

WORLD WILDLIFE

SAFE PASSAGE

For elephants in southern Africa's KAZA landscape, WWF's work with communities to secure key migration corridors and river systems offers big gains

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**WINTER
2020**



PACIFIC COAST :: ECUADOR, PERU, CHILE

MASTER OF LAND AND SEA

In the Pacific, a pelican nonpareil

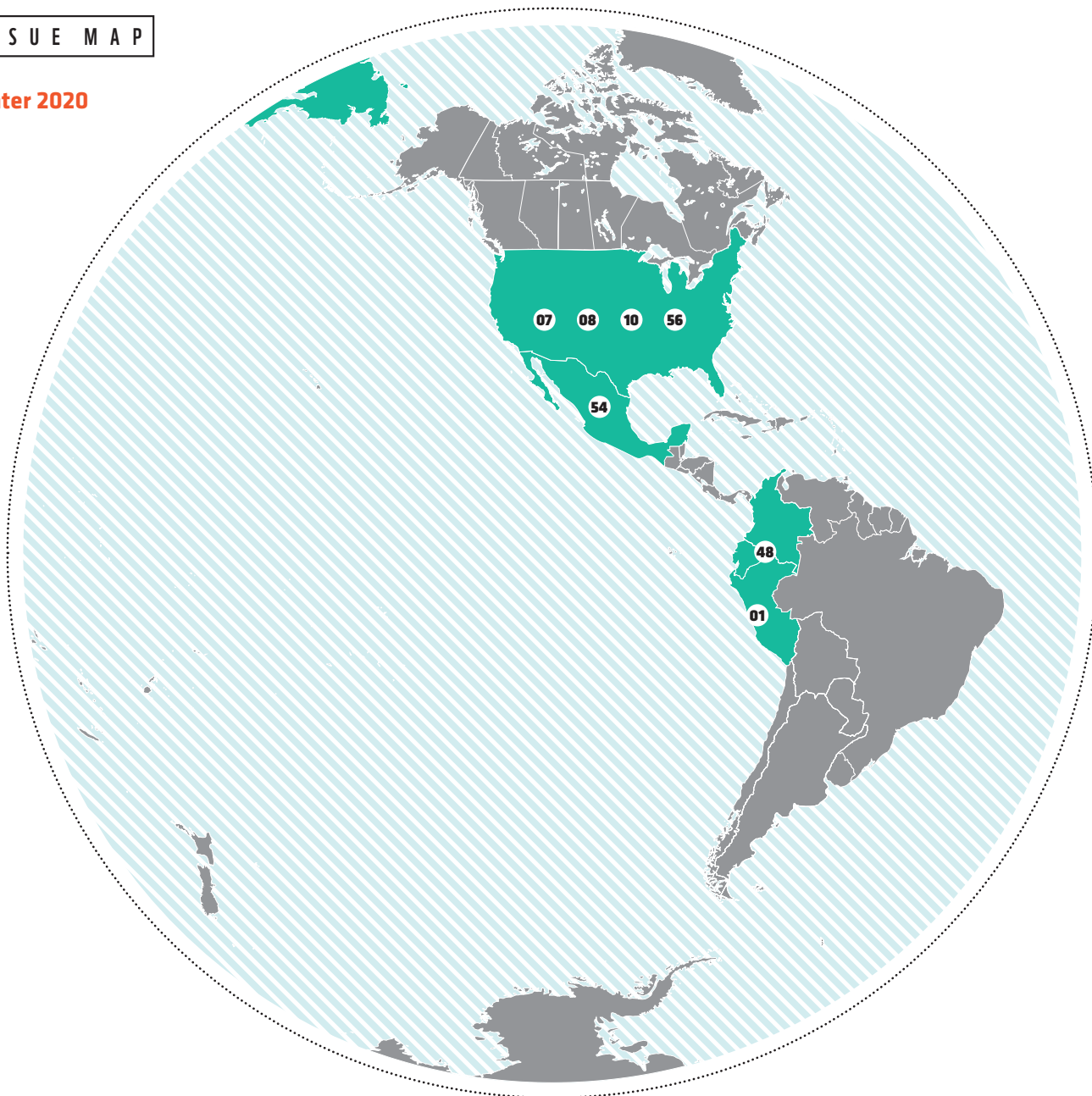
To fetch dinner, the Peruvian pelican rarely plunges. Instead, it glides. Plying the Pacific Ocean, the bird skims the surface with its flame-orange bill, its royal blue throat pouch unfurling as it fills with seawater and fish. When satisfied with its meal, the seabird may unfold its massive wings and alight on one of the steep crags that drop into the shallow sea. Peruvian pelicans, which are much larger than their brown cousins, nest, fish, and rear their young along the coastal regions skirting southern Ecuador, Peru, and Chile.

In 2008, the majestic birds were declared a near-threatened species—a status they retain. Today, through an innovative funding mechanism known as Project Finance for Permanence (learn more on page 16), WWF is partnering with the Peruvian government and others to secure sustainable funding for the management of the country's protected areas, including pelican stronghold Paracas National Reserve.

*What's that on the cover?
Details of the feathers, bill,
and pouch of a Peruvian
pelican in breeding plumage.*



Winter 2020



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IN DEPTH

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In the Kavango-Zambezi Transfrontier Conservation Area, or KAZA, WWF has been working with local communities and five nations to secure wildlife-friendly livelihoods, mitigate human-wildlife conflict, and manage natural resources to conserve elephants and other wildlife.

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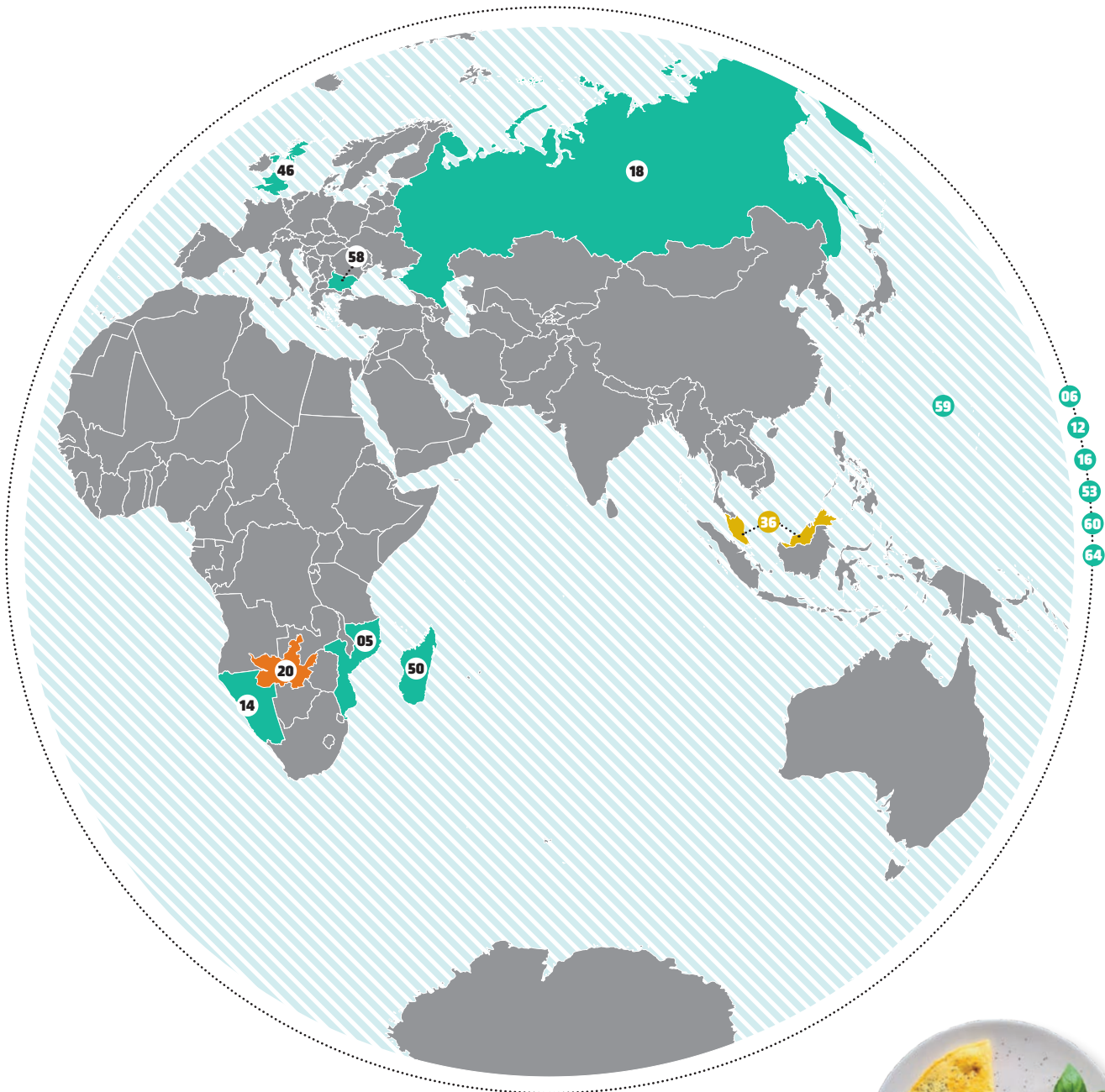
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The only thing that stays the same

SHORELINES SHIFT. Ponds become forests. Species evolve. Barrier islands, when allowed their natural rhythms, move with the waves. As has been said before, the only constant in life is change.

But because of humanity's too-often shortsighted approach to meeting our needs, the planet we rely on is changing so fast that many species—including human beings—are struggling to keep up.

WWF is working to change that on a thousand fronts. We are fighting to make the products we use more sustainable and safe for the people who produce them ("Common Ground," page 36); finding new ways to integrate healthy waters, wildlife, and community needs (KAZA, page 20); and expanding the use of cutting-edge financial tools to protect nature long term, as in our Earth for Life program ("Inside Track," page 16).

Change is hard and on many days feels unrelenting. This is a scary time. But at WWF we are up for the challenge. Join us as we ride the tides of these fretful times and evolve toward a better future for us all.

Thanks,



ALEX MACLENNAN

editor@wwfus.org



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WINTER 2020

WORLD WILDLIFE

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WWF's mission is to conserve nature and reduce the most pressing threats to the diversity of life on Earth. WWF's vision is to build a future in which people live in harmony with nature.

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FISH FOR FOOD

Between 2010 and 2014, conservation actions like community-managed fisheries and mangroves were implemented. The diversity of fish within no-take zones tripled, and, as a result, households living in or near these community-managed areas had 25% more diversity in their diet.

FAST FORWARD

Along Mozambique's coast, a joint CARE-WWF project has **boosted environmental and human well-being**



NOVEMBER 2013

In our first issue of *World Wildlife* magazine, we landed on the shores of the Primeiras e Segundas archipelago, Mozambique's first Area of Environmental Protection. Since 2008, CARE and WWF have worked together in this region to improve the livelihoods of artisanal fishers and farmers while protecting the natural resources on which they rely: 4,020 square miles of coastal forests, dunes, mangroves, estuaries, seagrass beds, islands, and ocean. This shared effort addressed environmental degradation and poverty, ensuring benefits for both people and nature.

CONSERVATION BENEFITS PEOPLE

At the end of the 10-year project, the CARE-WWF Alliance conducted an analysis of its impact in Primeiras e Segundas. Through household surveys and focus group discussions, researchers found that the people in these communities perceived that protecting natural areas had bolstered community food security and helped them adapt to extreme weather conditions.

RESILIENT FARMS

Farmer field schools, which teach and encourage experimentation with more productive and sustainable farming practices, helped communities improve soil fertility and water filtration, making their crops better adapted to climate change. On average, communities that adopted conservation agriculture techniques and planted resilient seeds doubled staple crop yields and were 13% more likely to have food security year-round than communities without such schools.

EMPOWERED WOMEN

Communities believed these interventions especially benefited women, who traditionally manage tasks such as fetching household water and harvesting shellfish from mangroves. Constructing wells and protecting mangroves lightened the load of these tasks. Additionally, women-led households that participated in informal savings and loan groups saw a 31% increase in assets.

MORE WORK TO DO

When enforcement of no-take zone rules waned after 2014, and as illegal logging and overfishing resumed, the food security benefits of the community-conserved areas disappeared. To restore those hard-fought gains, WWF and local development partners, supported by the Blue Action Fund, began a new project in late 2018. It focuses on working with communities and the Mozambican government to ensure protection of coral reefs and mangroves and management of no-take zones.

Belts and **suspenders**

“The next best thing to permanent conservation is to **create institutions and policies and commitments that endure...**”



EVERY SO OFTEN, someone will ask me to identify a place that has been truly conserved. They want to hear about a glorious landscape forever protected from development, guaranteeing the wildlife there a safe and healthy home. They want to know about a river or seascape that is in perfect balance and whose precious resources will never again be overused or misappropriated.

As I think about how to respond, I always pause. Because no matter how far I search for examples, I cannot name a single place where the job of conservation is actually complete. In the words of Marjory Stoneman Douglas, who successfully championed the preservation of Florida's Everglades, “the most unhappy thing about conservation is that it is never permanent. If we save a priceless woodland today, it is threatened from another quarter tomorrow.”

The next best thing to permanent conservation is to create institutions and policies and commitments that endure and are devoted to keeping the world's most essential forests or rivers or marine systems intact for as long as possible. Our greatest success stories have done exactly that.

In Namibia, the first African country to include protection of the environment in its constitution, WWF has worked for more than two decades to help establish a national system of conservancies that enable local communities to benefit from their own natural wealth. Or in the Northern Great Plains, where Native American communities and neighboring ranchers are creating practices and systems to keep the prairie intact and restore bison, because they've found ways to benefit from both. Or in the Amazon, where a combination of protected areas, Indigenous reserves, a forest code, and a long-term financial mechanism have all helped secure protections for nearly 12% of the entire ecosystem. All of these initiatives have in common multiple enabling factors that confer greater durability and resilience in the face of the slings and arrows that come with time.

Over nearly six decades of global conservation work, we've learned that it's not enough to simply help establish a park and then walk away, assuming it will thrive in perpetuity. It's not enough to create a community enterprise, without giving people the tools and the enabling policies they need to make it succeed over time.

We've learned that for our efforts to make a difference at a scale that matters, effective government policies must be in place; markets for goods and services must exist; community partnerships must be strong. And you need each of these to signal that conservation matters—in how policies are written, in how goods are priced, and in how communities decide what happens on the ground. And it all works even better if these “belts and suspenders,” however redundant they may seem, are interwoven so that they mutually reinforce each other.

You'll see in the pages of this magazine stories from Malaysia and KAZA in southern Africa that bring to life this truth about our work. Over the past 60 years, we have learned that durable conservation requires knitting together conservation input at every level, in a way that keeps an eye on the whole—the whole river, the whole forest, the whole marine system—and on what it takes to keep it all intact and thriving.

CARTER ROBERTS

President & CEO

SANS SOIL

Growing enough food to feed the world's population comes with an environmental price tag. Traditional farming practices can use too much water, cause deforestation and soil erosion, and lead to pesticide overuse. So how do we feed people sustainably? By combining a new study with an experimental program in St. Louis, WWF is investigating whether soilless alternatives to traditional agriculture can offer a more environmentally friendly system for growing our food.

HYDROPONICS

In this soilless technique of growing crops, plant roots are submerged in nutrient-rich water.



AEROPONICS

Exposed plant roots are misted with nutrient-rich water in this offshoot of hydroponics.



AQUAPONICS

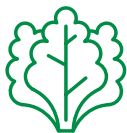
Here, fish tanks are hooked into hydroponics systems, with the waste generated by aquatic animals nourishing the plants.



UV LIGHTS

SAVINGS ACCOUNT

A recent WWF report found soilless agriculture can save both land and water. It can also sidestep soil erosion, reduce food loss through controlled conditions, and minimize pesticide use. **Greenhouse hydroponics, for instance, uses only 10% of the water needed for traditional farming** and uses significantly less land. Vertical hydroponics—growing crops in stacked layers—also uses far less land and water but requires energy-intensive lighting for the plants.



ENLIGHTENED VEGGIES

The study found that lettuce from traditional farms in California has a lower carbon footprint than lettuce that might be grown in a soilless agriculture system in St. Louis. But as lighting technologies and a more renewable energy grid evolve, soilless agriculture may become a more effective approach to producing food. Optical fibers could transmit sunlight directly to the indoors, eliminating the need for LED lights. And genetic engineering could create seeds optimized for indoor farming.

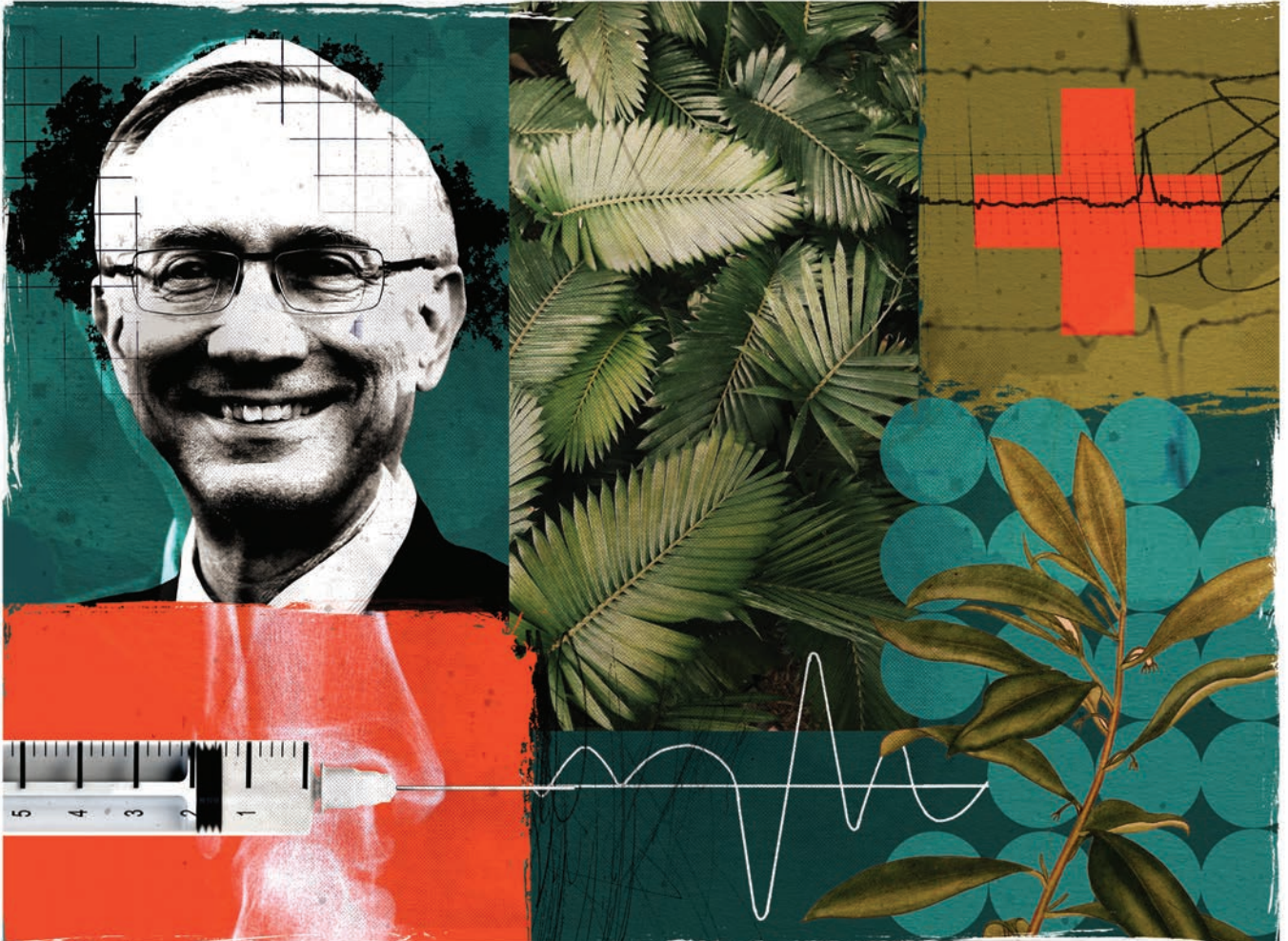


THE RIGHT SPOT

WWF has assembled diverse stakeholders that are partnering with vertical farms to launch a soilless agriculture facility in 2021. This unique collaboration will create a truly innovative farm, reusing existing materials from the area and working to achieve environmental and social goals. St. Louis will host the pilot program; the city has unused structures that can be adapted to indoor farms and also offers a wealth of plant science expertise.



Dr. Harvey Fineberg *on the connection between nature and human health*



Dr. Fineberg is president of the Gordon and Betty Moore Foundation. Previously, he was president of the Institute of Medicine and provost of Harvard University, following 13 years as dean of the Harvard School of Public Health. Dr. Fineberg has devoted most of his academic career to the fields of health policy and medical decision-making. Here, Dr. Fineberg offers five ways to look at some of the issues society faces today.

1

MANAGE RISK

There are many connections between human health and nature. These connections affect everything from the risk of emerging infections to the risk of wildfire. They impact the world's food supply, the survival of threatened species and ecosystems, and more. The COVID-19 pandemic highlights the risk of emerging zoonotic infections.

2

CHOOSE WISELY

As ecosystems are degraded or humans move into frontier regions, opportunities for human-animal interactions increase, along with the risk of emergent disease. The long-term solution rests in ecosystem management and species conservation, as well as human choices in how and where we live and interact with the world around us.

3

LOOK FORWARD

Each zoonotic virus will have its own attributes. But there will generally be a need for accurate and timely diagnostics, public health control, clinical treatments, and safe and effective preventives. There is no shortage of preparedness plans. What has been lacking is successful implementation, adequate investment in public health preventives and solutions, and acceptance of a shared burden.

4

BE THE CHANGE

Philanthropy can act both independently and cooperatively. It can be flexible. It's a diverse field, ranging from individuals and families to large professionalized organizations. Through this diversity, when there is a call to common purpose, durable change is possible. This is what the Moore Foundation seeks to achieve through our work.

5

FUTURE FOCUS

Focusing on possibility gives me hope to continue working toward a better future, every day. To quote Dr. Bernard Lown, cofounder of International Physicians for the Prevention of Nuclear War: "I am a pessimist about the past, because there is nothing to be done to change it. But I am an optimist about the future, because that is in our hands to shape."

NATURE-BASED SOLUTIONS

global challenges, greener futures



FULLERSYMPOSIUM
Science for Nature

We are in an unprecedented climate crisis that needs to be addressed with an unprecedented set of solutions—those that work *with* nature rather than against it. Hear what leading scientists have to say about the benefits and challenges of such nature-based solutions and how we can implement and expand them in a post-COVID world.

Videos from the 2020 Fuller Symposium, Nature-based Solutions, are available now at

worldwildlife.org/fuller2020



IN CONVERSATION

Carter Roberts talks with **Julie Packard**

WWF president and CEO Carter Roberts talks with **JULIE PACKARD**, founding executive director of the Monterey Bay Aquarium and a WWF National Council member, about coping during COVID-19 and creating a place where marine life shines.

This interview has been edited for length and clarity.

CARTER ROBERTS It's a great pleasure to be here with my friend Julie Packard, longtime director of the Monterey Bay Aquarium, trustee of the Packard Foundation, current National Council member, and past WWF Board member. We are having this conversation via Zoom, at a time when the world is being disrupted in many ways. How are you holding up?

JULIE PACKARD Well, Carter, I always try to find humor or some lightness in what's happening—but I'm telling you, this situation does beat all. I think what's giving me positive energy is all the people who are connecting with the aquarium. People need that connection to nature right now. We're doing a daily online ocean meditation in front of our big ocean exhibit. It's really rough times, but we're all reminded that we're in this together. So I take heart in that notion every day.

CR We are in a moment in time that has laid bare the inextricable connection between people and nature. Would you talk about that a bit?

JP I think realizing that we are all being affected by the same global pathogen is a huge reminder that

we live on this small blue planet together and we are so interconnected. It's also a reminder of how the society we've built for ourselves is quite problematic. There are so many aspects of this modern life that demand our attention—from illegal wildlife trade to habitat loss to unsustainable development.

CR Absolutely, and it means of course that we have to think about how we influence people's lives. I would love it if you could just say a word about how you grew up, and what you learned from your parents.

JP I grew up on an apricot orchard, looking down on Santa Clara Valley—which is known as Silicon Valley now. There is such amazing nature here, and I grew up outside enjoying it. That was what our family did and really how I came to value nature. We were very science-based—my dad was an engineer. My mother appreciated the beauty and the aesthetics of nature. A big influence on me was seeing the massive pace of development in the San Francisco Bay area, and then seeing it transform with the birth of the tech industry. All of which was amazing, but the amount of nature that was lost in the process really affected me.

CR I've often said that if you really want to understand an organization, take a look at how it started. Could you tell us the creation story of the Monterey Bay Aquarium?

JP The aquarium idea came up in the mid-1970s, when our family foundation had been operating

for about 10 years. My father, who chaired it, challenged us to think about doing some big projects. Well, my older sister, Nancy Burnett, is a marine biologist, and she and her husband and a couple of their colleagues had a great idea: Take this old sardine cannery Stanford University had purchased and transform it into a place where the public could be exposed to the incredible marine life of Monterey Bay, which we all knew and loved. It took about seven or eight years from the inception to the opening.

CR It's really an extraordinary place. You've also created an innovative program to reach consumers through Seafood Watch [an influential sustainable seafood advisory list], and you've made a difference in several parts of the world on the policy front. Which gets me thinking about the various interactions we have with the ocean, from its value economically and as a source of food, to the interactions of communities and cultures with the ocean, and how we pull on all those different levers to keep it intact. What's your sense of the state of the world of conservation and our ability to look at things as a whole?

JP Wow, that's a big question, Carter. Thanks a lot. [Laughter]

CR I never said this would be easy.

JP My philosophy about doing conservation work is that it takes a village. Or perhaps more accurately in this case, it takes a planet. And each of us is motivated to take action in a different way. There are those who are motivated to do something themselves—they become

vegan, or install solar panels, or take public transportation. But I'm very practical, and I know that's not the case for everyone. I'm also cognizant of the very important role that business plays in our world. And so I've always maintained that influencing corporations is an essential lever—and honestly, perhaps the most powerful lever for now, as we find a path to each of us living as sustainably as we can.

CR The last time we were together in person was in DC, for the unveiling of your portrait at the Smithsonian's National Portrait Gallery. I have to admit to being surprised when you told me about the portrait, since you don't seek public attention as much as some others I know. So why did you agree to have a full-length portrait of yourself painted and hung in a Smithsonian museum?

JP [Laughs] Well, you are so right, Carter. I am a total introvert, and that is not something that I would usually agree to. I said from the start, "I'll do this, but the portrait is about the ocean, not me. I'll be in the portrait, but the focus has to be the ocean and the aquarium."

We found this wonderful contemporary artist, Hope Gangloff, and it turned out to be one of the coolest experiences of my life. She just loved the aquarium, of course; she went wild painting in there. We hit it off and found



My philosophy about doing conservation work is that it takes a village. And each of us is motivated to take action in a different way.

— JULIE PACKARD

ALL ABOUT OCEANS

With 200 exhibits and 80,000 plants and animals—including the Mola mola, shown here—the Monterey Bay Aquarium brings the ocean within easy reach of visitors. The organization has also been working to improve seafood sustainability, address climate change, and end plastic pollution.

out we have the same passion for the environment—we just work through different mediums.

CR Well, the artist succeeded, since the portrait is indeed luminous in its depiction of a vast vertical kelp forest, and Julie Packard just happens to be there in the middle. [Laughter] I'd like to close with two of my favorite questions. First, what professional accomplishment are you most proud of?

JP Leading the aquarium to be the force for nature that it is. It's been a huge privilege. I was given this opportunity at a really young age, and I decided that the way to succeed would be to surround myself with people smarter than I am. I've met so many interesting people and learned so much and have grown to appreciate the power of institutions like ours. And I'm really proud of our team and all that they've accomplished.

CR Last question: If you could be any animal on Earth, what animal would you be?

JP I would be an ocean sunfish. The scientific name is *Mola mola*. We have them periodically in our open-sea exhibit at the aquarium. They're the world's largest bony fish. They've got a fin on the top

and the bottom and sort of a lumpy, pseudo-tail on their behind. They're just kind of a goofy-looking, endearing fish.

I also like to point out that they eat jellyfish, and scientists say that in the future the ocean is going to be very favorable for jellyfish. And so if I am an ocean sunfish in the future, I will probably do fine in a global-warming world.

CR I love that. Ocean sunfish. Definitely spectacular in their weirdness. Low-key and persistent in their own survival.

Julie, thank you for all your work, and thank you for the role that the Packard Foundation has played in our work and the work of so many other institutions. And thanks for your time today. It's been a real pleasure.

JP Thank you, Carter, and good luck to you and the WWF team. You do fantastic work, and we'll look forward to lots of great progress in the future.



To see Julie Packard's ocean-inspired portrait, visit worldwildlife.org/PackardConversation.



05/06/2020
3:36 PM



1

**GRIZZLY BEAR
BRITISH COLUMBIA,
CANADA**

Images from camera traps were used to understand the impacts of human recreation (hiking, mountain biking, horseback riding) on wildlife.

PLOT POINTS

Photo **Whiz**



**WILDLIFE
INSIGHTS CAN**

Analyze 18,000
photos per hour

Recognize 600
species and counting

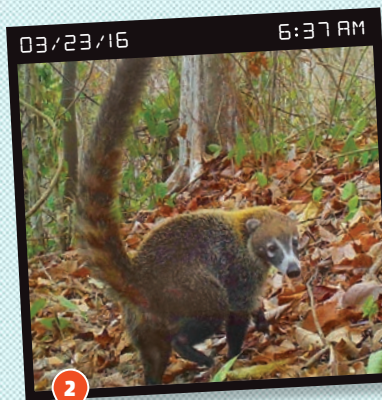
Tag every
animal in images,
not just researchers'
focus species

Filter out blank
(non-wildlife) images

Generate advanced
analyses and reports

Camera traps have become an essential tool for studying wildlife. Often deployed in remote areas for long stretches, they can snap thousands of photos of animals that researchers rarely see up close. But sifting through all that imagery can take weeks, even months. Tagging and analyzing the photos requires extensive training, and uploading and sharing them is a file-transfer nightmare. Enter Wildlife Insights, a new global platform that employs artificial intelligence (AI) to whiz through those tasks, helping conservationists move faster to protect wildlife.

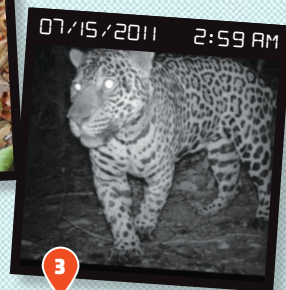
Launched in December 2019 by Google and a host of conservation partners—including WWF and Conservation International—Wildlife Insights offers a simple upload system, cloud-based storage, and AI tagging and analysis. By harnessing the power of big data, the platform unites millions of photos from camera trap projects (conducted by conservation organizations, governments, and citizen scientists) to reveal how wildlife is faring—in near-real time. With better information, we can understand how wildlife populations are changing and take action to protect endangered species. Check out some of our favorite images from the site.



2

**WHITE-NOSED COATI
PANAMA CITY, PANAMA**

Cameras were used in a study evaluating the extent to which climate change will impact tick-borne diseases, which can be carried by mammals like the white-nosed coati.



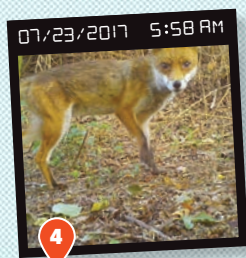
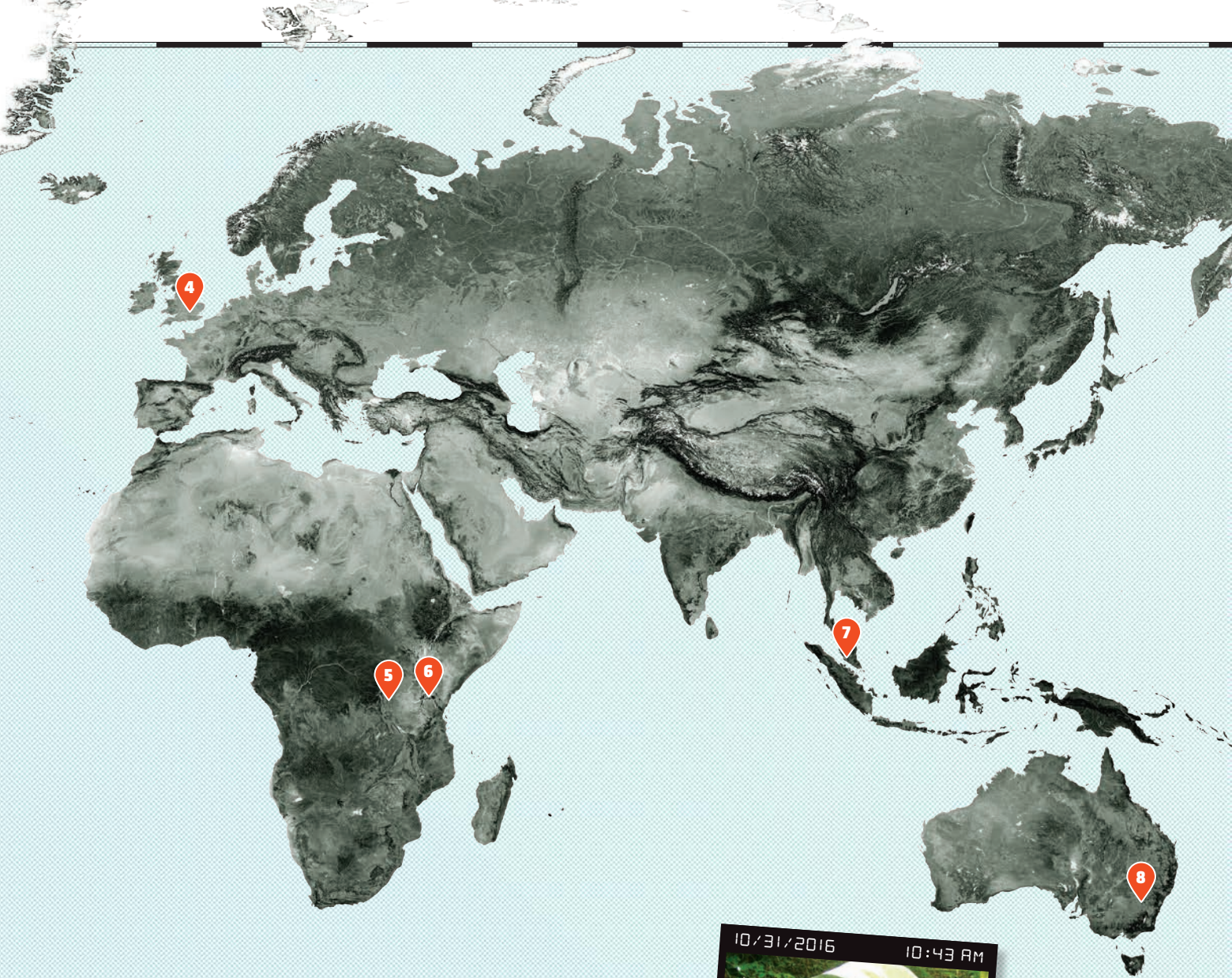
3

**JAGUAR
LA PAZ, BOLIVIA**

For 20 years, a jaguar monitoring program in Madidi National Park, Bolivia, has used camera traps to document the recovery of jaguars and other wildlife populations.

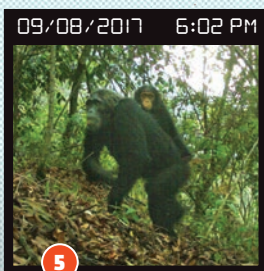


FROM LEFT TO RIGHT, CAMERA TRAP IMAGES COURTESY OF WWF-US, THE SMITHSONIAN INSTITUTE, WILDLIFE CONSERVATION SOCIETY, ZOOLOGICAL SOCIETY OF LONDON, THE TEAM NETWORK AND INSTITUTE OF TROPICAL FOREST CONSERVATION, WILDLIFE CONSERVATION SOCIETY, THE TEAM NETWORK AND SMITHSONIAN TROPICAL RESEARCH INSTITUTE, AND WWF-AUSTRALIA; MAP © ISTOCK.COM/FRANKRAMSPOTT



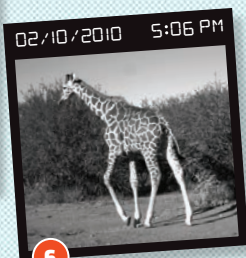
RED FOX
LONDON, UK

Hundreds of cameras were used across London's green spaces to look for urban hedgehogs, but they caught other animals as well, like this curious red fox.



CHIMPANZEE
KANUNGU, UGANDA

A project in Bwindi Impenetrable National Park helps monitor forest species like these endangered chimpanzees. It's part of a network of projects that collect data on biodiversity across the world's tropical forests.



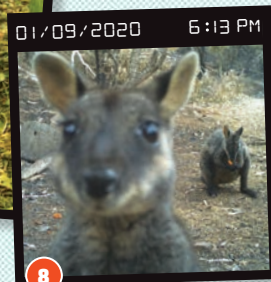
GIRAFFE
LAIKIPIA COUNTY, KENYA

In the arid rangelands of East Africa, cameras were used to explore the relationship between livestock on ranches and the surrounding wildlife.



MALAY TAPIR
NEGERI SEMBILAN, MALAYSIA

This tapir photo, from Pasoh Forest Reserve, is part of a mammal and bird monitoring program that has helped snap rare images of Malaysia's secretive wildlife.



BRUSH-TAILED ROCK WALLABIES
NEW SOUTH WALES, AUSTRALIA

Helicopters dropped food (mostly carrots and sweet potatoes) to isolated populations of wallabies to supplement their diets as they recovered from the recent devastating bushfires.

Namibia's conservancies get **a lifeline for people and wildlife**



Namibia wasn't always the poster child for inclusive conservation that it is today. In the late 1980s and early 1990s, wildlife was scarce, and the country was just emerging from colonial oppression. But with a new constitution came fresh hope: In 1996, the government granted communities rights to create communal conservancies, empowering local people to manage and benefit from their natural resources while giving wildlife populations a chance to recover.

It's a model that's seen enormous success. Today, Namibia's 87 conservancies cover nearly 65,000 square miles—around 20% of the country—and directly employ 300 support staff, more than 1,400 local tourism staff, and over 700 game guards. Recovered wildlife populations, from elephants to

desert lions, have contributed to a booming tourism industry that generates more than 14% of Namibia's GDP. And the country has drawn attention from others hoping to learn from its gains.

But when the COVID-19 pandemic struck, that progress was suddenly at risk. Soon after Namibia reported its first case in March 2020, the government declared a state of emergency, followed by a national lockdown that brought tourism to a standstill. Much of the world responded similarly, with many tourism-dependent communities shutting down hotels, tour companies, and transportation.

Namibia's people and wildlife—especially those in communal conservancies lacking cash reserves or alternative income streams—felt the effects almost immediately. As new bans

restricted travel, thousands of people lost their jobs, increasing their vulnerability to hunger and economic hardship. Hit hardest were rural areas, where many livelihoods had already been threatened by a six-year drought.

"It's a very sad situation because our livelihoods depended on our lodges," says Lorna Dax, manager of the Khaodi & Haos Conservancy in Namibia's Kunene region. In Namibia, she explains, it's not uncommon for one employee to support 10 family members.

Tourism businesses, including lodges and hunting concessions in conservancies, paid \$3.9 million in wages to conservancy employees in 2018. They also paid \$3.6 million in annual conservation fees that help cover the costs of managing and protecting wildlife and

Above: Catherine Mafumelo waitresses at Nambwa Lodge, a joint venture with Mayuni Conservancy in Bwabwata National Park. Namibia's lodges create employment opportunities for community members and provide financial support for conservation efforts.

habitats. This year, though, the payout could be a fraction of that amount.

Without such annual payments, protections for wildlife could decrease, which some worry could lead to a rise in poaching. Recently, a rhino was discovered poached—the first such incident in a communal conservancy in two-and-a-half years. While the event wasn't necessarily linked to the pandemic, experts say it's a warning of how quickly progress can be lost during economic downturns.

Maxi Louis, director of the Namibian Association of Community-Based Natural Resource Management (CBNRM) Support Organization (NACSO), says that she believes conservancies have generally improved people's attitudes toward wildlife, but fears that "due to COVID-19, those gains will be lost." Leonard Masangu Mbala, chairperson of the Kabulubula Conservancy in Namibia's Zambezi region, shares those concerns: "Everyone who has lost their employment has returned to the villages, and people are forced by hunger to poach," he says. "What else can they do?"

As communities try to cope in the short term, the Namibian government, civil society, and passionate conservationists have rallied—with support from WWF and key partners—to help fill the void the pandemic has created.

"Conservation responsibilities come at a cost," says Richard Diggle, CBNRM coordinator for WWF-Namibia. He is collaborating with Namibia's Wildlife and National Parks Directorate for the Ministry of Environment, Forestry and Tourism (MEFT) to develop the Conservation Relief, Recovery and Resilience Facility (CRRRF) fund, a coordinated national effort

to provide immediate financial relief to conservancies affected by COVID-19.

Initially, the fund's primary aim is to maintain salaries for game guards (as coordinated by MEFT); help mitigate human-wildlife conflict; and provide financial support to conservancy members who have lost their incomes. The first payments were disbursed in June 2020.

This joint response was enabled by collaborative relationships among WWF, Namibia's government, the private sector, and NACSO members such as Integrated Rural Development and Nature Conservation. Together with several donors, including The Hamer Foundation, these partners realized that unless strong support could be channeled to Namibia's conservancies, decades of advances might be quickly erased.

For The Hamer Foundation, the fund represents an investment in Namibia's future. "Our founder, Don Hamer, had an abiding love for the people, the animals, and the landscape of Africa. We think he would have seen the importance of providing support for the Hamer Conservation Leadership and KAZA Large Carnivore programs, so that these programs—and the people they benefit—can continue their amazing efforts once the pandemic eases," says Patrick Morse, a trustee of the foundation.

But, as Diggle points out, the CRRRF fund encompasses more than conservation; it's also about securing people's immediate health and livelihoods. "At a time when so many people around the globe have been financially impacted, it's incredible that we can rely on our donors' generosity to keep communities going," he says.

"At a time when so many people around the globe have been financially impacted, it's incredible that we can rely on our donors' generosity to keep communities going."

— RICHARD DIGGLE, WWF-NAMIBIA

Once the pandemic is over, communities must shift from survival mode to planning ahead, adds Tapiwa Makiwa, CEO of the Community Conservation Fund of Namibia. WWF and its partners, recognizing the need to prepare against future system shocks, have already been exploring ways to diversify Namibia's wildlife economy so that conservancies are not wholly dependent on tourism to fund conservation.

While it is still unclear when Namibia will open again to tourists, WWF is optimistic that through continued support and forward-looking leadership, the country's inclusive conservation model—and the communities and wildlife that rely on it—will eventually emerge stronger than before.



“I believe WWF’s Earth for Life initiative represents our best chance to ... **protect what’s left** of these intact natural systems.”

— **Chris Holtz**, Vice President, Earth for Life



CHRIS HOLTZ works to deliver long-term conservation solutions in partnership with countries around the world.

I WAS ON TRACK to go to law school when a graduate research trip to Belize changed my life. I was part of a multidisciplinary team of young academics when I met several WWF staff members and was astounded to learn that conservation was an actual career. Back in Washington, DC, I headed to WWF to ask for an internship.

What fired my imagination in Belize still drives me today. For the last 20 years, I’ve been working to ensure biologists, civil society organizations, and communities around the world have the resources they need to achieve their long-term conservation goals.

The truth is, conservation has become even more complex than it was a couple of decades ago. We are depleting our natural resources faster than we can restore them. But many developing nations appreciate how protected areas help conserve biodiversity by storing and sequestering greenhouse gases and providing income, fuel, water, and food to more than a billion people worldwide.

Funding the protection of these areas in developing countries is a massive challenge, with an estimated \$2.5 billion needed annually to effectively manage their existing protected areas and only about \$800 million on hand.

I believe WWF’s Earth for Life initiative represents our best chance to close that funding gap and protect what’s left of these intact natural systems in ways that benefit and support the rights of communities and Indigenous peoples. The program structures deals, usually in partnership with national and/or local governments, to finance long-term conservation outcomes. Drawing on lessons from the finance sector, future costs are modeled, commitments are made, and once a deal is struck financial pledges become legally binding. And theoretically, Earth for Life guarantees such protections forever.

This approach helps minimize the risk of large conservation projects being derailed by shifting agendas. It also empowers the community of donors. Smaller investors know their money will be effectively used, with fewer surprises down the line. And their donations give

larger investors the confidence to make bigger contributions. All parties know that the funds they pledge will help protect nature beyond the lifetime of an individual and that the money will be managed transparently according to pre-negotiated rules.

WWF is the first organization to create a program dedicated to setting up, testing, and replicating this financing model to achieve globally significant conservation goals. And I spend most of my days actively building partnerships to do this at increasingly large scales.

In practice, closing these deals is complicated and must be driven by a country’s vision. Bhutan is a perfect example. They enshrined conservation goals in their constitution, balancing development objectives with sustainability. Working with WWF, they raised funds to support their conservation goals for a period of 15 years, when they anticipate being able to fund these efforts themselves. Though Bhutan is a tiny country, Bhutan for Life has paved the way for Earth for Life, challenging other countries to adopt the same approach.

This approach also worked in the Amazon, with the Amazon Region Protected Areas for Life program, a \$215 million deal to secure over 148 million acres of the Brazilian Amazon against threats like unsustainable logging and climate change. It worked in Peru. And we’re going to be working with Namibia soon.

Of course, COVID-19 has pushed conservation and climate change lower on countries’ political agendas. So we are reassessing our assumptions about future tourism revenues for conservation and introducing other kinds of economic activities near protected areas. We don’t have all the answers yet, but experts, governments, communities, and scientists are collaborating to figure out answers.

My hope is that as we continue to grow the community of experts working across organizations, and across vast, transboundary landscapes, we can make an evermore convincing case that conservation and economic development can—and must—be reconciled.



KEEP YOUR IMAGINATION WILD

Canyons of the American Southwest. Imagine this: You're standing on the edge of the Grand Canyon, overlooking the Colorado River, a silvery ribbon below. The canyon's sedimentary layers, stacked more than a mile high, were formed by the erosive power of water and wind over millennia. Though this region is known as Red Rock Country, the canyon walls glow gold, rose, rust, and violet, ever-changing as the high desert light works its magic. Neighboring Southwest national parks Bryce and Zion, with their pink pinnacles and soaring sandstone ramparts, are no less moving. You're overcome by wonder at the geological history surrounding you.

Imagine the magic

WWF offers nearly 90 trips of a lifetime, all around the globe.

Learn more at worldwildlife.org/discover.

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WWF's membership travel program is operated in conjunction with Natural Habitat Adventures. They have donated more than \$4.5 million to date in support of WWF's mission and will continue to give 1% of gross sales plus \$125,000 annually through 2023.



WRANGEL ISLAND NATURE RESERVE ::
CHUKOTKA, RUSSIA

A NEW VIEW

Advanced technology offers a glimpse of a remote polar bear den

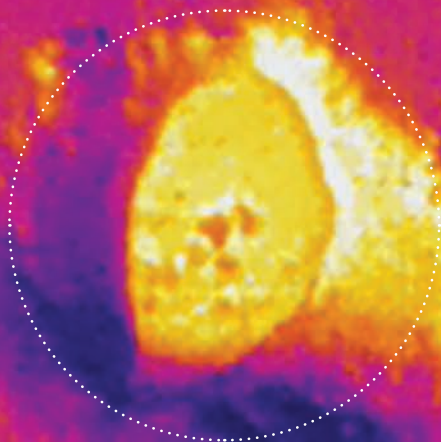
A quadcopter drone hovers above one of the world's most remote spots. Equipped with a thermal camera, the drone searches the snow-covered landscape for signs of new life.

Due to climate change, scientists predict a 30% decline in polar bear populations by 2050. So keeping track of polar bear births is vital to understanding the species' health. But discovering births is challenging: Pregnant bears often shelter in snow dens at high elevation, sometimes with entryways just three feet wide.

In northeastern Russia, WWF-Russia helps Wrangel Island Nature Reserve staff monitor these at-risk bears. Drones provided by WWF find bears more easily than tracking by land, withstand harsh conditions, and are non-invasive. From high in the air, their heat-sensing cameras spot the bears' warm bodies under the snow.

After training, staff successfully used a drone to photograph a den protecting a mother and her two cubs. That happy sighting is part of more good news: Polar bears on Wrangel Island are part of a stable population of more than 2,500 bears. Information obtained from continued monitoring of this population may help maintain long-term biodiversity in other areas where polar bears are declining, such as in nearby Alaska and Canada.

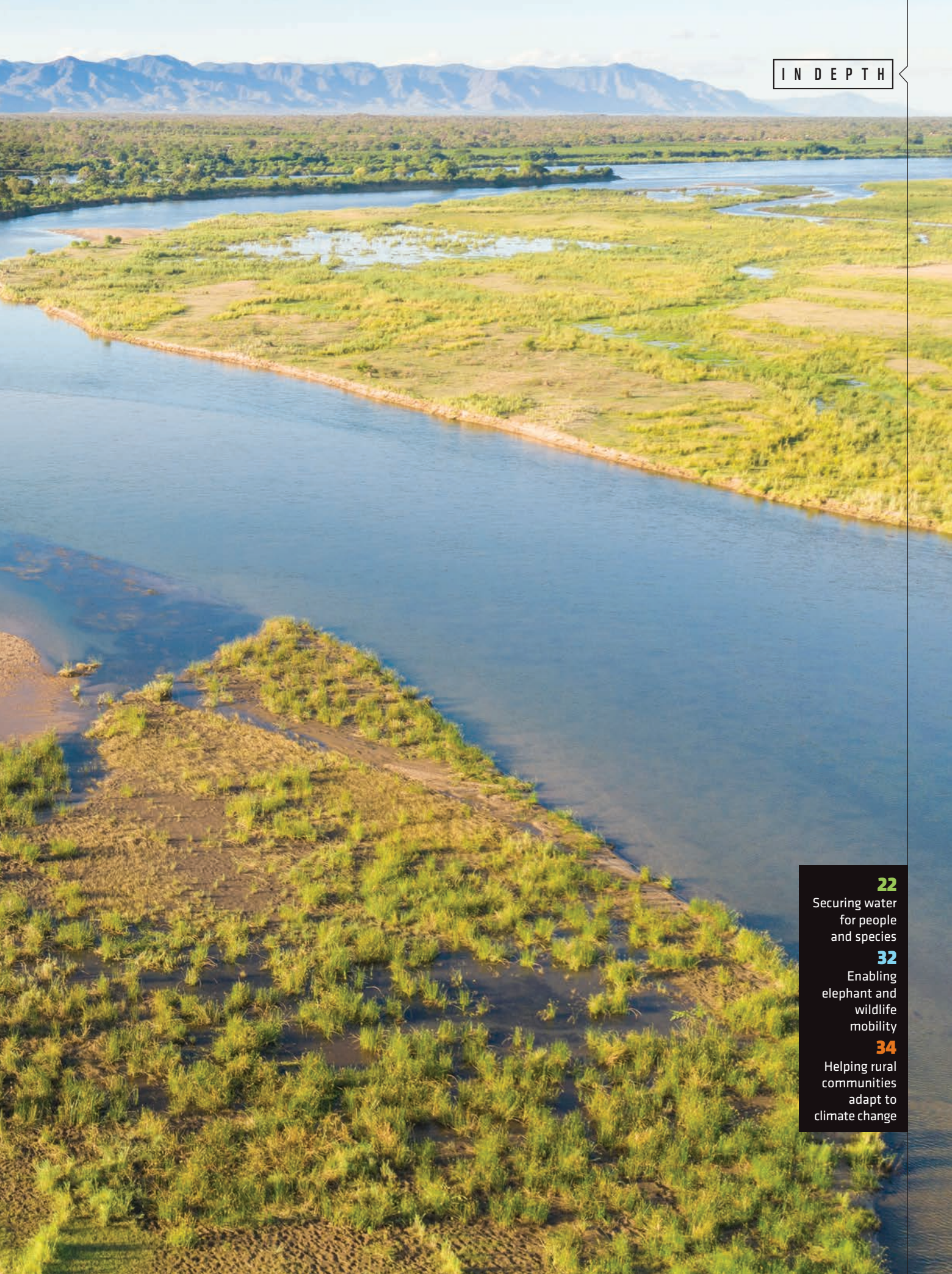
Polar bear den



KAZA

EXPANSIVE LANDSCAPES. LIFE-GIVING RIVERS. PEOPLE.
ELEPHANTS. WILDLIFE. LEARN WHAT WWF AND FIVE
COUNTRIES ARE DOING TO PROTECT IT ALL.



**22**

Securing water
for people
and species

32

Enabling
elephant and
wildlife
mobility

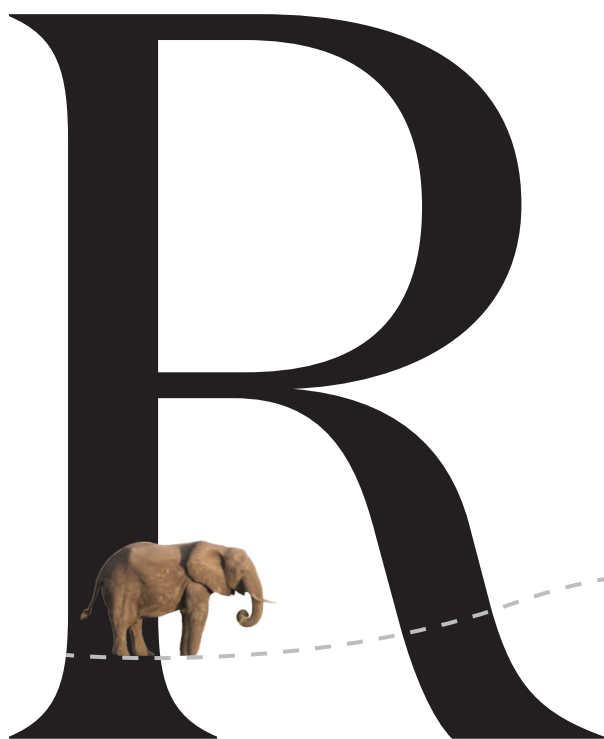
34

Helping rural
communities
adapt to
climate change

Flow Lines

In southern Africa, a confluence of rivers and elephant migration patterns unites five nations around a shared vision for conservation, tourism, and sustainable development

story by **Dianne Tipping-Woods**
photographs by **Patrick Bentley**



RIVERS, STREAMS, AND WETLANDS gush, trickle, surge, soak, seep, and filter their way through the Kavango-Zambezi Transfrontier Conservation Area (KAZA), bringing life to Africa's most ambitious conservation landscape. Like the people and wildlife of the region, the waterways here are unique, diverse, and interconnected. The Okavango River (called the Kavango along the Namibia/Angola border) spills into the famed Okavango Delta; the Zambezi thunders over Victoria Falls; and the Kwando slowly meanders between the two, filling Botswana's Linyanti wetlands before joining the Zambezi.



Three bull
elephants wade
into the Zambezi,
en route to an
herbaceous meal
on the river's
islands.



On a cool winter morning, three young lions bask in the warmth of the sun.



“It’s thanks to the water that this area has some of Africa’s most remarkable natural attributes, from vast herds of elephants to World Heritage sites,” says Mike Knight, KAZA transboundary leader for WWF, which helped establish the conservation area in 2011. “It’s critically important to make sure that water in the system keeps flowing.”

Shared resources are at the heart of KAZA, which is collectively managed for conservation, tourism, and sustainable development by the governments of Angola, Botswana, Namibia, Zambia, and Zimbabwe. (See “Rapid Response,” page 26, for information on WWF’s direct support to communities who have lost tourism-based income due to COVID-19.) The vision is for conservation to become the region’s economic driver, resulting in thriving landscapes where wildlife and human communities coexist.

At 200,000 square miles—roughly the size of France—KAZA is the world’s largest transboundary terrestrial conservation area. Along with its chief rivers and their tributaries, it features more than a dozen national parks and a host of other conservation areas—including large tracts of communal conservancies and Indigenous peoples’ lands. It also contains rural and urban settlements that are home to 2.5 million people.

More than 220,000 African elephants—half the continent’s total population—are the giants of this vibrant landscape. They range over thousands of miles and play a profound role in the ecosystem by dispersing seeds, cycling nutrients, and creating grazing areas for grassland species like buffalos and zebras. KAZA is designed to create space for elephants to move as the rivers do, across borders and between protected areas, and to allow other animals—herbivores like lechwe, roan, and sable antelopes and predators like lions, cheetahs, and African wild dogs—not only to survive but to thrive. “If you secure the environment for elephants, you secure it for other species too,” says Knight.

But wild animals can be hard for people to live with; they raid crops, kill livestock, and endanger human lives. Farmers know to scan the areas around their *kraals* (corrals) for predators’ tracks, and it is not unusual to see elephant footprints on dusty village paths.

The reality is that KAZA’s people and wildlife live together in a sometimes uneasy truce, punctuated by bouts of conflict. Mitigating such conflict, especially with large carnivores and elephants, is key to WWF’s efforts here, as are increasing the participation of local communities in natural resource management and contributing to species conservation and transboundary water- and land-use planning.

The vision for KAZA is an audacious one. “KAZA represents hope for Africa’s elephants,” says Knight, “and for all the communities—human, plant, and animal—that depend on healthy natural systems.”

A Conservation Opportunity

“Securing space for elephants is going to have a monumental impact on the opportunities that exist for people living in the region,” says Knight. But to flourish, elephants need more habitat than KAZA’s formally protected areas currently provide. They also need about 40 gallons of water a day to drink. “They’re quite simply running out of space, in part because of how humans have carved up and fragmented the land,” he says.

That’s why much of WWF’s work in KAZA focuses on wildlife dispersal areas. (See “Crossing Paths,” page 32.) Identified by the member countries, wildlife dispersal areas are strategically positioned tracts of land that connect protected areas so that elephants and other species can travel safely to expand their ranges. One of the most important for elephants is the Kwando

Wildlife Dispersal Area, which connects Botswana, Namibia, and Zambia to protected areas in Angola.

Historically, Angola was part of the natural range of southern Africa’s elephants, but due to decades of war and poaching, the country’s elephants have mostly disappeared. Infrastructure like roads and fences also deters elephants from moving north from Namibia and Botswana.

Although Angola committed to KAZA in 2006, it’s only in recent years that a stable political situation and a willing government have made southern Angola “a conservation opportunity that’s waiting to take place,” says Knight. He estimates that 30,000–60,000 elephants could move into the Angolan portion of

“We’re not changing our **focus** from wildlife, but just realizing how key **water** is to that mission, **both for people and the species** in the landscape.”

— Sarah Davidson,
WWF Director of Water Policy

KAZA, having a huge impact on their conservation and potentially relieving pressure on northern Botswana, where elephant numbers are high. Angola is also home to the headwaters of the Kwando and Okavango rivers, meaning it is vital to the region’s water flows.

Data from collared elephants shows some are already using the Kwando Wildlife Dispersal Area to move into Angola from neighboring countries. One corridor in particular, on the west side of the Kwando River, is “heavily used by elephants and other species,” says Robin Naidoo, WWF’s lead wildlife scientist. This is partly because the river creates a natural corridor and partly because of a gap in the border fence between Namibia and Botswana. “It’s an area of fundamental importance for KAZA’s wildlife,” he says.

Rapid Response

The COVID-19 pandemic has been a huge setback to wildlife- and tourism-dependent communities in KAZA. After taking stock of the situation on the ground, WWF has responded in meaningful ways.

HEALTH FIRST

The pandemic has had a negative impact on agriculture as well as tourism and hospitality industries in Zambia's Sioma district, part of a vital elephant corridor. Due to these dwindling income streams, many communities couldn't afford face masks or hand sanitizer. WWF-Zambia and the Peace Parks Foundation responded by delivering \$22,369 worth of personal protective equipment for communities and frontline health workers to the Ministry of Health in the Sioma Complex of Sesheke District in Western Zambia.

SHARP FOCUS

As tourism-related incomes falter and some rangers are required to shelter in place, illegal trade in wildlife is expected to spike. So WWF-Zimbabwe and the Zimbabwe Parks and Wildlife Authority are implementing and upgrading an automated digital surveillance system in Hwange National Park to gather data from ranger patrols, analyze local poaching trends, and track law enforcement responses—all of which can help control wildlife crime. Additionally, GPS-enabled camera traps allow instant photo messaging from strategic points such as watering holes to a call center, which allows rapid reaction when suspicious movements occur—and reduces the need for face-to-face interactions during the pandemic.

BETTER BASIN HEALTH

The COVID-19 pandemic has highlighted the importance of protecting water sources for both agriculture and human well-being. Improving river basin health not only benefits agriculture but also improves people's access to drinking water, sanitation, and hygiene. With support from USAID and the US Department of State, WWF-Zambia and ACADIR (a partner in Angola) are working with communities on inclusive management of water resources in the Kwando River Basin. At the height of the pandemic, adhering to strict safety precautions, the team continued important training on water management, conservation farming, and climate change adaptation, and also distributed soap and other health and safety materials to help fight the spread of the virus.

Read about what WWF is doing to help people affected by COVID-19 in Namibia on page 14.

"In Portuguese [this part of southeastern Angola] has been called a *terra do fim do mundo*, the land at the end of the Earth," says Antonio Chipita, who works for the Associação de Conservação do Ambiente e Desenvolvimento Integrado Rural, or ACADIR (the Association for Environmental Conservation and Integrated Rural Development), a WWF partner. Chipita describes the area as having some isolated villages, few clinics, fewer hospitals, and very few schools. Most of its residents are subsistence farmers, some of whom moved to the area to escape the worst of the 27-year conflict that began soon after Angola gained independence from Portugal in 1975. Crop yields here are among the lowest in Africa due to poor, sandy soils; most people grow just enough to survive.

Based in the Angolan town of Menongue, Chipita sometimes travels for days on poor roads in this remote area to talk with villagers—many of whom live within Luengue-Luiana National Park—about their challenges, their needs, and their livelihoods.

"We are interested in helping people here have better lives," says Chipita. How do they feel about thousands of elephants potentially moving through their landscape? The views are mixed, he says, adding that villagers have already had conflicts with several elephants, as well as crocodiles, baboons, buffalos, and some predators.

"We don't know what the answers are yet, but we focus on people's needs as a way to start talking about conservation," says Chipita. "People here care about healthcare and food security. Often people say, 'The wildlife is nice, but we're hungry.' You can't argue with that."

Water for Elephants, Water for All

Water, too, is a fundamental concern. In Luengue-Luiana National Park, Chipita says, villagers rely on the Kwando River for water to drink and wash with, for reeds to build with, and for fish to supplement their diets.

But as mighty as the Okavango, Kwando, and Zambezi rivers are, their flows vary in quantity and quality from year to year. Upstream events—droughts, new hydropower dams, pollution, increased extraction—have an impact on the people and wildlife downstream.

People generally cope by shifting their activities to the rivers in the dry season and during droughts, but animals respond in the same way. In the wet summer months, there are natural pans and streams for wildlife to drink from, but in the dry season rivers are the animals' lifelines, too. Take elephants, says Naidoo: "Research clearly shows that water availability is one of the strongest variables for their distribution ... and as human settlements increase along rivers, the points where wildlife can visit the rivers to drink without encountering people become fewer and farther between."

Not surprisingly, human-wildlife conflicts in KAZA often have a link to water. Jess Isden of WildCRU's Trans-Kalahari Predator Programme, a conservation research unit associated with the University of Oxford, studies these conflicts in parts of KAZA. One village where she works in Botswana, for example, is surrounded by protected areas. In the dry season, animals move out of the protected areas and through the village and communal grazing lands to reach water.

"Every village I have worked in has different approaches to and thoughts around wildlife conflict based on their culture and lived experience," says Isden, a coexistence coordinator for WildCRU. But water—and where it flows in relation to people and wildlife—can increase or decrease the potential for conflict. As climate change affects where and how people and wildlife access water, conflicts are likely to grow.



Fishers return to dry land on the Kafue Flats after gathering their nets and catch.

A family of elephants leaves behind tracks in the thick mud of an island in the middle of the Zambezi River.





A pod of hippos
naps in the warm
winter sunshine;
a crocodile rests on
the land nearby.



Climate change has other impacts as well. “The changing seasonality of rainfall is a big thing we’re seeing in all countries in KAZA,” says WWF’s Nikhil Advani, who directs climate change projects in KAZA in collaboration with local organizations like ACADIR. He says that getting real data from people who are living with the consequences of a changing climate is critical, adding that in many cases “it’s simply devastating livelihoods.” (See “Climate Crowd,” page 35.) When communities are under this kind of pressure, he adds, their responses can harm biodiversity as they turn to poaching animals for bushmeat and deforesting areas for charcoal production.

“We need to help communities adapt, with a view to helping nature too,” says Advani. One way to do that is to increase water access for communities through innovative methods like rainwater harvesting.

Flow On

To keep water flowing for people and wildlife in KAZA will take action at every level, from the local to the national, says Sarah Davidson, WWF’s director of water policy. “We need everything from communities using water-saving farming techniques during droughts to neighboring countries collaborating on decisions about shared water resources.”

In collaboration with WWF-Zambia and their partners—including the Angolan government, the intergovernmental Zambezi Watercourse Commission, USAID, and the US Department of State—Davidson is looking specifically at the Kwando River. It’s one of the least-studied rivers in one of the most strategic areas of KAZA, with not only the potential for elephants to move north along its course into southeastern Angola but also, and perhaps even more important, the vital function of moving water south.

As a first step, Davidson and WWF-Zambia are helping local and regional stakeholders develop a “report card” on the health of the Kwando River Basin; it’s an approach that’s been successful elsewhere in planning for the wise use of water. She is optimistic that the report card will serve as an informed and inclusive starting point for conversations about the river’s future.

“Often, our collective understanding of water centers on drinking water and sanitation, but these cannot be separated from rivers and biodiversity,” says Davidson. “We’re not changing our focus from wildlife, but just realizing how key water is to that mission, both for people and the species in the landscape.”

Davidson emphasizes that the communities living in southeastern Angola are small. “It’s not their activities that are threatening the river. It’s the larger upstream decisions about how the river is managed that will affect its health.”

Perhaps the largest threats are hydropower dams: Angola’s hydropower potential is among the highest in Africa. WWF’s

Evan Freund, who focuses on the impacts of infrastructure on freshwater systems, says that hydropower development in the Angolan headwaters would “absolutely” change the dynamics of the Kwando River, not to mention the Okavango and Zambezi rivers.

He says that to protect biodiversity, to allow people to benefit and coexist in a permeable landscape, and to minimize the human footprint through smart regional planning, stakeholders need to manage KAZA’s water as its most fundamental asset.

Wise Development

“The thing to appreciate is that the governments [in KAZA] are trying to figure out how to support an economic growth agenda,” says Freund. “If we are going to promote our conservation strategies, we have to think about infrastructure as part of that. Infrastructure is a conservation issue, front and center.”

With WWF’s support, the Angolan government and the KAZA-TFCA Secretariat are working with small and medium-sized Angolan businesses to look at bankable projects in the tourism, energy, agriculture, and fisheries sectors that will deliver services and support livelihoods without jeopardizing conservation.

In the Kwando Wildlife Dispersal Area, for example, this means making smart decisions about smaller-scale projects linked to zoning and land use. Questions that need to be answered, suggests Freund, include these: Are there better places to plant crops? Can fisheries help offset food insecurity? How do people access markets if the roads are bad? If you must build something, can you make it sustainable and compatible with conservation outcomes?

Solutions that answer questions like these aren’t always obvious, says KAZA-TFCA Secretariat executive director Nyambe Nyambe. But he believes “there cannot be conservation success and impact without other sectors, like commerce, fisheries, agriculture, and public health, because only then can we have true ecosystem health.”

“That’s what makes working on KAZA so exciting,” says Neville Isdell, former chair and CEO of The Coca-Cola Company. The long-time WWF supporter and Board member, and former Board chair, invests in people’s health in KAZA

through the Isdell Flowers Cross Border Malaria Initiative, while helping to rewild conservation areas. “KAZA is designed to care for people, for wildlife, and for habitat. National boundaries do not stop animals, or water, or diseases. We’ve got to address the issue of human well-being and how that’s linked to climate change, and how that in turn is linked to food security and all these other issues in the region.”

“Conservation comes through wise development,” says WWF’s Knight. “For a wildlife economy to work in KAZA, an intact, functioning ecosystem is key.”

“Often people say,
‘The **wildlife** is nice,
but we’re **hungry**.’
You can’t **argue**
with that.”

— Antonio Chipita, ACADIR

Crossing Paths

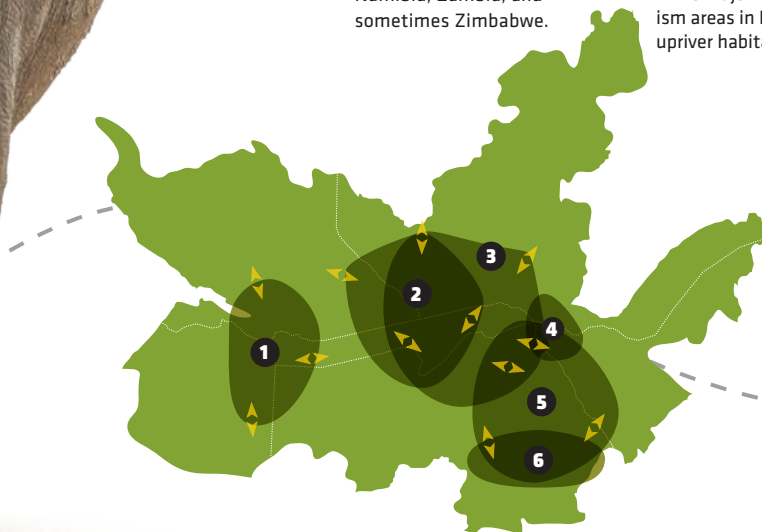
As seasonal waters ebb and flow, the movements of elephants and other wildlife follow. When water sources are more abundant, for example, ranges may expand, but when water is scarce, wildlife can come into conflict with humans and each other. WWF is working hard to understand these movements, to support the continuation of natural systems, to strengthen communities, and to ensure that these vital migrations—across vast areas where people and wildlife must coexist—continue.



WILDLIFE DISPERSAL AREAS

To facilitate wildlife movement across the region, the five KAZA countries have defined six “wildlife dispersal areas” based on existing and historical animal migration routes. These “WDAs” are key corridors for allowing wildlife such as elephants to move more freely across the landscape, spurring healthy species population growth and distributing wildlife-dependent economic benefits to more people.

- 1 KHAUDUM-NGAMILAND**
Wildlife moves throughout northeastern Namibia with extensions into Angola and Botswana.
- 2 KWANDO RIVER**
Movements follow the Kwando River through portions of four countries.
- 3 ZAMBEZI-CHOBE**
Seasonal and migratory crossings between Botswana, Namibia, Zambia, and sometimes Zimbabwe.
- 4 ZAMBEZI/MOSI-OA-TUNYA**
Defined by world-famous Victoria Falls. Provides a small but important corridor between Zambia and Zimbabwe.
- 5 HWANGE-KAZUMA-CHOBE**
Follows wildlife corridors from northwest to southeast, hugging the Botswana and Zimbabwe borders.
- 6 HWANGE-MAKGADIKGADI-NXAI PAN**
Links major wildlife and tourism areas in Botswana with upriver habitat in Zimbabwe.



REASSESSING FENCES

Border fences and veterinary fences erected for disease control purposes run between Botswana and Namibia. WWF research suggests these fences are largely impenetrable for female elephants and family units, even as bull elephants cross fences more regularly. WWF is supportive of government efforts that assess whether the realignment or decommissioning of veterinary fences may appropriately balance livestock and wildlife concerns in the transboundary region.



- KAZA boundary
- Country borders
- Major towns
- Rivers
- Roads
- Deltas
- Dams
- National parks



ELEPHANT MOVEMENT PATTERNS

1

A gap in the Namibia-Botswana border fence allows movements of elephants and other species from northern Botswana into Namibia and southern Angola on the west side of the Kwando River.

2

A state forest and community-designated wildlife corridor allow elephants and other species to move between Mudumu National Park in Namibia and Sioma Ngwezi National Park in Zambia.

3

In the wet season, elephants move out of Hwange National Park in Zimbabwe and across an unfenced border into northern Botswana.



An aerial view
of Victoria Falls,
also known as
Mosi-oa-Tunya,
or “the smoke
that thunders.”

Climate Crowd

Crowdsourcing climate data in Zimbabwe

FARMER AND VILLAGE HEAD George Shoko, from Chisuma village near Victoria Falls in Zimbabwe, clearly remembers the last big thunderstorm he experienced. It was 11 years ago, and it caused flooding. Now, he says, there is less rain each year, it falls later than before, and the weather seems hotter.

“We no longer practice rainmaking ceremonies. Survival is uncertain. Some of us have even stopped farming altogether,” he observes.

His home in Zimbabwe’s Matabeleland North Province lies within the Kavango-Zambezi Transfrontier Conservation Area (KAZA), the five-country expanse that’s been formed to protect biodiversity while supporting people who live in the landscape. It is not far from the Zambezi River, but despite the volume of water that flows over Victoria Falls and through the gorge below, it is a water-scarce area, and there is no direct access to the Zambezi River, which lies across the gorge.

“[Around Victoria Falls], people walk between three and 12 miles for water. Sometimes, they encounter elephants on the way. We lost three people in our community last year due to conflict with elephants,” says Charlene Hewat, director of the nonprofit organization Greenline Africa Trust. Hewat has been working with WWF to collect data on how people living around Victoria Falls experience climate change.

As part of WWF’s Climate Crowd program, the effort informs pilot projects to help rural communities adapt, while reducing pressure on biodiversity.

According to Nikhil Advani, WWF’s director for climate, communities and wildlife, while we know that most of Southern Africa experiences a single rainfall season between October and April, there is a lack of good weather data on Africa in general, and this in turn influences our ability to develop suitable climate projections. However, it’s considered very likely that Africa will continue to warm during the 21st century, and there

is some confidence in projections suggesting reduced rainfall during Southern Africa’s winter months.

“Perhaps of greater importance are observed weather patterns we are already seeing,” he says. “As is the case through much of sub-Saharan Africa, seasonality of rainfall is shifting considerably, and this, along with climate extremes such as drought, is likely to have the most significant impact on communities in the KAZA region, including around Victoria Falls.”

From the 44 interviews (25 women, 19 men) Greenline Africa Trust conducted, access to water and human-wildlife conflict emerged as two big challenges. Two-thirds of respondents said there was less freshwater, while 61% experienced more frequent conflicts with wildlife, which compete with livestock for water and enter farms and villages in search of food. Insufficient water combined with an increase in the prevalence of pests (reported by 57% of respondents) contributed to crop failure, and many farmers reported selling off livestock they could no longer feed.

As peoples’ livelihoods become more vulnerable, they turn to natural resources. A little over a third of those interviewed noted that such coping strategies were negatively affecting the environment. Brick-making, for example, requires large quantities of firewood during the firing process, so it drives deforestation; in turn, the removal of trees contributes to siltation and land degradation along the riverbanks.

“It really is all connected, so trying to reduce all the stressors is important, because we can’t control the rainfall. We just have to hope it comes,” says Advani.


He’s excited by the results of pilot projects implemented with

farmers around Victoria Falls to improve crop yields using conservation agriculture and drip irrigation. Other interventions like reforestation and fuel-efficient cookstoves have shown promise in reducing pressure on natural ecosystems.

The Manyika family farm, on a small piece of land about 15 miles from Victoria Falls, suggests what successful adaptation looks like. The family is part of the Inchelela Farmers Network, which, supported by WWF, began supplying hotels and lodges in Victoria Falls with fresh produce this year. In March 2020, when COVID-19 abruptly halted sales, the farmers bartered tomatoes for maize, sor-

ghum, and millet—a practical innovation in a cash-poor economy like Zimbabwe. Stanley Manyika and his wife plan to sell the extra grains later in the year, “when people start running out of food.”

According to Hewat, more farmers are starting to think long term and are investing in their own land and water provisioning to improve their yields.

A long-time conservationist, Hewat says she realized very early on that “if we don’t involve communities in conservation in a meaningful way, there is no hope for conservation.” And, she says, “access to water is fundamental.” 

“A lack of good **weather data** on Africa in general ... influences our ability to **develop** suitable **climate projections**.”

— Nikhil Advani, Director for Climate, Communities and Wildlife, WWF-US

An aerial photograph of a palm oil plantation. The image shows a dense grid of young palm trees planted in rows, with blue irrigation lines visible on the ground between the plants. The ground is a mix of brown soil and green vegetation. A teal-colored teardrop-shaped graphic is positioned in the lower-left quadrant, containing white text.

How Sabah,
Malaysia,
is seeking to
balance
conservation
and palm oil
production

An aerial photograph of a palm tree nursery. The ground is covered with rows of young palm trees, each in a black plastic nursery bag. The trees are arranged in a grid pattern, with rows of trees separated by narrow paths. A large, yellow teardrop-shaped graphic is superimposed over the center of the image, containing the title 'Common Ground'.

Common Ground

A large, orange teardrop-shaped graphic is located in the bottom right corner of the image. It contains the text 'story Sandy Ong' and 'photographs Aaron Gekoski' in white.

story
Sandy Ong
photographs
Aaron Gekoski

TAWAU, THE EAST MALAYSIAN DISTRICT where Christina Ak Lang grew up, is a tropical paradise. The surrounding sea is a brilliant blue, so clear you can see the coral reefs below. Journeying inland, you'll find gently rolling hills covered with thick stands of trees.

It was in one of these forests that Lang spent many happy days in her youth. "The forest was my playground," the 43-year-old says. "I used to see sun bears and wild boars."

But now, much of Tawau's terrain has been transformed. The rain forest where Lang played is gone, replaced like many others in the area by rows of spiky palm trees that stretch as far as the eye can see. These are the oil palm plantations that today cover more than 50% of the landscape.

"I feel sad that it's all turned into oil palms," says Lang, an office supervisor at Sawit Kinabalu, the third-largest oil palm grower in the state of Sabah, where Tawau is found. (Oil palm is the name of the plant; palm oil, its product.) But, she says, "plantations can help increase people's standard of living."

For developing countries like Malaysia that are trying to grow their economies, the oil known as "liquid gold" holds special promise. Around the world, from Guatemala to Gabon, tropical rain forests are being replaced by plantations growing the orange-red fruits from which palm oil is extracted. Today oil palms cover almost 67 million acres—an area larger than New Zealand.

"It's a fundamental driver of deforestation," says Glyn Davies, WWF-Malaysia senior advisor. "Borneo—the world's third-largest island, comprising the Malaysian states of Sabah and Sarawak, as well as Brunei and five Indonesian provinces—has lost 47% of its forest to palm oil in the past 20 years."

"A fifth of Sabah," Davies continues, "is now covered by a single crop, where wildlife-rich forests stood 40 years before." And as forests have been cleared, animals like the sun bears and wild boars that Lang used to see have been robbed of their habitats.

But today Sabah is aiming to change this trajectory. Primed by local civil society, the state government has committed to meeting the highest standards for responsible palm oil production by 2025 using a pioneering "jurisdictional approach"—one that looks beyond individual plantations and strives for sustainability goals across the whole state. And WWF-Malaysia's Living Landscapes program is contributing to this by bringing together diverse stakeholders in the key landscapes of Tawau, Lower Sugut, and Tabin; testing innovative approaches; and informing the statewide effort in the process.

A UBIQUITOUS COMMODITY

Malaysia is the world's second-largest producer of palm oil, after Indonesia, raking in about US\$9 billion from the crop in 2018—nearly 3% of the country's gross domestic

product. Sabah has supplied up to 10% of annual global trade, estimated at over 70 million metric tons.

Driving palm oil demand are some 3 billion consumers across 150 countries. The edible vegetable oil is found in half of all supermarket goods and seven out of every 10 personal care products—everything from doughnuts to detergents, from ice cream to eyeliner. It's used in animal feed and as a biofuel to power vehicles.

Palm oil has many desirable properties that are hard to find in any other single ingredient: It's stable at high temperatures; resistant to spoilage; and able to smooth lipstick, make foods crispy, and lather up shampoos. "The truth is, there are few alternatives," says Davies. "It's a very versatile commodity. Plus, it's an incredibly efficient crop." A single acre can produce 1.3 tons of palm oil in a year. In comparison, soy and coconut yields are 0.2 tons and 0.3 tons, respectively. "So you would need four to 10 times the land area to get the same amount of other oils," he says.

With global demand continuing unabated and expected to reach a whopping \$US88 billion in value by 2022, palm oil looks set to stay.

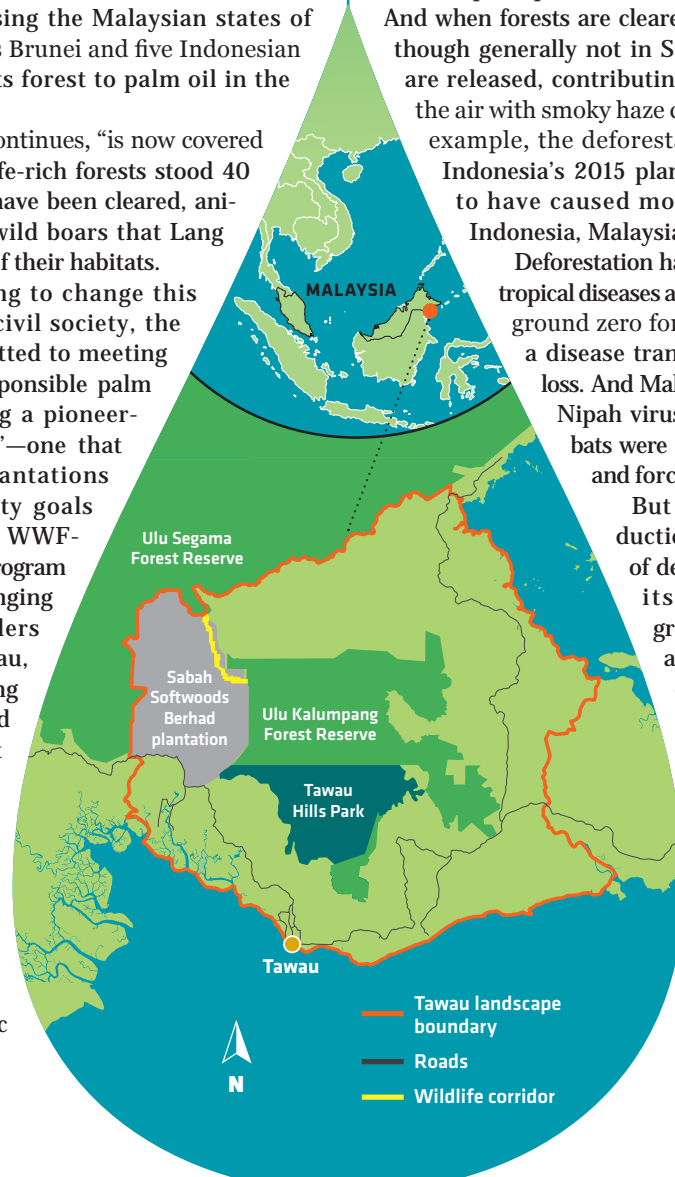
But when weighed in the balance, the costs of palm oil in a place like Sabah—to people as well as to forests and wildlife—have their own superlatives.

When tropical forests, with their protective canopies and lush understories, give way to the uniformly spaced monocultures of palm plantations, flooding and soil erosion increase. And when forests are cleared by burning, as they often are—though generally not in Sabah—harmful greenhouse gases are released, contributing to climate change and choking the air with smoky haze clouds. Human health suffers. For example, the deforestation-induced haze clouds from Indonesia's 2015 planting season alone are estimated to have caused more than 100,000 deaths across Indonesia, Malaysia, and Singapore.

Deforestation has been linked to increased rates of tropical diseases as well. Sabah, in fact, has been called ground zero for a new form of zoonotic malaria, a disease transmitted by monkeys after forest loss. And Malaysia's 1999 outbreak of the deadly Nipah virus emerged after huge numbers of bats were displaced from their forest habitats and forced closer to people and livestock.

But the challenges in palm oil production are not limited to the impacts of deforestation. For example, despite its contributions to economic growth, the industry has also been associated with poor wages and conditions for laborers, and in some cases serious rights violations, that must be addressed across the sector.

So if replacing palm oil isn't an option, then the question is this: How do we produce it in a way that's sustainable in the long run—a way that's better for people, for threatened species, and for the forests that support them both?



NEW GROWTH

A worker plants elephant apple, a native species that bears fruit elephants enjoy, to help restore land that Sabah Softwoods Berhad oil palm plantation has set aside as a wildlife corridor.



WOODLAND WALK

Elephants are a common sight in Sabah's oil palm plantations. At Sabah Softwoods Berhad, WWF has guided efforts to reduce human-wildlife conflict, enabling these animals to roam safely between habitats while reducing crop loss.





“We need to improve sustainable production through better labor and agricultural practices, and minimize further deforestation,” says Davies. “The key is finding a balance.”

IN ALIGNMENT

Helping Sabah find that balance is where Living Landscapes comes in.

“The idea,” says Nicholas Fong, who manages the program for WWF-Malaysia, “is to create a shared vision around balancing production with conservation, to analyze a landscape holistically and determine which areas would be most suitable for production, protection, or restoration.”

“The aim is to get diverse stakeholders to come together and agree on how to balance competing land-use needs,” he

“Ultimately, with the Living Landscapes program, we hope to inspire a new balance between people and nature and foster a culture where we protect forests, produce crops sustainably, and restore lands we have damaged.”

— Glyn Davies, WWF-Malaysia Senior Advisor

continues, “to talk through how we can produce palm oil but also have healthy rivers and protect our forests and wildlife.”

For example, Sabah has now developed a statewide map of high conservation value areas that can guide landscape-level planning and surrounding land use—including where and where not to expand palm oil production. In turn, WWF-Malaysia is convening district-level planners, oil palm growers, and representatives of civil society in several landscapes to test and codify these maps into district development plans.

WWF-Malaysia not only facilitates and participates in the discussions but also brings to the table technical information, such as elephant and orangutan surveys that can be guideposts for land-use planning. It’s a challenging process, Fong admits, because local governments, communities, producers, suppliers, and others often have different priorities.

“This is the DNA of a jurisdictional approach,” says WWF-US director of forests and climate Lloyd Gamble. “We need to be looking at ecosystem health at the scales at which ecosystems function. In jurisdictional approaches, we look to engage multiple stakeholders—government, private sector, civil society, and local communities—across an entire landscape to identify shared sustainability goals and then put planning, policies, and incentives in place to meet them.”

Getting stakeholders to the table can be its own challenge. But when it comes to palm oil, says Gamble, “responsible corporate buyers have already elaborated their own sustainability goals—around zero deforestation, climate, and nature or biodiversity—and their businesses ultimately depend on sustainable supplies.” By engaging with the Sabah government and facilitating the multistakeholder discussions, WWF can help suppliers understand and



1. Landscape spatial planning identifies suitable areas for production and restoration activities

meet those buyers' interests, better positioning themselves in a competitive marketplace.

To that end, WWF is working with a handful of global companies with a footprint in Sabah, including consumer goods giant Unilever. The British-Dutch multinational, whose products range from soap to snacks, committed to using only sustainably sourced oil by 2019 (and came within 0.4% of that goal). In 2018, Unilever backed Sabah's ambition by committing to support the restoration of critical wildlife corridors and help hundreds of the company's palm oil suppliers implement better growing practices.

Many corporations also have goals targeting improved labor standards and other issues that contribute to lower-risk business environments, says Gamble. "Increasingly, they want to do business in places where government takes these issues seriously."

By supporting Living Landscapes and Sabah's jurisdictional approach, Unilever aims not only to improve the sustainability of its own growers but also to foster a better business environment overall. Unilever joined HSBC Bank as an early leader in Sabah, and others have since followed suit.

"The bottom line here," Gamble says, "is that businesses are responding to increasing global demand for sustainability in their supply chains. And this becomes a compelling reason for them to directly support ground-level strategies in the places their products come from, so we can jointly take on these sustainability issues at scale."

SETTING THE STANDARD

The good news is that Living Landscapes isn't starting from scratch, especially when it comes to sustainable production. In 2015, Malaysia introduced a voluntary sustainability standard, called Malaysian Sustainable Palm Oil (MSPO), and subsequently mandated that all players in the industry, from plantations to processing facilities, meet the standard by 2019 in order to operate legally.

"It's about taking care of people, planet, and profit," says Nazlan Mohamad, the sustainability manager at Sawit Kinabalu. To attain certification, firms have to demonstrate they have effective management practices in place, transparent and traceable record keeping, and safe and fair working conditions. They also have to demonstrate environmentally friendly operating practices, such as using renewable energy where possible, maintaining the quality and availability of ground and surface water, and conducting soil and wildlife surveys prior to planting.

"We've been asked to take care of the environment more," says Arni Mansur, who has worked as an herbicide sprayer at Sawit Kinabalu for over a decade. Sitting on a narrow wooden bench outside her company-provided accommodation, a well-ventilated concrete house fronted by a trimmed lawn, she gestures down the road to a row of brightly colored recycling bins. "We can't throw rubbish in the river," she says. "We used to sweep up the leaves that fall and burn them. But now we have to put them in bins, and a truck comes along to collect them."

MSPO has already moved the needle on sustainable palm oil production in Malaysia. Now Sabah seeks to take it further, calling for all its oil palm stakeholders to meet the more stringent international Roundtable on Sustainable Palm Oil (RSPO) standard by 2025. This sets Sabah's palm oil further apart on the international market.



2. Landscape spatial planning identifies where natural resources require protection



CULTIVATING LIQUID GOLD

Clockwise from top left: Arni Mansur reviews homework with her daughter, Nurul Susilayanti, who attends school on the Sawit Kinabalu plantation compound where her parents work; the colorful fruit that yields palm oil, the world's most in-demand vegetable oil; a frog perches on a leaf in Tawau Hills Park; a worker harvests palm fruits in Tawau, Sabah, where oil palm plantations occupy a majority of the landscape.



CROP PRODUCTION REPORT

PROUD PRODUCER

Nazlan Mohamad is the sustainability manager at Sawit Kinabalu, a company that has been certified by MSPD, Malaysia's standard for palm oil sustainability.

JAN	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	D
7900	7700	7600	7800	8500	8000	8600	9400	10000	11000	9
8000	7500	9000								
7546.8										
75.53										
74.34										

ESTATE YIELD PER HECTARE

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	D
1.97											
2.00											
1.88											

YIELD PER HECTARE

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	D
2.15											
1.77											
2.17											
1.71											
1.95											
1.62											
1.58											
1.88											



The brainchild of WWF, Unilever, the Malaysian Palm Oil Association, and others, RSPO was established in 2004 to unite stakeholders, including palm oil producers, consumer goods manufacturers, and investors, in developing and implementing a global standard. Today RSPO certifies nearly 10.7 million acres, or roughly 16% of global palm oil production. Consumers can look for the RSPO symbol—palm fronds splayed out in a neat circle—and know that the product they are buying meets the industry’s highest social and environmental standards.

Twenty-six percent of Sabah’s total oil palm area is already RSPO certified, says WWF-Malaysia’s Fong, and there’s room for new areas to be certified.

Under RSPO, he explains, a landholder or company is required to identify areas of high conservation value on their land—areas that cannot then be converted to plantation. All told, it’s an expensive, technical undertaking.

And while that’s not a hurdle for large corporations with deep pockets, says Fong, it’s a cost that most of the state’s middle-sized growers—which account for more than half of Sabah’s total oil palm area—would struggle to meet.

To help more of them attain RSPO status, WWF-Malaysia is adopting a group-certification approach for small and medium-sized plantations. The move helps defray costs by grouping firms in the same location and supply chain. Members can support one another and attend training sessions together as well, explains Fong.

WWF-Malaysia is also helping growers by providing a platform to link buyers and their producers, working closely with colleagues in India and China, the largest global consumers of palm oil, to help growers understand the nature and quantity of demand. Additionally, the Sabah team invites Chinese and Indian buyers to witness responsible growing practices in action and meet the local government and growers.

But, says Fong, while RSPO is a vital piece of the puzzle in Sabah, certifying individual producers isn’t sufficient. Individual companies can meet the environmental criteria for riparian buffers and so on, but the conservation of wildlife and rivers isn’t confined to discrete production sites. “Animals like elephants and orangutans move across many sites, so for good wildlife and environmental management, we need neighboring plantation managers to work together to achieve better conservation outcomes,” says Fong.

That’s why the Sabah government is now partnering with RSPO and WWF to figure out how to get to statewide RSPO certification, and why WWF-Malaysia is piloting this more holistic land-use planning approach that integrates protection, production, and restoration.

A SHARED SPACE

To comprehend what it’s like to work on such a massive scale, it helps to see how varied a single landscape can be. Sabah Softwoods Berhad is a sprawling 148,000-acre oil palm plantation. Across undulating hills, the characteristic trees extend for miles. There are also rows of *Eucalyptus* and *Albizia* trees, introduced species that the company sells for wood chips and round logs.

But part of the estate feels different: The trees here don’t grow in neat, plantation-style rows, and they’re a mix of heights and species. Laran trees and napier grass grow chest- and head-high.

Unlike in the palm plantations, the undergrowth is fairly thick, although the canopy cover is too sparse to provide relief from the unrelenting tropical sun.

Sabah Softwoods comprises industrial tree plantations, oil palm plantations, and a wildlife corridor. Native tree planting is now cofunded by Sabah Softwoods and Unilever. Covering 2,600 acres in an 8.7-mile stretch, the corridor was established in 2014 to connect two forest reserves, Ulu Kalumpang and Ulu Segama.

“This is the ‘restore’ part of the Living Landscapes program,” explains Fong. The corridor is at the heart of WWF’s vision for a thriving, shared space for people and wildlife.

“The idea is to create a shared vision around balancing production with conservation, to analyze a landscape holistically and determine which areas would be most suitable for production, protection, or restoration.”

— Nicholas Fong, Living Landscapes Program Manager, WWF-Malaysia

“It’s where we work with companies to connect fragmented forested landscapes so animals can pass through safely.

“It’s a big decision for companies to set aside land and forgo money they can make from crops,” says Fong. But for Sabah Softwoods the decision was a no-brainer.

The company used to have trouble with elephants destroying its crops, and in 2012 it approached WWF for help in tackling the issue. WWF carried out biodiversity surveys to identify elephants’ preferred routes. They also shared technical expertise regarding the soil and terrain, what native plant species to grow, and when to grow them—all in order to restore the corridor. For instance, advisers suggested planting fast-growing native trees such as laran and binuang first, followed by dipterocarps, which require more shade.

Eight years on, the impact has been tremendous, says Ram Nathan, Sabah Softwood’s senior manager for environment and conservation. “It’s helped reduce human-elephant conflict in our plantation areas,” he says, and the costs of crop damages fell nearly 100% from 2012 to 2018.

“And we see the presence of wildlife, especially elephants,” Nathan says, proudly noting that eight calves were born on the plantation in 2018. Although originally established to allow elephant movement, the corridor now serves multiple species, and there have been sightings of orangutans, sambar deer, and even sun bears.

“Ultimately, with the Living Landscapes program, we hope to inspire a new balance between people and nature and foster a culture where we protect forests, produce crops sustainably, and restore lands we have damaged,” says Davies. “A few brave successes will show what ‘good’ looks like, and we hope Sabah can become a model for other places that are critical for the ecosystem and wildlife.”



3. Landscape spatial planning informs smarter infrastructure development



PORTHDINLLAEN BEACH :: NORTH WALES, UK

(SEA)GRASS ROOTS**Restoring underwater vegetation to boost biodiversity and ocean health**

On a clear, sunny morning in August 2019, a snorkeler waded into the chilly sea off the coast of North Wales. Beneath him, an expanse of seagrass grew in every direction. He swam toward the seafloor, plucked a handful of seed-bearing stems, and then placed his quarry in a mesh bag and repeated the process.

The snorkeler, a local volunteer, was joining in efforts to collect 1 million seagrass seeds, the first stage in the largest seagrass restoration project ever undertaken in the UK. Seagrasses protect coastlines from erosion, absorb harmful pollutants, and provide safe nursing grounds for species from codfish to seahorses. Able to sequester carbon at 35 times the rate of rain forests, they're also an astonishingly effective buffer against climate change. But in the UK, around 92% of seagrass meadows have been lost.

"Luckily, the science behind seagrass restoration is simple," says Ricardo Zanre, a marine program manager for WWF-UK's Seagrass Ocean Rescue. "It's just like underwater gardening." Once collected, seeds are mixed with sand, placed in burlap sacks, and sown across a seagrass bed in South Wales, where seagrasses had disappeared due to water pollution, industrial development, and boating and fishing activity. Because the area's water quality has now improved, the seeds will soon sprout through the sacks, forming a sprawling meadow.

A partnership with Sky Ocean Rescue and Swansea University, the WWF project aims to restore a total of around five acres of seagrass this year. Eventually, Zanre says, this work could provide a replicable model for restoring seagrass meadows throughout the UK—a nature-based solution that would help address the climate emergency while benefiting fisheries and coastal livelihoods.



SEEING SPOTS

Jaguars often move between forest habitats to hunt and breed. Over a century ago, these large cats roamed as far north as New Mexico and Arizona and as far south as Argentina. But today, they've lost almost 50% of their original range due to threats like deforestation and habitat destruction, and the vast majority of their population is restricted to the Amazon basin. In 2017, WWF-Peru began monitoring jaguars in the Napo-Putumayo Corridor to gain crucial insights that could help ensure the species' long-term survival.



1 IN FOCUS

Between 2017 and 2019, WWF staff installed 129 camera traps in three areas of the corridor: Colombia's Putumayo Predio Indigenous Territory, Ecuador's Cuyabeno Faunistic Production Reserve, and Peru's Güeppi-Sekime National Park. Their aim? To determine jaguar and prey species' population numbers and collect data on how jaguars use their habitats.

2 FOREST KING

WWF scientists identified 30 jaguars across 64,700 camera trap images, allowing them to calculate that around 2,000 jaguars live in the roughly 32 million-acre corridor. These results confirmed that the corridor encompasses vital jaguar habitat, strengthening the case for protecting these ecosystems.

3 BAD GOODS

The illegal trade in jaguar parts—such as these items for sale at a market in Iquitos, Peru—is largely driven by both local and international demand, posing an ongoing threat to jaguar populations in South America.

4 CRUCIAL CORRIDOR

Güeppi-Sekime National Park in Loreto, Peru, is one area included in the study. Soon, WWF will begin the second stage of jaguar monitoring in the corridor, and hopes to replicate the project in Brazil and Bolivia. The data collected will guide WWF's efforts to protect this region and help local authorities make informed conservation decisions.

YOUR ESTATE CAN CHANGE THE WORLD



"A gift in my will offers stability, allowing WWF to do the long-term work needed to protect nature for future generations."

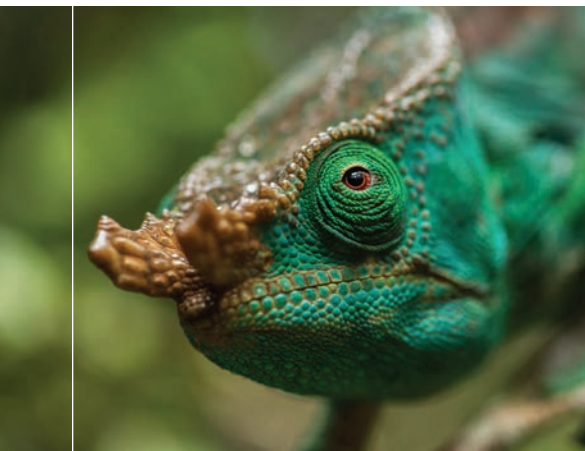
Deb Talbot
WWF Legacy Circle Member



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ANJAVY NATURE RESERVE :: MADAGASCAR

MAKING THE CONNECTION

Learning how Madagascar's coastal forests support bountiful biodiversity

As our boat weaves among Morambay's *tsingy* islands—towering limestone formations that jut from the water—our naturalist guide points to the treetops. “There, look!” It’s one of the most coveted bird sightings in the world: a critically endangered Madagascar fish eagle.

We’re lucky to spy this rare raptor: Fewer than 300 remain in the wild, and they’re found only on this coastal strip of northwest Madagascar, with a handful of breeding pairs in this vicinity. Our group is on an excursion from Anjavy Nature Reserve, on Natural Habitat Adventures’ Madagascar Wildlife Safari, exploring the mangrove forest that provides habitat for the fish eagle and other at-risk species.

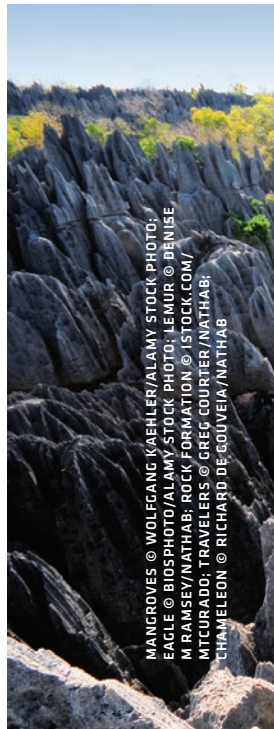
Mangroves flank the Anjavy Peninsula, holding nesting sites for birds and sea turtles, sheltering commercially valuable crab and shrimp, and supporting high levels of connectivity between ecosystems such as coral reefs and seagrass beds. With stilt-like root systems, mangroves also trap mud, filter water, and safeguard coastlines against tidal surges. And they’re incredible carbon sinks, able to store up to four times more carbon than tropical rain forests.

But these important ecosystems are disappearing quickly, our guide explains. They’re threatened by sea level rise, upstream erosion, and deforestation. Madagascar lost about 21% of its mangroves between 1990 and 2010. But since 2007, WWF has partnered with 16 Malagasy communities to help protect and regenerate these incredibly biodiverse coastal forests.

As we return to shore, we feel enlightened. We’ve discovered the intricacies of a single rich ecosystem—and we recognize how fortunate we are to witness it for ourselves. —Wendy Redal



Learn more about travel to Madagascar
at worldwildlife.org/DiscoverMadagascar2020



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GIVE A GIFT THAT GIVES BACK

This holiday, WWF has the perfect way to express your love for friends and family while protecting wildlife and the environment. Donate through WWF's Gift Catalog and choose from many great thank-you items.

Is there a fashionista on your list? Make a gift to WWF and help them spread your love for nature with wild socks in soft organic cotton. Choose from 30 designs inspired by WWF's conservation work around the globe. Sets of three pairs come in a special WWF logo sack.

This holiday, give something you can feel good about ... in more ways than one!

**FOR UNIQUE GIFTS THAT
GIVE BACK, VISIT**

wwfcatalog.org/choose

WHAT'S ON TAP

Some archaeologists theorize that early humans settled near rivers not in pursuit of stable food supplies, but to domesticate crops for brewing beer (a process that made water safer to drink). That thirst for beer—and freshwater's essential role in making it—hasn't changed much since. But as erratic weather and droughts driven by climate change impact crops and freshwater, the world's favorite fermented beverage could take a hit.

> **90%**

The majority of water used in beer production goes toward farming. Barley, which gives beer its flavor and color, requires 15 to 17 inches of water to complete its growth cycle, while some hops varieties require four times that. Scientists predict that droughts and higher temperatures could affect barley crops enough to cause beer shortages by the end of the century. **In the US, the beer supply could fall by 20%.**



The average beer is **90%–95%** water.

CHEERS TO FRESHWATER

Wastewater from the brewing process often contains nutrients or by-products that can pollute freshwater ecosystems. In response, many better-managed breweries have begun to rethink their wastewater disposal, treating water through on-site facilities or green infrastructure, such as constructed wetlands.



REASONS FOR HOP-TIMISM

WWF works with global brewing company Anheuser-Busch InBev (ABI) to measurably improve water availability, water quality, and freshwater biodiversity in at-risk watersheds. The partnership's efforts include improving water use efficiency across ABI's operations, working to restore and protect rivers and water resources, and collaborating with peer companies to advocate for industry-wide change.

BREW HOUSE BREAKDOWN

5-6 GALLONS

The amount of **water needed to produce one gallon of beer inside the average craft brewery.** Most goes toward cleaning, cooling, and packaging operations, while some evaporates or washes away. Now, some breweries have adopted innovative strategies for reducing their water waste, from installing hot-water recovery systems to sourcing recycled H₂O from wastewater treatment plants.

1,039

The number of craft breweries in California in 2019, the most of any US state. But while craft beer pours billions into the economy, it's a water-intensive industry for a drought-prone region: In total, California craft brewers use around **651 million gallons of water annually**—the equivalent annual water usage of 12,000 people.

SAN RAFAELITO :: BAJA CALIFORNIA, MEXICO

PLAYTIME

A sea lion pup is ready for a game

I rowed a kayak for two hours to get from San Rafaelito Island to a spot in the ocean where sea lions were said to interact with schools of sardines. The water was cold, and the pungent scent of sea lions filled the air. Below the surface were thousands of sardines moving in unison through the water. As I snapped underwater shots, I realized that the sea lions were *playing* with the sardines, rather than devouring them!

Then a young sea lion approached me with a playful gleam in its eye and a wiggle in its tail. I continued to take pictures, and it disappeared from the frame of my lens, only to reappear moments later with a toy in its mouth: a seabird feather.

The pup swished the feather from side to side, released it while looking at me, and then grabbed the feather back in its mouth. I could tell it was waiting for me grab the toy and join in the fun. It was as if the youngster were saying to me, "Hey friend, want to play?"

In the end, the pup seemed to realize I would not interact with it or its toy, and it swam away to find a more willing playmate. Now, this photograph is my souvenir of that beautiful experience. —Alejandro Prieto



Deb Talbot on the **magic and wonder of nature**



A self-described workaholic, **Deb Talbot** left the corporate banking world—and New York City—more than two decades ago and hasn't looked back. Since then, she's earned a PhD from the Pacifica Graduate Institute in California, introduced her twin nieces to the beauty of the outdoors, and traveled extensively, including trips to the Galápagos, Namibia, New Zealand, and Botswana. Her love for nature inspired her to support WWF as a Partner in Conservation and become a member of WWF's Legacy Circle, a group of individuals who have included WWF in their estate plans.

Has your passion for conservation evolved over time?

Growing up on a farm in Tennessee taught me the value of hard work and how to live on the land. I believed from an early age that land was sacred, and spending time outdoors has always brought me solace. But it wasn't until later, during one of my PhD courses where we discussed how humanity treats nature as an object, that my perspective really shifted. I realized that all the time I had spent taking care of the land, it had been taking care of me too. That awareness made the magic and wonder of nature all that more important.

What have your travels taught you about conservation?

Before traveling with WWF and Natural Habitat Adventures, I didn't fully understand all the work that goes on behind the scenes to make conservation successful. You have to

work alongside communities to find solutions that respect cultural values and support the local economy, ensuring that both nature and people benefit. For example, in Kenya I got to see how technology is being used by the Maasai people to protect their lands and wildlife. Meeting the people who are doing the work, witnessing their way of life, hearing their stories, and seeing the effort that it takes to create a sustainable future for wild places have all been eye-openers.

Why did you choose to become a member of WWF's Legacy Circle?

More than anything, I believe that my legacy should reflect how I lived. And I want WWF to be able to continue its important conservation work well after I'm gone. Bequest gifts offer stability, allowing an organization like WWF to do the long-term work needed to protect nature for future generations.

CHAMPION THIS

"All aspects of our environment have to be in balance for anything to survive and thrive over the long term. Humans, animals, and the entire natural world depend on the cumulative health of our planet for the well-being of all. At the heart of it, this is WWF's comprehensive conservation approach. I support WWF as a Partner in Conservation to advance this crucial work."

Marlene Petter
Kempton, PA

Contribute \$1,000 or more and become a Partner in Conservation. By pooling your contributions with those of other Partners, you ensure that your impact goes much further—all around the globe, in fact—to make a real difference for the world that our children will inherit.

Because of your exceptional commitment to our work, you will receive the *Privileges of Partnership*. These include

ACCESS—Hear directly from WWF experts; have a personal liaison answer your questions

IMPACT—Get personalized updates on how your gifts advance our conservation goals

COMMUNITY—Network with your fellow Partners in Conservation at exclusive events

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**PARTNERS
IN CONSERVATION**

Blazhka Dimitrova is doing her part to inspire **a zero-waste Bulgaria**



NAME Blazhka Dimitrova
AGE 30
HOME Sofia, Bulgaria
CAUSE Championing a zero-waste lifestyle

IN 2018, Blazhka Dimitrova knew it was time to make a change. She had spent two years working to create a zero-waste home—eschewing single-use plastics, reusing what she could, and composting leftover food. Her catering company, on the other hand, was producing a significant amount of waste.

That disconnect led her to reexamine her business. “I felt uncomfortable creating so much waste at my company while throwing away almost nothing at home,” she says. Dimitrova was right to be concerned: One-third of food produced for human consumption is lost or wasted.

By 2020, Dimitrova had transformed her catering company into Blagichka-Zero Waste, the first zero-waste restaurant in Bulgaria. She also opened a second restaurant, and rather than sending excess food to landfills, both aim to use every scrap of food possible—down to the last potato peel. Any unused food is given to people in need or composted. The restaurants also collaborate with food distributors and customers to ensure that food arrives and leaves in reusable packaging.

But the zero-waste philosophy is about more than minimizing our environmental

footprint, Dimitrova explains. “It’s about the way you think and live your life,” she says. For her, it’s a worldview.

In addition to managing her restaurants, Dimitrova authored a book about zero-waste principles and devotes time to teaching others about living waste-free. She cofounded Zero Waste Bulgaria, a group that develops educational materials for schools and consults with local businesses looking to reduce their impact. And she advocates for legislative changes, too.

In recognition of these efforts, Dimitrova was awarded this year’s WWF International President’s Youth Award. The award recognizes outstanding achievements by young conservationists who are making significant contributions toward protecting the natural world and inspiring others to do the same.

What started as a lifestyle choice has now become a movement, Dimitrova says, and she plans to keep working to encourage change in Bulgaria and beyond. “Business as usual no longer works. Being able to provide alternative solutions gives me so much satisfaction,” she says. “I hope to inspire more people to join me in building a more sustainable world. It depends on us.”

A PLASTIC-US PROBLEM

New marine species are discovered daily—but in some cases, plastic pollution is finding them first. In 2014, scientists named *Eurythenes plasticus*, a creature living in the Marianas Trench, after a microplastic fiber they found inside its belly. The species is the first animal ever to be named after plastic, a moniker that serves as a warning of the far-reaching impacts of the choices we make every day.

DEEP-SEA DIVER

The new species is a deep-sea scavenging amphipod. Sometimes called “hoppers,” amphipods are small crustaceans that resemble shrimp.

THORAX

BODY

Smooth, with no carapace (protective shell)

actual size



HEAD

ANTENNAE

ABDOMEN

LEGS

microfiber

FIRST IMPRESSIONS

HABITAT AND RANGE Amphipods are found in every ocean in the world at a range of depths. *Eurythenes plasticus* was discovered in the Marianas Trench's upper depths, at about four miles deep.

SIZE Around a half-inch long

DIET Primarily carrion and plant and animal detritus

CANARY IN A SEA TRENCH

Recently, researchers collected amphipods from six of the deepest ocean trenches. They found microfibers in almost 75% of the creatures—and in all of those from the Marianas Trench.

OUT OF SIGHT

Microfibers come from plastic or synthetic sources; they also come from organic ones, such as cotton. Simply washing clothing can release microfibers into waterways, where they can be mistakenly ingested by marine life and damage fragile ecosystems.

PET PEEVES

The microfiber removed from one specimen was about 80% similar to polyethylene terephthalate (PET). PET fibers are used in clothing materials—in the garment industry, it's known as polyester—and in the electronics and automotive industries. PET is also found in household items, from plastic bottles to food packaging.

Artwork from #ArtForEarth

This year, in celebration of the 50th anniversary of Earth Day, eco-enthusiasts around the world found a new way to express their love for the planet. Between April 20 and 26, WWF invited our supporters to create artwork expressing the value of nature and its meaning in their lives, and then share their art on social media channels using the hashtag #ArtForEarth. In just one week, contributors ranging from *New Yorker* cartoonists to school-aged children shared 16,000 posts across Instagram, Facebook, and Twitter, showcasing their incredible creativity and the power of nature to connect us all. Here are just a few of our favorites from Instagram.

BELOW

@oliviawendelttextiles

OPPOSITE

Left to Right

Row 1: @miragoldeart

@gilljoirwin

@vernislabb

Row 2: @amelinajonesart

@letsgomakeart

@veliadeiuliis

Row 3: @shopaltcreative

@jeffdillonfineart

@bridgetsfineart

Row 4: @danywaizart

@noemie_labrosse

@seanfournier







**ABOVE**

@c.schwathe/@all.she.makes

OPPOSITE

Left to Right

Row 1: @tomassanchezstudio

@littledudegallery

@elissapoma

Row 2: @lorraineloots

@watchmecomplain

@art_elena_mille

Row 3: @amydecaussin

@mercedesbellido

@katiewillmeringdesign

Row 4: @tarasarart

@artbykfitch

@vanessabarragao_work

THE TAKEAWAY

WEAR IT WELL

Clothing habits to help the Earth

Thriving secondhand marketplaces—online and in person—have made it easier for us to upcycle the clothes we don't wear, giving discarded items new life. But beyond selling or buying secondhand, a few basic practices can reduce our sartorial environmental impact.

WISER WASHING Reduce water and energy use while making your clothes last longer. Wash only what *really* needs washing: A sweatshirt that's worn over a t-shirt doesn't have to land in the hamper. Wash clothes in cold water; in most cases it cleans as well as hot and uses less energy. If you have a clothesline, skip the dryer and hang clothes up to air dry.

ON THE MEND A hole in that favorite pair of jeans? Learn *sashiko*—the Japanese art of embroidered mending—and give them an upgrade! And sewing on a button only takes a few minutes; reclaim that shirt languishing in the back of the closet. Or, when you buy clothes, do some research. Some well-known brands will mend clothes for you.

DONATE AWAY Once you've loved a piece of clothing and are ready to let it go, donate it to your local clothing donation site. Many donation centers will recycle almost any item that's not suitable to resell or give away.

By caring for your clothes with the environment in mind, you'll reduce your carbon footprint and be able to wear your favorite outfits longer.



SECURITY FOR YOU AND WILDLIFE



When you establish a **charitable gift annuity** with WWF, you can provide yourself or someone you designate with dependable income for life. Best of all, your gift will help guarantee a more secure future for wildlife and their habitats around the world.

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TEAM TODAY.**

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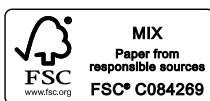
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