extinction. Invertebrates are declining globally and as many species slip towards obscurity before they have been described, we will never know the extent of knowledge that we have lost.

There is however, always hope. Working with invertebrates, I have come across people who continually amaze and inspire me. Volunteers and professionals alike are pushing against invertebrate declines, and their dedication, I believe, sets the stage for a hopeful second act.

Soldier beetle. © Laura Kor

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Joseph Cook
National Geographer Explorer, Rolex Awards Laureate and Microsoft AI for Earth grantee

Ice Alive

Earth's coldest places are rarely thought of as hotspots for biodiversity, but a microscopic frozen rainforest exists in our ice and snow. Hidden life in the cold matters to humans around the globe.

Our planet is warming up and that is a big problem for its ice, which in turn is a big problem for biodiversity. Ice and snow also has its own hidden biodiversity, that connects to that of the oceans as glaciers and snowpacks melt. If we look closely, a microscopic, largely unexplored frozen rainforest reveals itself on our glaciers and ice sheets.

Trillions of microbes engineer a hidden ecosystem that darkens huge areas of ice, causing them to heat up in the sun and melt faster. In the next few decades, climate change will continue to destabilize biodiversity and human interests worldwide. Making good decisions for managing and minimizing these effects requires accurate predictions into the future. I see glacier biodiversity as a crucial missing piece that must be included in our computer models. This will be a technological challenge bridging complex field measurements with drone, plane and satellite observations, big computing and artificial intelligence. The glacial frozen rainforest is yet another beautiful example of the deep connection between living creatures and the stability of our environment.

Walking to a field site on Livingston Island, Antarctica, January 2020. @Joseph Cook (@tothepoles)

ICEALIVE

tothepoles.co.uk

Ben Mirin

Acoustic biologist, musician, National Geographic Explorer. Fellow, National Science Foundation

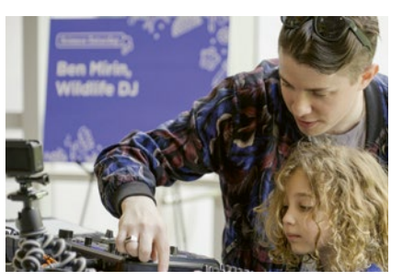
Music as a Gateway to Nature

I travel the world recording animal sounds as a scientist, and sample their voices to create music that inspires conservation and connects new audiences to nature. The educational multimedia films, television, music and games I produce give people new ways of engaging with science, nature, and conservation.

These are unprecedented times, and they call for unprecedented creativity. I have been fortunate to find my own career through creating music and media backed-up by science, but with the future of our planet at a crossroads, we must encourage young people to take similar steps of their own, applying their passions to the world and finding ways to connect with nature. If we continue to innovate in the ways we transfer environmental responsibility to young people, we can make conservation more inclusive, foster creative solutions to environmental problems, and inspire more people to improve the future of life on Earth.

"These are unprecedented times, and they call for unprecedented creativity."

Ben Mirin in Madagascar. © Drew Fulton



Rockefeller University Science Saturday.
© Aleks Rikhterman

ECOTONE

benmirin.com
@benmirin

Iris Berger

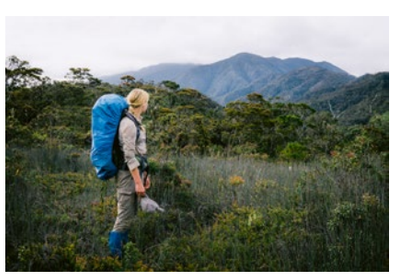
Masters student at the University of Oxford, National Geographic Young Explorer

Sumatra Megatransect

I look into the effects of megafauna declines on tropical forest dynamics. On my 2016 Sumatra Megatransect expedition, reaching regions previously unknown to scientists, we crossed the Indonesian island from coast to coast, to record how deforestation is affecting bird diversity.

At a global level, conservation is not working. Wildlife and habitats are declining, even within protected areas. Simply setting aside areas for biodiversity does not work, because many of the forces threatening biodiversity (e.g. climate change) are of planetary-scale and do not recognize park boundaries. Other global forces, such as growth economics, have warped conservation priorities – ironically placing the safeguarding of biodiversity into the hands of the systems that threaten it. Innovative funding models will be essential for conservation success and some of these models may utilize market-based principles, but market whims must not determine the value (and hence survival) of biodiversity.

A step-change in conservation is urgently needed – the Anthropocene mandates this change. The Anthropocene emphasizes the inseparability of humanity and nature and recognizes that human-induced pressures are both planetary-scale and multifaceted. Consequently, there is a need for conservation efforts of corresponding scale and nature, but conservation does not occur in a vacuum. For it to be successful, a systemic socio-economic change will need to occur. We have done incredible damage, but even where species composition has been irreversibly altered, ecosystem functioning may still be recoverable. There is no way back, but we can shape the future.



Sumatra views. © Oli Broadhead

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Adult male back gorilla
from H group at Bwindi.

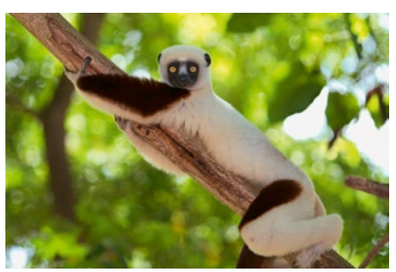
Travis Steffens

Lemur researcher,
Assistant Professor
of Anthropology,
International Fellow
of the Explorers Club,
Founding Director
of Planet Madagascar

Marvels of Madagascar

After having spent years studying primates in the wild, I now focus my research on One Health approaches to lemur conservation.

Madagascar is an entire world in an island. It is filled with bizarre wildlife and incredible people. But it is also a country at risk. For example, 95% of lemur species – all of which are found only on Madagascar and nowhere else in the world – are threatened with extinction due to habitat loss, hunting, and the pet trade. But the issue is complicated because the people in Madagascar are some of the poorest in the world. This conservation challenge led me to start Planet Madagascar, a conservation, education, and community development non-profit. Although people in Madagascar were interested in protecting lemurs, they were limited by their need to feed their families. Together we realized that to preserve habitat and help lemurs, we must work to build sustainable forest communities. Planet Madagascar works directly with local communities to run conservation education, fire management, and forest restoration initiatives in areas where people and wildlife live in connection. As we continue to grow, we will expand our projects and so ensure that the next generation can witness the beauty and wonder that is found in Madagascar.



Lepilemur edwardsi in hole. © Travis Steffens

Propithecus coquereli. © Travis Steffens

planet MADAGASCAR

planetmadagascar.org

Oliver Steeds

Mission Director, Nekton

Exploring and Conserving the Deep Sea

Nekton's mission is to get scientists and conservationists in the deep sea to explore and protect the ocean – particularly the deeper bits below scuba depth. Nekton works with, and on behalf of ocean nations to support their goals to conserve their ocean. Missions are focused on the Indian Ocean with a goal to galvanize 30% protection by 2030.

The Indian Ocean is the least explored and one of the least protected oceans. It is already home to nearly 2.7 billion people and by 2050 it will be home to half of the world's population. How this ocean changes will profoundly affect the lives and livelihoods of billions of people. In March 2020, President Faure announced that Seychelles had protected 30% of their ocean. With a population of only 100,000, Seychelles is often misrepresented as a small island nation. But with an ocean territory of 1.3 million km^2, it is a vast ocean nation. Their achievement is extraordinary and profound and should give us all hope in the darkness of this pandemic. Seychelles have shone a light on what is possible and demonstrated that we can achieve what our scientists tell us: for a healthy, prosperous and resilient ocean, we need to protect at least 30% of the entire ocean by 2030.

"We are running out of excuses to not take action and running out of time. The time to act is now."

President Danny Faure
delivering the first live subsea Presidential Address
from a submersible during Nekton's First Descent
mission in Seychelles' deep sea, in April 2019.

NEKTON
DEEP OCEAN EXPLORATION

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The giraffe weevil (*Trachelophorus giraffa*) is endemic to Madagascar.

Jut Wynne

Assistant Research
Professor of Cave Ecology,
Northern Arizona University

Going deep! Cave Biodiversity

Using examples from Belize, China, Easter Island, and the Grand Canyon, Jut discussed why animals colonize underground habitats, how they adapt to life in complete darkness, and why some caves can support an impressive panoply of biodiversity.

With the Anthropocene undergirding our biosphere, formally describing new species has never been more imperative. To name an organism, taxonomists must describe it, the peer-review process vets the description, and then it is formally published. This critical first step is only part of the conservation equation. We also need to factor the organism's habitat and life history requirements, as well as human activities threatening its persistence.

Over the past 20 years, subterranean biology has flourished. We have significantly advanced our understanding of underground ecological processes. Concomitantly, discoveries of species adapted to caves remain a quotidian occurrence. To date, even the most intensively studied and impressively biodiverse regions, the Dinaric karst of eastern Europe and the Cumberland Plateau, in eastern United States, continue to yield new species. Areas that may ultimately eclipse these regions and emerge as biodiversity hotspots are the South China Karst and cave-bearing tropical regions in Central America.

Through a triumvirate of biodiversity inventories with taxonomic descriptions, habitat and life history characterizations, and vulnerability assessments, we will be poised to make paramount decisions to protect these sensitive ecosystems and the diversity they support.

This springtail species (Family *Entomobryidae*) is a fine example of subterranean-adaptation. Note the animal has elongated and slender antennae and legs and is eyeless and depigmented. This undescribed species is presently known from two caves and is presumed endemic to Runaway Creek Nature Reserve, Belize, Central America. ©Jut Wynne

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Sylvia Earle

President and Chairman
of Mission Blue,
National Geographic
Explorer-in-Residence

Our Ocean

Sylvia Earle is President and Chairman of Mission Blue/The Sylvia Earle Alliance. She is a National Geographic Society Explorer in Residence, and is called Her Deepness by the New Yorker and the New York Times, Living Legend by the Library of Congress, and first Hero for the Planet by Time Magazine. She is an oceanographer, explorer, author and lecturer with experience as a field research scientist, government official, and director for several corporate and non-profit organizations.

"I wish you would use all means at your disposal – films, expeditions, the web, new submarines – to create a campaign to ignite public support for a global network of marine protected areas; Hope Spots large enough to save and restore the blue heart of the planet."

Mission Blue ignites public support for a global network of marine protected areas and inspires action to explore and protect the ocean. Led by legendary oceanographer Sylvia Earle, Mission Blue is uniting a global coalition to inspire an upwelling of public awareness, access and support for a worldwide network of marine protected areas – Hope Spots. Under Dr. Earle's leadership, the Mission Blue team implements communications campaigns that elevate Hope Spots to the world stage through documentaries, social media, traditional media and innovative tools like Google Earth. Mission Blue also embarks on regular oceanic expeditions that shed light on these vital ecosystems and build support for their protection.

mission-blue.org

Ruthmery Pillco Huarcaya

Osa Conservation Botanical Restoration Team Leader

Andy Whitworth

Wildlife conservationist, National Geographic Explorer, Executive Director of Costa Rican non-profit Osa Conservation

Osa Conservation: Saving Rare and Threatened Rainforest Mega-Trees

Deep in the jungles of Costa Rica, the Osa Conservation Botanical Restoration team works to research, collect and propagate rare and threatened tree species from the forest. Ruthmery Pillco Huarcaya, an indigenous botanist from the mountains of Peru, leads her team on remote expeditions to find and collect seeds from ancient mother-trees, many of which are endemic – meaning they can only be found in this part of the world. At Osa Conservation's native tree nursery, the scientists trial different methods to propagate those seeds. The nursery is a place of botanical innovation and discovery, where the team works to understand species that have never been studied before. Recently, they collected samples from a potential new tree species to science. They also collected seeds from the *Pleodendron costaricense*, an incredibly rare, endemic tree (we think there have been as few as four mature trees ever recorded). If their efforts succeed, the Osa Conservation team will be the first in the world to germinate the species.

Osa Conservation botanist Marvin Lopez works with rare and threatened trees in the conservation's nursery. © Lucy Kleiner

Osa Conservation botanic programme coordinator Ruthmery Pillco Huarcaya holds rare *Pleodendron costaricense* sample. © Andrew Whitworth

osaconservation.org

Paul Rose

Expedition Leader

Science Expeditions: How to Convert Science Hypotheses into Fieldwork in Challenging Places

One of the most beautiful jobs in the world: Meeting a science team and working out how to deliver the field elements of an ambitious science hypothesis.

It is a real joy to gain a working understanding of the science goals and priorities, visualize the field work and then convert this plan into the practicalities of mobilizing logistics such as icebreakers, aircraft, supplies of food, fuel and technical equipment and establishing remote field camps with teams of support staff. All science projects need support staff – specialists of all kinds: Cooks, divers, mountaineers, tree climbers, boat drivers, heavy equipment operators, pilots, mechanics, builders, plumbers, electricians and medics. The scale of some projects means that each of these roles is a dedicated, full-time job whilst on smaller projects everyone does everything.

"Science support teams are the beating heart of field science."

I have led science expeditions for most of my life and yet I still retain the sense of excitement and enthusiasm for making science happen in remote, challenging regions and am very happy to say that I am emotional when each project begins and becomes a live, beautiful expedition!

Taylor Glacier, Antarctica. © Paul Rose

paulrose.org

Science in the most remote locations is made possible with the support of research stations such as Rothera. The view looking East, across Rothera Research Station, towards the Antarctic Peninsula.
© Pete Bucktrout, British Antarctic Survey

Ami Vitale

National Geographic Explorer, Photographer and Filmmaker

Wild Hope

Nikon Ambassador and National Geographic Photographer, Ami Vitale has traveled to more than 100 countries, bearing witness not only to violence and conflict, but also to surreal beauty and the enduring power of the human spirit. Throughout the years, she lived in mud huts and war zones, contracted malaria, and donned a panda suit – keeping true to her belief in the importance of "living the story". In 2009, after documenting a powerful story on the transport and release of one of the world's last white rhinos, Ami shifted her focus to today's most compelling wildlife and environmental stories. She says, "nature has sent us all a strong message. This pandemic is a reminder of just how small and deeply interconnected our world is. This is a moment to reimagine our relationship to nature and to each other. We need to reduce human encroachment on wildlife."

© Ami Vitale

March 18, 2020 marked two years since the passing of the last living male northern white rhino on the planet, named Sudan. Today, nearly 1 million species are in danger of extinction due to exploitation, the climate emergency and habitat degradation. Ami believes, "our own health and destiny is intricately connected to these ancient species. Our fates are linked. Without rhinos and elephants and other wildlife, we suffer more than just a decline in the health of the ecosystem of which we ourselves are a part. We and future generations suffer a loss of imagination, a loss of wonder, a loss of beautiful possibilities."

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Phil Rhodri Taylor

Head of Policy and Operations, Open Seas

Can We Stop Illegal and Damaging Fisheries in Scottish Seas?

Scotland's coastal seas have sadly suffered several decades of decline. Overfishing through the 20th century has made most fish stocks unsustainable. Fisheries have therefore had to respond by moving down the food chain to shellfish, and using more damaging approaches, such as scallop dredging and bottom trawling. These are the most damaging forms of fishing in Europe but are permitted in at least 90% of our coastal seas – including inside Marine Protected Areas and on sensitive reefs. Open Seas and others in Scotland are coming together to call for change.

"What struck me is the scale of the global conservation challenge but also the scale of the movement that is stepping up to address it."

The Global Biodiversity Festival was a fantastic event which showcased so much extraordinary work from around the world. What struck me is the scale of the global conservation challenge but also the scale of the movement that is stepping up to address it. There are many commonalities in the issues we face and in the things we need to resolve. Almost universally, we need more political support and a greater public understanding. The fantastic work of Paul, Joe and Dan is doing lots to address both.

openseas.org.uk
ourseas.scot

Jeff Corwin

Biologist, Wildlife conservationist, broadcaster

Discussing Biodiversity and Festival Wrap-Up

We face incredible challenges when it comes to our natural legacy for our planet; the wild species and wild places have never been under such a great level of threat. We have a greater species loss right now than when dinosaurs were wiped off our planet over 60 million years ago, except that back then it was because of an asteroid impact on Earth, and today we realize that we are the asteroid through poor sustainability, habitat loss, black market wildlife trade, climate change and pollution.

This COVID-19 pandemic reminds us that we fall prey to all of the pluses and minuses of being a biological creature. Biology doesn't look at a human being and say: 'you are extra special, we are going to give you a little extra edge'. Biology and ecology in nature are not about being kind or fair or being equivalent, they are just about being in that moment. It is very likely that our connection to COVID-19 came about through habitat loss, the pressure on a species of bat or something similar, which has caused the disease to transfer to us. That is the negative. The positive is that it has caused us to take our feet off the planetary gas pedal. We are burning less fossil fuels, we are more inside and less outside, having a more positive impact on the planet by just not connecting to it. We have discovered that nature is incredibly resilient and can bounce back. We are seeing wild species overtake urban ecosystems around the world, and in some Indian cities, you can see the Himalayas for the first time in over 50 years. Powerful lessons remind us of how vulnerable we are, but also the rapid rewards we could be paid through good sustainability.

"Powerful lessons remind us of how vulnerable we are, but also the rapid rewards we could be paid through good sustainability."

The Final Word

by Enric Sala

Nature has been telling us for a long time, but most people – seven billion centres of the universe occupied with our human affairs – were not listening. The COVID-19 pandemic provided the loudest wake-up call in recent history. The world came to a halt because a tiny strand of genetic material spilled over to a person and, thanks to our globalized lifestyle, spread a lethal disease like wildfire across the world.

Regardless of which animal was the host of the virus, the pandemic happened because of our broken relationship with nature. We not only ship wildlife across the planet for food, medicine or as pets, but we also destroy the habitats that nine million species of plants and animals call their home. That biodiversity, that baroque complexity of nature, is not a luxury, but a feature of our planet that made our own life possible in the first place, and continues to provide for us. Everything we need to survive – the oxygen we breath, the food we eat, the clean water we drink – depends on the work of other species. The more biodiversity – from number of species to different types of ecosystems – the more benefits we obtain from the natural world. We can bring that richness back, if we just give nature some space.

The work of all those involved in this book gives me hope. Conservationists are the immune system of our planet. Our biosphere became too sick, and now it's the time to heal it, so she can continue taking care of us.

“One planet, one experiment.”

E. O. Wilson

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Global Biodiversity Festival – The Book

globalbiofest.com

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Back cover photo © Ami Vitale

Cover photo © Callie Broaddus.
Hylocirtus sp. nov. (male), a new species of tree frog discovered by Ecuadorian scientist Mario H. Yánez-Muñoz of Instituto Nacional de Biodiversidad, Ecuador, and photographed here on a 2019 expedition to the Ecuadorian Chocó cloud forest. This species is in the process of description, and its habitat range includes the site Reserva: The Youth Land Trust is working to protect, in conjunction with Fundación EcoMinga and Rainforest Trust.


All species shown here are protected by CITES

In three days, 68 scientists, explorers, conservationists and filmmakers working on the front line of conservation presented their work to an audience of thousands joining us from 80 countries. This was the Global Biodiversity Festival 2020.

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