Sustaining nature's diversity

Issue 2, February 2021

BIODIVERSITY & ENVIRONMENT AFRICA

CONSERVATION NEWS

LATEST REPORTS

HEALTH & WELLBEING

the GUT Microbiome

Suncare in the age of global warming

BIODIVERSITY FOCUS

Endangered Frogs

Cover image: A Kloof frog *Natalobatrachus bonebergi*
Photo: Warren Schmidt

MISSION
Biodiversity & Environment Africa (publication) strives to present accurate and informative news on relevant biodiversity and environmental topics from across the African continent. We aim to disseminate academic research findings and communicate this in an informative and understandable format to our readers, as well as highlighting important **conservation and environmental issues.**

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Biodiversity & Environment Africa is published monthly as an independent electronic magazine in PDF format. It is published under YamakuwiTek (Pty) Ltd – Technical & Environmental Services.

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When will the tide of DESTRUCTION turn?

There is a sense of increasing urgency with each new report and academic paper published. Species loss, biodiversity collapse, climate change, environmental destruction. But why are we not being proactive and taking this seriously? The major challenge we have, I believe, is that the wrong people are reading these reports. Simply put, it is a minuscule percentage of conservationists, biologists and ecologists, and a handful of others, that even glance at these documents. In fact, the editors and reviewers are probably the ones that have read them more intensively than anyone else. And the problem is, conservationists are reading something they already know. This information is only reaching the politicians and corporates in fragmented pieces. To them, it's like viewing a half- constructed jigsaw puzzle so they're only getting half the message, but the urgency and extent of the problem is not being appreciated or adequately addressed.

Against the backdrop of information overload, I believe the average working person out there simply does not have the time nor energy, or inclination, to take time out of their schedules, to really delve deep and think about the problem. At best, most people will get snippets through Discovery or Nat Geo Wild, or perhaps some other televised programme. But the problem is, very, very few people are appreciating the magnitude of the problem. And of course, it's a fine line between being an alarmist and a pragmatic realist.

The longer someone has been in conservation, the more acutely aware they are of the challenges our natural world is facing. It's no surprise that renowned conservation celebrity Sir David Attenborough has made a passionate plea for people to sit up and take note. The problem, however, is that people are naturally attracted towards positive and upbeat news or events rather than facing uncomfortable truths. Take a marketing company, for example, that invests an equal amount of time and effort into marketing two side by side events – one a music concert

with top artists, and the other a show on environmental destruction. The music concert will be sold out and the environmental show will attract perhaps a dozen pensioners or so. No one wants to hear about doom and gloom. So how do we go about creating awareness on such a disheartening subject, yet do it in a positive, creative, and upbeat manner? And I'm not convinced our celebrity artists can achieve this either. In 1981 Boney M released their song "Don't kill the world" as an impassioned plea for environmental awareness, but 40 years later, that's exactly what we're doing…killing the natural world.

there is a glimmer of hope…

I have recently read some thought provoking papers and these make worthwhile reading. They address some of the problems I've highlighted above, and some give us some hope that the effort behind conservation is not completely in vain.

In a paper published in the journal Sustainability, Michael Gavin and colleagues make the point that effective biodiversity conservation requires dynamic, pluralistic and partnership-based approaches. In the paper they made a disconcerting claim: "Global-scale policy initiatives, including the Convention on Biological Diversity, have failed to curb the loss of biodiversity." This is disheartening but when measured against the challenges of a growing human population, poverty, conflict and the overwhelming need for resources and land, this comes as no surprise. In this paper they discuss the principles of Champions of New Conservation Science (NCS) and Half Earth (HE) conservation approaches, but suggest a broader, integrative approach with a strong focus on indigenous communities. I have always been uncomfortable in assigning a specific category or approach to biodiversity conservation. Nature is dynamic and complicated; therefore a one-shoe fits all approach will never work. We need an adaptable, evidence-based, community-driven and integrated approach to conservation with a strong focus on education. Not enough is being done to teach communities living near threatened species about ecosystem services and the importance of those species within the environment.

Another important paper is one published in Bioscience by William Ripple and Christopher Wolf (affiliated with the Department of Forest Ecosystems and Society at Oregon State University) with 11 258 scientist signatories and titled "World Scientists' Warning of a Climate Emergency."

>>>>>>>>>>> *continue to page 4*

In this paper, a number of graphs are presented showing the rates of human consumption and reliance on fossil fuels and the associated negative environmental impacts. The rapid downward trajectories in many of these illustrative examples are truly alarming.

On a slightly upbeat note, Friederike Bolam and colleagues, in the journal Conservation Letters, gives a review on how many bird and mammal extinctions have, through recent conservation action, been prevented. The results show that at least 28-48 bird and mammal extinctions were prevented between 1993 to 2020. Despite an estimated 15 confirmed or strongly suspected extinctions, this figure would have been much higher without active conservation management of these threatened species. Unfortunately, this paper never addressed amphibian and reptile species, which are declining at alarming rates and whose extinctions are more difficult to gauge.

There is much to be done and we need a massive, collaborative effort to preserve the legacy of 4 billion years of evolution so that our children and their children and the generations that follow, can still appreciate a frog at the pond or a caterpillar emerging from its cocoon as a beautiful butterfly.

And on conclusion, and in a positive light, read what Dr Jeanne Tarrant and the Endangered Wildlife Trust are doing for our threatened amphibians. The stories on the Pickersgill's Reed Frog and Amathole Toad highlight some of the conservation success stories.

VIEWPOINT RESEARCHED AND WRITTEN BY: Warren Schmidt

Warren Schmidt holds a Master of Science degree in Ecological Sciences awarded by the University of KwaZulu-Natal, South Africa. He has three decades of experience in ecology, conservation science, invasion biology and herpetology. He has worked as a journalist, magazine editor, and lecturer, and has presented numerous talks, seminars, and lectures.

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The Black-collared Barbet

These birds are primarily frugivorous, feeding on a variety of tree fruits. Photo: Warren Schmidt.

The Black-collared Barbet is a bird allied to the Savanna and Indian Ocean Coastal Belt Biomes, preferring woodland and forests. It will however readily occupy open savanna and urban gardens with adequate tree cover. There are around eight subspecies recognised throughout Africa, but differences are based on plumage colour and size differences, so for the sake of simplicity, subspecies and races are not covered in these birding features.

Male and female Black-collared Barbets have similar plumage. The broad bill is black and the eyes dark with reddish iris. The front half of the head, cheeks and neck is bright red with the back of the head and neck being black. On a few birds the red is replaced by yellow. The body plumage and tail feathers are silvery grey.

The primary wing feathers have a yellow-striped appearance when the bird is perching. The legs and feet are greyish-black.

Black-collared Barbets are resident birds within their territories and are usually observed in pairs. Therefore, at feeding stations or favourite trees, the same birds are likely to be seen daily. They may roost in small groups and usually inside the hollow cavities of trees. These birds are primarily frugivorous, feeding on a variety of tree fruits and small nuts. They are especially partial to wild figs but will also take the fruit of waterberries, karee, guarris, sourberries, milkwood and jackalberries. In addition, Black-collared Barbets will opportunistically include insects and nectar in their diet.

Black-collared Barbets are monogamous, cooperative breeders. Barbets construct their own nest cavities by digging out hollows in trees. These are often enlarged and used by other birds over successive breeding seasons. Breeding takes place throughout the summer season and females lay from 3-5 eggs at a time. The eggs are incubated by both parents and will hatch after 18-19 days. Both parents participate in feeding the young and may sometimes leave the nest unattended as they forage for food. Fledglings emerge after 33-36 days.

The Black-collared Barbet is a bird allied to the Savanna and Indian Ocean Coastal Belt Biomes,preferring woodland and forests. Photo: Warren Schmidt.

Black-collared Barbets are resident birds within their territories and usually observed in pairs. Photo: Warren Schmidt.

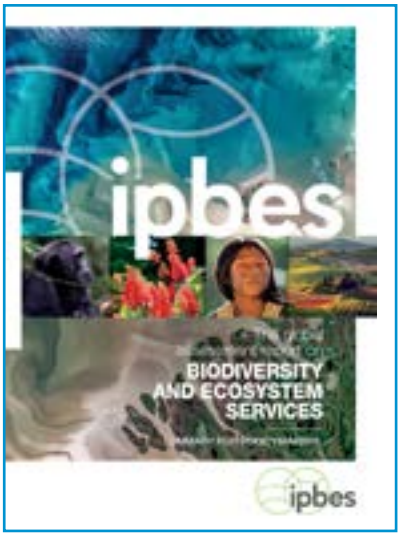
Class: Aves
Order: Piciformes
Family: *Lybiidae*
Species: *Lybius torquatus*
Etymology: *Lybius* = derived from Greek and in reference to a bird mentioned by Aristotle and Aristophanes. *torquatus* = adorned with a necklace.
IUCN Conservation Status: Least Concern

PHOTOS & WRITTEN BY: Warren Schmidt

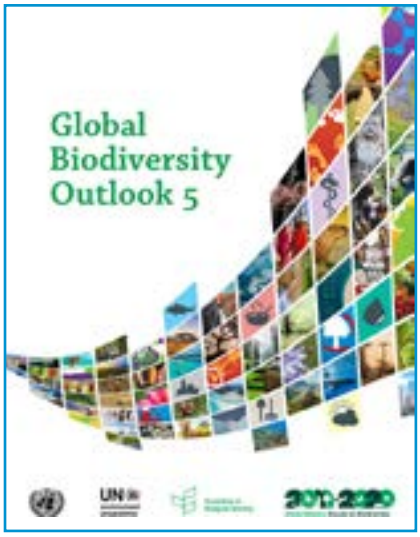
RECENT PUBLICATIONS & REPORTS

The following reports provide a wealth of information on the status of biodiversity. They highlight key findings into the state of biodiversity and essential reading for conservationists and resource managers across the globe. These reports, if anything, should stimulate a global emergency response to tackle the serious state of ecosystem and biodiversity collapse and global climate change. In addition, a new publication produced by the Department of Environment, Forestry and Fisheries, the South African National Biodiversity Institute and BirdLife South Africa, in collaboration with Enviro Insight.

The Species Environmental Assessment Guidelines provides a framework and guidelines for environmental practitioners on the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa.



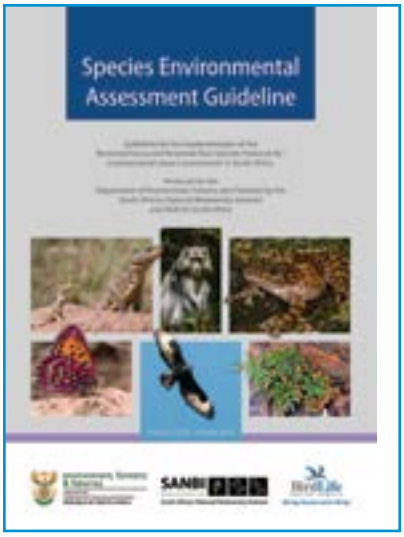
IPBES – The global assessment report on Biodiversity and Ecosystem Services is a summary document for policymakers on the current status of biodiversity and ecosystem services. It is produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) 2019 and can be accessed here: ipbes.net/global-assessment



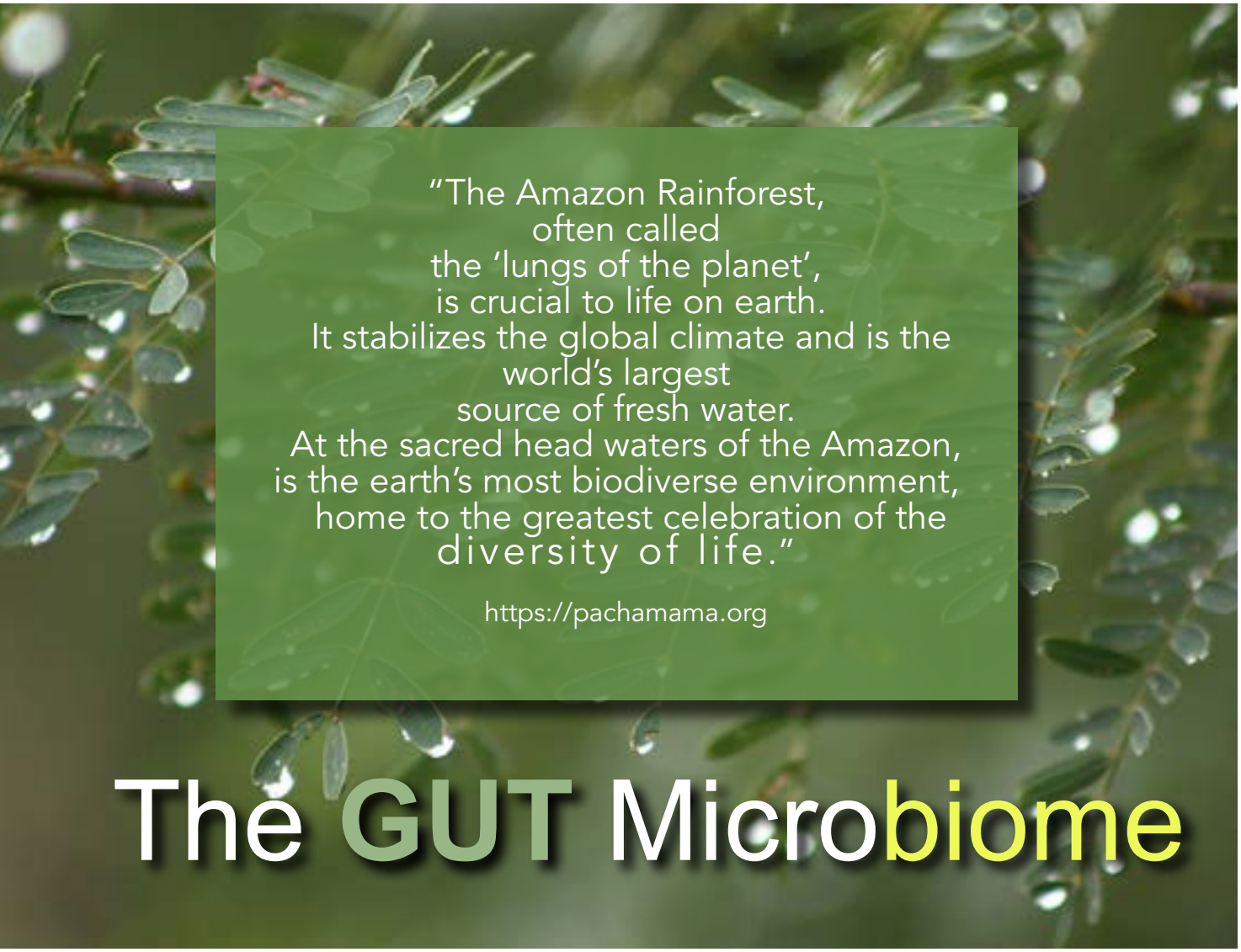
Global Biodiversity Outlook 5 is the latest status report produced by the United Nations Environment Programme and the Convention of Biological Diversity (2020). This publication provides an overview on the current state of biodiversity and a review of the 2011-2020 United Nations Decade on Biodiversity. Access the report here: cbd.int/gbo5

The Living Planet Report is a collaborative synthesis by the World Wide Fund for Nature (WWF) and the Zoological Society of London. This status report should be read together with the Global Biodiversity Outlook 5 as it provides sobering and thought-provoking details on the current status of the world's natural areas and biodiversity crisis. Access the report here: livingplanet.panda.org/en-za/

The State of the World's Forests (2020) is another publication by the United Nations Environment Programme and the Food and Agriculture Organization of the United Nations. This report investigates the status of the world's forests and the communities which rely on these forests for food, shelter and materials. Access the report here: fao.org/state-of-forests/en/



With the increased need for Environmental Impact Assessments (EIAs) on all developments including agriculture, forestry and other landscape uses, the Species Environmental Assessment Guidelines provides a framework and guidelines for environmental practitioners on the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa.



The GUT Microbiome

As above so below, the Amazon Rainforest lends a powerful lead-in to an eye opening parallel. We know that this earthly *macro*biome continues to survive precariously under persistent threat. Conversely, much has been said around raising awareness in relation to the *micro*biome dwelling inside our own human colon. Both entities house life. As the overall health of our planet depends on saving this ancient green belt of forest, sacred to some, an individual's health and vitality depends greatly on the delicate balance and biodiversity of our microbiota -commonly known as our friendly flora. Our 'biological micro-forest' one can call it.

Current research into sustaining the microbiome from cradle to grave in overall human physical, mental, and societal health, has become a huge focal point in Functional Medicine and appears widely throughout informational platforms that speak about natural healing. Yet old indigenous communities have always had this knowledge and have freely passed it forward. Chris Kresser, renowned expert, leading clinician and top educator in the fields of Functional Medicine and ancestral health, and the New York Times-bestselling author of the Paleo Cure, teaches that we can learn a lot from looking at paleontological evidence and studying the few remaining traditional hunter-gatherer cultures on Earth. From an ancestral or evolutionary perspective, surmounting evidence is showing that many modern chronic diseases are a result of a mismatch between our innate biology and our modern environment tainted heavily by restructured food production.

As with deforestation, where the loss of trees and other vegetation can cause climate change, desertification, soil erosion, fewer crops, flooding, increased greenhouse gases in the atmosphere, a host of problems can occur when there is disruption and deterioration of the colon's own micro-ecology.

BIOLOGICAL CONTROL CENTRE

The human digestive system is nothing short of a vast ecosystem occupied by trillions of microorganisms. These are collectively referred to as the gut microbiome. Sound gut ecology consists of a wide abundant variety of beneficial microbes. It is understood to influence everything about our health.

The gut microbiota can be thought of as 'a control centre' for so much of our biology. It regulates many physiological functions, both locally inside the colon itself, and systemically, in various tissues and organs ranging from our heart to our skin. These inter-relationships remind us yet again of the ecological balance inside a vast biosphere such as a rainforest and how all the numerous biospheres globally ensure the delicate balance of life on our planet. In an interview with Dr. Justin Sonnenburg he explains that our microbiota are not only impacting digestion and absorption, but that they make systemic and collective impacts

on our immune system, our metabolism, and our brain chemistry. Much of our biology outside of the gut is being controlled by these beneficial microbes.

The most important facet of our biology that is impacted by this microbial community is our immune function, again, certainly in the large intestine, but also throughout our body. It hugely determines how likely we are to fight off a respiratory infection, how quickly an autoimmune disease in our central nervous system progresses, how we respond to vaccination, and these are just a few examples. All these kinds of processes are impacted by what our gut microbes are doing.

An extremely interesting aspect of the gut microbiota is that it is malleable. It changes day to day. We can affect it through what we eat. This means we own a powerful lever on our health and in determining how well our immune system can protect us.

Look out for our next article in March titled: 'Saving the Micro-Biome', where we look at practical ways of how to take care of our good colon flora for better health and well-being.

Did you know?

Your skin and gut both have their own microbiome that 'speak to each another'…

The perception of the skin as an ecosystem - made up of living biological and physical components taking up space in diverse habitats - can further our understanding of the delicate balance between host and microorganism.

Like the colon, the skin can also be understood as an interface with the outside environment and is likewise also colonized by a diverse milieu of microorganisms, most of which are harmless or even beneficial to their host. These include bacteria, fungi and viruses and even mites! These ecological players have a vital role in signalling to the gut microbiome who in turn help in educating the immune system for an effective response against invading pathogens.

WRITTEN BY: Nicolette Da Costa

Nicolette completed her tertiary education in social sciences, humanities and romance languages through the University of the Witwatersrand (WITS) and UNISA.Subsequently, her drive for making a difference lead her to the complementary health world where she is a registered Therapeutic Reflexologist & Meridian Therapist. Over the past 16 years, Nicolette has run her practice in Johannesburg providing treatments that offer strong support in bringing about stress relief, healing and recovery from illness, and a sense of greater vitality for people of all ages, from all walks of life. She has written several magazine articles and an e-book called *Earthing The Wired Generation -Stress Relief for Busy Kids*, available on Amazon.com. Nicolette believes that 'wellbeing', in all senses of the word, individually, societally, and globally, now and for the future, is inextricably tied in with nature. We can not fully care for ourselves & one another without looking after and being with the natural world.

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Interview with Industry Experts: **Britta Wilson** (Brand Manager) and **Jenny Wright** (Managing Director) of **Galderma**, the largest independent **Dermatology company** worldwide.

Will sun protection creams be protective enough with global warming and climate change in years to come? Climate change refers to the global shift in weather patterns occurring over long periods of time. These changes include temperature, rainfall, cloud cover and wind speeds. Climate change has accelerated rapidly in the past half century but it is important to remember that the sun is not responsible for global warming. This global warming phenomenon is caused by greenhouse gases, such as carbon dioxide and nitrous oxide, trapping infrared radiation from the sun in the atmosphere, warming temperatures over time.

With warmer temperatures, there is an increased tendency to spend more time outdoors and possibly wear less clothing, which would possibly indicate an increase in exposure to sunlight and the UV radiation. Sun protection will therefore potentially become a more integral part of daily skincare routine to ensure we protect our skin, and first line of defense! As more studies are conducted around this topic and more information is uncovered, companies will continue investing into developing new, and better ways of sun protection.

Has the skin technology around sun protection evolved in line with climate change and global warming? Skin technology continues to evolve with the growing needs of skincare and is not specifically linked to climate change and global warming. According to insights from skin specialists and skincare influencers, trends for the future will include the move towards *minimalistic regimens*. This means simplifying skincare regimes, including wearing less make-up for more of a Natural appearance, or using products that involve less steps in a regime eg. instead of cleanse, toner, moisturizer, etc. one will use products that are pH balanced so that the toner step may be omitted.
We also see the rise of *microbiome-friendly* products. These are skincare products that will be infused with the natural bacteria of the skin, which will help the skin maintain its optimal balance, and the rise of microbiome-friendly products.
One of the biggest changes will be in in the packaging used, moving from the use of single-use plastic packaging to packaging that is less harmful on the environment. However, studies will need to be undertaken to ensure that the new form of packaging used is safe and has no detrimental effect on the ingredients or action of the ingredients in the product.

How about Vitamin D absorption -won't we block this or interfere with the natural physiological processes in the body by wearing sun cream too often? We all need vitamin D. It helps keep your bones strong by regulating calcium levels and also gives an important boost to the immune system. When your skin is exposed to sunlight, it manufactures vitamin D. The sun's ultraviolet B (UVB) rays interact with a protein in the skin, converting it into vitamin D3, the active form of vitamin D.
The problem is people are worried they may develop a vitamin D deficiency if they are using sun creams and other forms of sun protection. It is believed that the best way to obtain enough of the vitamin is through unprotected sun exposure. The truth is, it doesn't take much sun exposure for the body to produce vitamin D. Even though high-SPF sun creams are designed to filter out most of the sun's UVB rays which may cause sunburn and damage, some of the sun's UV rays still reach your skin. Clinical studies have not found that everyday sunscreen use leads to vitamin D insufficiency. In fact, the prevailing studies show that people who use sunscreen daily can maintain their vitamin D levels. There is overwhelming evidence for the multiple benefits of sun protection so rather protect yourself!

What happens in the skin, as the largest organ of the body, if we don't use a good sun cream? When your skin is exposed to the various rays from the sun (which include Ultraviolet (UV) A, B, as well as Infrared rays), the skin absorbs these rays. The UV rays penetrate outer skin layers and hit the deeper layers of the skin, where they can damage skin cells/DNA or kill skin cells. Usually the skin tries to protect itself against these rays by: increasing epidermal (outer layer of the skin) thickness, producing Melanin, DNA repair mechanisms and apoptosis (controlled cell death).
The pigment Melanin, also responsible for giving your skin its colour, absorbs the energy of UV light and helps prevent the light from damaging skin cells and penetrating deeper into the tissues. Even though your skin has developed all these mechanisms to try protect itself, there are always some rays that penetrate through these natural defenses, and so extra precautions of including the use of high to very high protection sun creams is advised.

SUN SAFETY TIPS:

- By applying an SPF 50, you are providing 50 times the skins normal skin protection against UVB rays (ie: 98% protection). The lower the SPF, the less protection.
- It is important to remember: regardless the SPF being used, you always have to reapply your sun cream every 2 hours if in direct sunlight, or after swimming/ sweating.
- Try to avoid the sun when UV rays are their strongest between 10am and 2pm.
- All ethnicities need to wear sun protection creams. The sun creams help prevent the UV rays from penetrating and damaging cells/DNA, thus protecting your very important largest organ – your skin, so it can perform its important functions!

Leaping Conservation for Frogs

Frogs are essential environmental indicators, but many species have vanished across the globe. We spoke to Dr Jeanne Tarrant, Threatened Amphibian Programme Manager at the Endangered Wildlife Trust, about these endearing creatures, and Leap Day for Frogs – an annual campaign to bring awareness to frogs, their fascination, and their plight.

Tell us about your background and what stimulated your interest in amphibians? I grew up in the southern Drakensberg of KwaZulu-Natal and have always felt a connection to nature and animals. Although, to be honest this connection wasn't very focussed on frogs! Like a lot of people, frogs scared me a bit. I thought they were slimy and strange! It was not until I enrolled for a MSc degree in Environmental Science through North-West University in 2006 and taking up a study on frogs of the Drakensberg and Lesotho that my eyes started opening up to the world of frogs. I truly had no idea what a diverse, interesting and widespread group of animals they are. This led to a PhD in Zoology on amphibian conservation in South Africa, and I have been incredibly fortunate to model a career on this, and the need to bridge the gap between academic research and on-the-ground conservation action for amphibians.

With heightened awareness around declining amphibian populations and conservation, what is the current global outlook for threatened species?

Amphibians as a group have been historically rather overlooked in terms of conservation planning and funding. With an increasing recognition that amphibians as a group are the most threatened vertebrates on Earth, this is slowly changing. There is a global action plan, first published in 2007, that is currently being revised, along with a practitioner guide to implementing the most urgent actions. Funding for amphibian conservation is also being increasingly recognised as important, and there is a growing public awareness about the biodiversity crisis, and I think, a genuine increase in interest in smaller wildlife. Social and television media also helps in spreading this urgent message to the public. However, with more than 40% of amphibians (a total of some 8000+ species) threatened with extinction, until we manage to protect critical habitats – especially forests and freshwater -, reduce our consumption and stabilise human population growth, the outlook for amphibians will remain on the decline. Much progress is being made on understanding threats and how to mitigate these, but this requires not just research, but massive behavioural change at both the public and policy level.

How many species are threatened in South Africa?
Of our 135 species, 43 species are listed according to the **IUCN Red List** categories:
Critically Endangered (CR): 6
Endangered (EN): 9
Data Deficient (DD): 4
Near Threatened (NT): 12
Not Evaluated (NE): 11
Vulnerable (VU): 1
Total threatened: 43
The percentage of species endemic to SA is 54%, i.e. they don't occur outside of our borders!

What are the major drivers contributing to amphibian declines?

Amphibians are the class most impacted by the current extinction crisis. Habitat loss and transformation is the primary threat to amphibians globally (affecting 60% of species). Loss of wetlands and forests in particular is of significant concern. The next biggest driver of declines is pollution and contamination, especially of freshwater ecosystems. Disease, in particular the amphibian chytrid fungus has been responsible not only for declines, but extinctions of numerous species. Climate change, the pet and food trade, and alien invasive species also all impact negatively on native amphibian populations. Often, these factors are working synergistically to exacerbate the effects on amphibian species, creating the 'perfect storm' for extinction. This is not only upsetting, but should be deeply worrying given that amphibians have been in existence for over 300 million years.

Please tell us more about the Endangered Wildlife Trust's Threatened Amphibians Programme and some of the current projects? The EWT Threatened Amphibian Programme was established in 2012, with one project on the Critically Endangered Amathole Toad, Vandijkophrynus amatolicus. We continue to work on this species today and are working to secure the first formally declared Protected Areas for the species' habitat in the Eastern Cape Amathole Mountains through landowner agreements covering up to 20,000 hectares. We have also run a project on the Endangered Pickersgill's Reed Frog, Hyperolius pickersgilli, since 2013, including habitat restoration of coastal wetland, through local employment to clear over 1000 hectares of alien vegetation from nine sites. We are working towards declaration of a Protected Environment encompassing 530 hectares of wetland

>>>>>>>> *continue to page 12 &13*

The Table Mountain Ghost Frog *Heleophryne rosei* is **Critically Endangered** and only found in a handful of streams on Table Mountain in the Western Cape. Photo: Jeanne Tarrant.

The Amathola Toad *Vandijkophrynus amatolicus* is a **Critically Endangered** frog found in the Eastern Cape. Photo: Chad Keates.

Pickersgill's Reed Frog *Hyperolius pickersgilli* from KwaZulu-Natal is another threatened frog listed as **Endangered**. Photo: Jeanne Tarrant/EWT

A Cape Mountain Toad *Capensibufo sp.* from the Western Cape. Photo: Jeanne Tarrant/EWT

The Kloof Frog *Natalobatrachus bonebergi* lives in forested Kloofs in KwaZulu-Natal and is listed as **Endangered.** Photo: Warren Schmidt.

and swamp forest with the traditional authority in Adam's Mission on the south coast to protect these critical habitats.

We now run five projects across KwaZulu-Natal, Eastern Cape and Western Cape focussed on eight threatened frog species (as well as some reptile work). The more recent work in the Western Cape includes improving catchment management based on research and monitoring of the Critically Endangered Table Mountain Ghost Frog, Heleophryne rosei – known only from a handful of streams on Table Mountain. In 2020, we started work on additional species in the Overberg region of the Western Cape, all of which are highly endemic, range-limited, threatened frogs. Namely, the Moonlight Mountain Toadlet, Capensibufo selenophos (Data Deficient); Rough Moss Frog, Arthroleptella rugosa (Critically Endangered) and Micro Frog, Microbatrachella capensis (Critically Endangered).

This work, done in partnership with the dynamic Bionerds duo, Keir and Alouise Lynch, aims to improve knowledge on distributions and secure sites for protection through landowner agreements. Since June 2020, we have confirmed nine new localities for these species and three landowners have already committed to Biodiversity Stewardship agreements, to protect and manage sites on their land where these frogs occur.

You have been involved in numerous awareness programmes – what is the overall perception of frogs with the communities you have engaged with?

Perceptions of frogs are very varied. Some cultural beliefs have created genuine fear of frogs as these associations are based on beliefs of witchcraft and curses. However, even simple engagement and environmental education can go a long way to changing these attitudes towards the positive end of the spectrum. We conduct extensive community surveys to understand these beliefs and attitudes towards frogs, and the natural environment in general. Between 2019 and 2020, we engaged over 1030 community members and learners in environmental education programmes. Four hundred people in Adams Mission have signed for support of a Protected Environment adjacent to their community, a clear indication of the recognition of the value of natural ecosystem services.

Tell us about Leap Day for Frogs, the origins and events planned for this year? This will be our 7th official "Leap Day for Frogs" – the concept of which hinges on the idea of leaping frogs (of course!), Leap Year (being held at the end of February each year), and taking a leap of action by members of the public that contributes to appreciation of frogs.The day aims to celebrate, recognise and appreciate the amazing diversity of frogs in South Africa, but also to bring action to the plight of frogs, which is that they are the most threatened animals on Earth. And that they play an extremely important role in the ecosystem, without which, we too as humans will "croak"! This year, with the restrictions imposed because of Covid-19, we have postponed our usual events that involve gatherings of more than 100 people, but we encourage the public to organise their own events (the day has built a momentum of its own that several groups carry out their own annual activities) – you can follow these on the Leaping for Frogs Facebook Page.(We will also be launching an update of the Frog Atlas for South Africa, eSwatini and Lesotho. Help us with your contributions by uploading them the 'Find your Frog' project on iNaturalist (https://www.inaturalist.org/projects/find-your-frog) and stand a chance to win some awesome froggy prizes that will help you in your citizen science quest!)

What can readers do to contribute towards amphibian conservation, both at the grassroots level, as well as active support for the EWT projects?

Start by learning more about the frogs in your local area – we have several regional posters (feel free to email me to request these: jeannet@ewt.org.za). Join relevant Facebook groups etc. to share and learn. Build a frog pond. Clean up and restore a wetlands/pan in your local area. Oppose developments that impact sensitive ecosystems in your area. Keep your garden wild and indigenous. Don't keep frogs as pets. Have two or fewer children. Question your consumption (eat less meat). Donate to amphibian conservation projects.

Dr Jeanne Tarrant

Programme Manager- Endangered Wildlife Trust, Threatened Amphibian Programme

Based in KwaZulu-Natal, Jeanne Tarrant, aka the "Frog Lady", manages the Endangered Wildlife Trust's Threatened Amphibian Programme (TAP).

Her passion for amphibians began when she joined the North-West University (Potchefstroom) to do an MSc in Environmental Science. There she met Prof. Louis du Preez who heads up the African Amphibian Conservation Research Group, and "almost by default fell into the world of frogs". Her thesis was on river frogs of Lesotho, including the second largest species in Africa – the Maluti River Frog, a huge frog that comes complete with teeth. She now has 14 years of experience in the field of amphibian research and conservation, having completed a PhD in Zoology in 2012 and her post-doctoral fellowship through North-West University, while at the same time establishing TAP for the EWT. Much of her PhD and post-doctoral research was dedicated to the Pickersgill's Reed Frog, Hyperolius pickersgilli, at the time Critically Endangered, and which remains a key focal species of TAP's work. As a Programme Manager for the EWT, she is responsible for project design and coordination, specialist knowledge, partner and donor relations, fundraising and project management. The TAP team currently employs 7 full time staff – the highest number of people directly employed in frog conservation by any one organisation in South Africa. The programme is dedicated to implementing on-the-ground conservation action for South Africa's most threatened frog species, and aims to:

- Elevate the conservation importance of frogs and their freshwater and associated terrestrial habitats within southern Africa.
- Implement conservation actions that align with global amphibian conservation goals.
- Bridge the gap between research and on-the-ground conservation action by supporting and implementing relevant research projects.
- Drive social change to promote behaviours that support sustainable natural resource use to the benefit of amphibians and their habitats.

Almost all of her work is linked to threatened frog species, which are usually associated with very limited distribution ranges and specific habitat types, most of which are not protected or well-managed, so this is where TAP focuses its efforts. Currently the programme has projects looking at about 8 threatened species across three province (KZN, Eastern Cape and Western Cape). Where a species may occur in several locations, we carry out prioritisation exercises to determine which sites are most in need of intervention. We also look at priority areas in terms of provincial and national conservation importance.

At a global scale, this work contributes directly to putting into action the objectives outlined in the Amphibian Conservation Action Plan (ACAP 2007), which is a high-level, cross-disciplinary strategy to address amphibian conservation needs. The ACAP is the most ambitious program ever developed to combat the extinction of species and offers practical, large-scale, creative, innovative and realistic actions that will be required to halt the present tide of extinctions of amphibian species. Through its amphibian work, EWT is the only NGO operating in South Africa to include frogs as a conservation focus. Using threatened frog species as flagships for the conservation of important freshwater and terrestrial habitats, we implement species and habitat monitoring, initiate habitat protection strategies at important amphibian areas, improve management of important amphibian habitat, use research to support conservation action, and promote social change to galvanise behavioural change towards frogs and recognition of the importance of their habitats in South Africa. Jeanne initiated and led the development of a Biodiversity Management Plan (BMP-S) for Pickersgill's Reed Frog with the support of Ezemvelo KZN Wildlife. The plan was gazetted by the Minister of Environmental Affairs in June 2017 – the first such plan for a threatened frog species in South Africa to be formally recognised by government – and has to date achieved several of its objectives, including downlisting the species to Endangered from Critically Endangered in 2010. This plan identifies the key threats facing this species and outlines broad actions to mitigate against these threats. She has been responsible for catalysing exciting national and international partnerships with key players in the amphibian conservation realm, including local and provincial conservation authorities, ex-situ facilities, academic institutions and the Amphibian Specialist Group. In 2020, Jeanne was recipient of the Whitley Award, or "Green Oscar" for her work in conservation. This award is awarded to grassroots conservationists form the global south – i.e. Africa, Asia and South America. Jeanne was one of 112 applicants, whittled down to 6 winners, and the only recipient with a project focused on amphibians. Edward Whitley, founder of the Whitley Fund for Nature, said that Jeanne is an inspiring leader who tirelessly advocates for amphibians - an often overlooked group. "We hope that this award will allow her to spread her important message far and wide, and bring about real change for amphibians and their habitat through science, policy, and community education."

RECYCLING SMALL HARD PLASTIC

Plastic bottle caps, rings, clips and containers are serious environmental pollutants.

Plastic remains one of our most serious environmental pollutants. Small plastics such as bottle caps, medicine containers and bread clips are found in thousands of consumer products. Bottle tops come in a range of different sizes and colours and are often embossed with a company logo or some other design. Bottle caps are manufactured by high speed injection moulding.

The main constituents used in the manufacture of bottle caps include:

PET – polyethylene terephthalate – lightweight and strong and used in softdrink and water bottles.

HDPE – high density polyethylene – tough, stiff and lightweight.

LDPE – low density polyethylene – flexible and good impact strength.

PP – polypropylene – a hard and rugged plastic used in many bottle caps.

WHAT IS POLYETHYLENE?

Polyethylene is the most common type of plastic found in most pa ckaging products including plastic bags. Over 100 million tons of polyethylene plastic is produced annually and accounts for over 34% of all plastic produced. Polyethylene is made from hydrocarbons (the main constituents of petroleum and gas) and various chemical additives to give the plastic certain strengths and characteristics.

There are two main types – low density polyethylene is extruded using high pressure and high temperatures whilst high density polyethylene is extruded using low pressure and low temperatures.

Polyethylene plastics are not biodegradable but can be collected and recycled. However, some bacteria can feed on polyethylene plastic under certain conditions and can slowly break down the plastics. Daniel Burd, in May 2008, won the Canada-Wide Science Fair after discovering that a bacteria Pseudomonas fluorescens together with Sphingomonas can degrade up to 40% the weight of plastic bags within six weeks. A Chinese researcher also discovered by accident that the Indian mealmoth Plodia interpunctella is also capable of ingesting plastic and has bacteria in the gut able to break down the plastic particles. Research into this field is ongoing.

The European Union has set down recent legislation pertaining to single-use plastics under Directive (EU) 2019/904. This Directive aims to ensure manufacturers produce plastics subject to product requirements and standardized for recycling purposes. There will also be a requirement for separate collection of plastic bottles and their lids.

HOME RECYCLING

I tend to remove all caps and small plastic tags and store them separately in a large empty water container. This way these small plastics don't make their way into a landfill site. As an added precaution, I cut all plastic rings as these are commonly found entangled in a range of wildlife including birds. It is important to note that recently, some soft-drink manufacturers have written instructions on the bottle cap for it to be replaced. This is to prevent it from being discarded. However, if responsibly removed and stored with other small plastics, then these, together with the other plastics, can be dropped off at a recycling collection point. In future articles we will investigate this aspect further.

It is not only bottle caps and rings that fall into this category of small plastics, but also a range of other small plastic items. These include plastic bread clips, vitamin and medicine containers, contact lens containers, milk bottle caps (including those of aluminium sealed cardboard cartons) and many other types.

Some softdrink bottle caps come with the instruction to replace the cap after use so that it is not discarded into the environment.

The inside of a bottle cap showing the plastic constituent HDPE and recycling symbol.

Most bottle caps and small plastics are manufactured from high density polyethylene which can be recycled.

SAFELY CONTAINED. **A variety of small plastic clips and bottle caps are kept from filtering into the environment.**

ABOUT US.

Biodiversity & Environment Africa is a fully digital, website-based platform - freely available to readers globally. Publications and resources are available as downloadable PDFs, as well as regular online blog posts. It is our hope to make information available as far and wide as possible. In keeping with its environmental ethos, printing and distribution is effectively reduced, therefore striving towards a low carbon footprint and minimal use of natural resources.

The primary objective of B & E Africa is to interpret and disseminate often complex academic research and environmental policies in a digestible and easy to understand format. The website, www.biodiversitynature.com and blog articles therein, can easily be viewed in alternative languages by right clicking and using Google translate.

Never has environmental communications been as important and pertinent as it is in today's rapidly changing, dynamic world. It is critical that people receive reliable information about biodiversity, conservation, and environmental issues. Just as important, communities need to understand why biodiversity is important in their daily lives and why environmental issues are personally relevant to their health and wellbeing. Given the levels of poverty across Africa, the challenges may seem insurmountable, but can be overcome strategically with foresight, dedication and consistency.

Traditional knowledge and consumption of natural resources must be integrated into sustainable biodiversity management strategies and communities need to see, and experience first-hand, the benefits of biodiversity. The benefits of ecosystem services need to be demonstrated clearly and practically. Africa must also be cautious of international and corporate investments which lead to environmental destruction and biodiversity loss for short-term profit. Such short-term financial gain and profits cannot be allowed to overrun long-term sustainable goals and biodiversity conservation objectives. As humans, we yield immense power over the natural world, but we have a moral and ethical responsibility to leave a legacy of natural wonder to the generations that follow, so that they too can experience the majestic roar of lions, the trumpeting of elephants, and the humble dung beetle in the African savanna.

It may seem idealistic to aim for environmental sustainability and conservation of biodiversity when many regions of Africa are suffering from prolonged civil conflict, disease and poverty, but these challenges can be overcome. It will however take dedication and resolve from politicians, and more importantly, Africa's citizens. Thousands of game guards, wardens and environmental activists have lost their lives protecting biodiversity and natural assets across Africa. This alone goes to show that the will to protect is there. We owe it to these fallen heroes to ensure that their sacrifice will not be in vain.

Africa is custodian to some of the world's most unique landscapes, plants, and animals. Elephant, rhino, gorillas and a plethora of less enigmatic but no less interesting creatures call this continent home. Nurturing an appreciation and spiritual connection to these plants, animals and landscapes is critical to ensuring their long-term survival. It is the continent's youth that needs to be uplifted and guided to do this. Environmental education and resource management are essential skills that should be taught at every stage of a child's education, from pre-school to tertiary level. B & E Africa strives to be a communications channel bridging the gap between academic research findings and translating scientific literature into a format that anyone can appreciate and understand.

B & E Africa will cover a range of topics and carry out interviews with scientists, researchers, businesses, and politicians across the African continent and further afield. Some of the topics covered include:

- Biodiversity (focus on diversity and conservation of plants and animals)
- Biosecurity (the prevention of pathogens and invasive species)
- Climate change (global climate change)
- Community upliftment (environmental benefits to communities, tourism, bioprospecting)
- Conservation (endangered species, trade, poaching and conservation issues)
- Economy (financial economics and the environment)
- Ecotourism (safari and game lodges, ecotherapy, tourism, birding and hunting)
- Environmental management (landscaping, environmental scoping and impact assessments)
- Invasive species (spotlight on invasive animals and plants)
- Legislation (environmental law and legislation)
- Marine resources (fisheries and recreation)
- Recycling (waste management)
- Resource management (agriculture, forestry and mining)
- Sustainability (development and resource management)
- Technology (GIS, satellites and other technology used in environmental management)
- Water (water resource management & wetlands)

Email us your feedback and news to: *biodiversityenvironmentafrica@gmail.com*
For further information and contact details, visit *biodiversitynature.com*