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BIODIVERSITY & ENVIRONMENT AFRICA

BIODIVERSITY FOCUS

Ancient denizens
of the deep:

Coelacanth

Marine Turtles

HEALTH & WELLBEING

DANIELA LUZ
Beach YOGA
Ecotherapy

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Photo: Warren Schmidt

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MISSION

Biodiversity & Environment Africa (publication) strives to present accurate and informative news on biodiversity and environmental issues 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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Protecting our natural assets

We have recently emerged from a whirlwind of conservation and climate symposia and meetings. In the last two months I have attended and participated in numerous symposia and workshops.

On 4 September, I attended the WESSA Lowveld Symposium on the Green Economy and Ethical Sustainable Utilisation. This was followed by COP26 (the Climate Change Conference) held in Glasgow, Scotland, between 31 October – 13 November. Coinciding with this event was The Conservation Symposium (1 – 5 November) which was held as a virtual symposium sponsored by Ezemvelo-KZN Wildlife and CapeNature. It brought together over 700 South African and international delegates. In addition, I registered and engaged in the Durban Research Action Partnership Year End Symposium on 15 November.

In summary, there is an incredible amount happening in the world of conservation and sustainability. Right from ground level through to the highest levels of government. BUT...we

still have a long, tiresome, and difficult road ahead of us. Covid-related fears and uncertainty around international travel means that Africa's tourism sector is still in dire straits.

Unemployment levels are at record highs in many African countries. At the present moment, we face an incredibly uncertain future. But history has taught us resilience and we live in eternal hope and optimism.

As I've highlighted in previous viewpoints, we can raise our arms up in despair, or we can brave sheer madness and against all odds, continue fighting for a better future. I opt for the latter every time I see my child and the new generation. I, and the collective "we", simply can't give up. Our natural world is simply too precious, but we need to up our game...by multiple scales.

How do we balance sustainability with development?

How do we expose companies that are greenwashing their public image? How

do we tackle plastic pollution without causing widespread famine? How do we walk away from fossil fuels when it is still the cheapest and most reliable method of power generation? How do we completely rethink urban development and build "realistic" green, sustainable cities? How do we ensure interlinked wildlife corridors through our suburbs, protect our wetlands, and reduce human-wildlife conflict?

The other big news events of late has been the petrochemical company Shell's seismic surveying along the pristine Wild Coast. I tuned in to watch the High Court proceedings where an attempt was made to get an interdict against Shell to halt the survey. It was a complete disaster. Shell won the case.

It begs the question though, how many other authorisations have been given the go ahead for potentially destructive development, mining activities and fossil fuel extractions? And where do we find this information?

Collectively, as a united Africa, we must decide what type of future we want for our children.

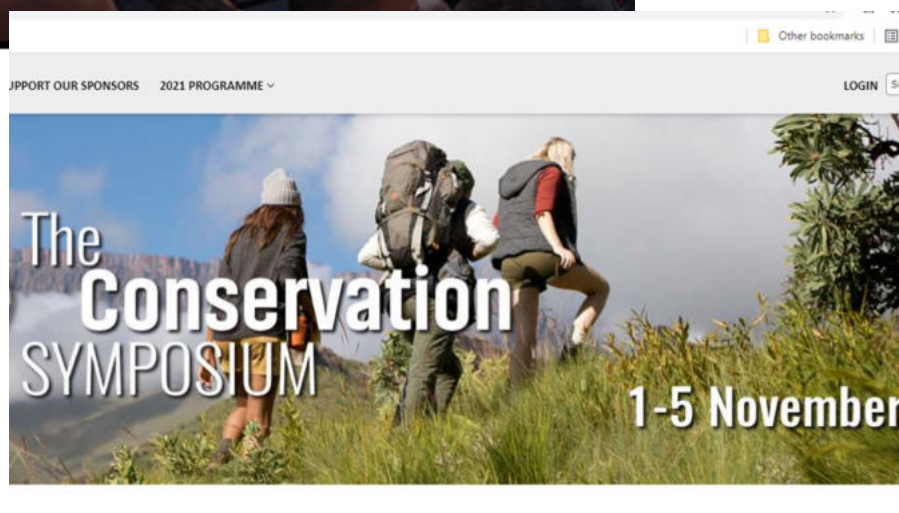
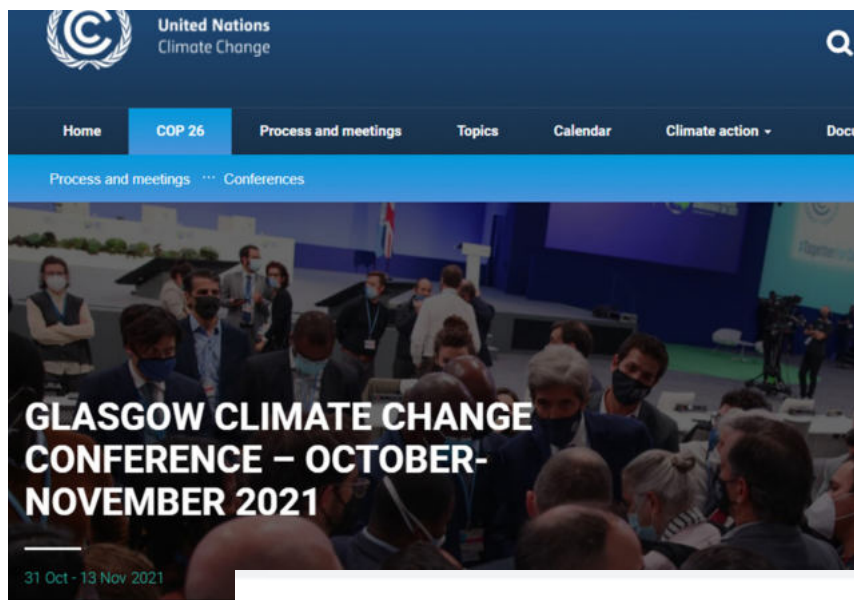
Will it be one of exploitation of minerals and natural resources with little or no benefit to the communities on which the very land they live upon is being ripped from underneath them, leaving polluted waters, unfertile wastelands and no more wildlife in sight? Or will it be an oasis of life, and an example to the rest of the world, as to what sustainability and teaming biodiversity is all about? ■

As always, I look forward to your comments and feedback.

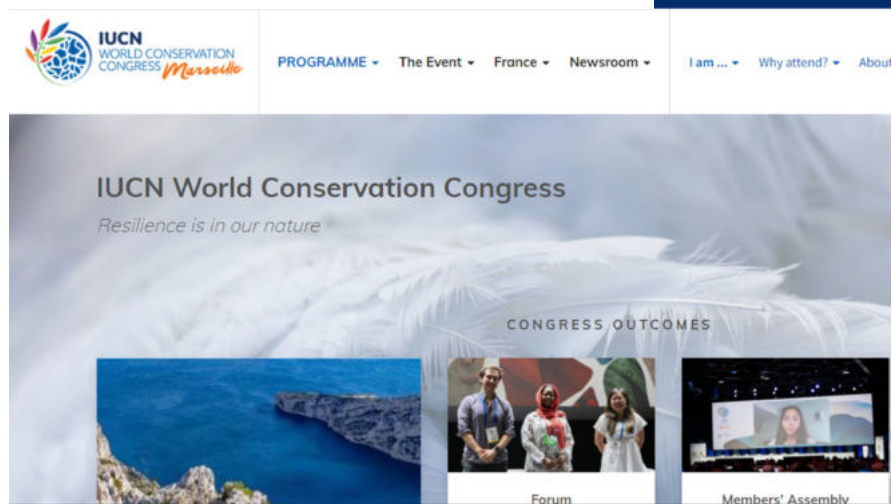
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Will the White Rhino still be with us in a decade from now, displaying its majestic horns without fear of man and rifle?

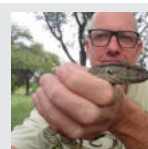


“how many other authorisations have been given the go ahead for potentially destructive development, mining activities and fossil fuel extractions? And where do we find this information?”



VIEWPOINT 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 talks, seminars, and lectures.



Ancient denizens of the deep

On the eve of World War II, something unknown and peculiar stirred from the ocean depths. In a fortuitous moment in natural history, an ancient fish-like creature got itself entangled in a trawling net and hauled to the surface together with other fish and sharks.



Marjorie Courtenay-Latimer, the curator of the East London Museum who first identified and alerted scientists to the coelacanth find.

On Thursday morning, 22 December 1938, a fishing trawler named the *Nerine*, owned by the now famous Irwin & Johnson fishing company, and captained by Hendrik Goosen, steered into port at East London to offload its catch. Nearby, the curator of the East London Museum, Marjorie Courtenay-Latimer, was alerted to the arrival of the trawler and went to see if she could find interesting specimens for the museum's collection. This was standard procedure whenever the trawler entered port.

When she arrived at the wharf with her assistant, she noticed a pile of fishes and identified many of them as sharks, but an odd-looking fish caught her

attention and she asked to see the half-buried creature. It was unlike anything she had ever seen before and realising its importance, she made arrangements to transport it back to the museum. It was given to a taxidermist to preserve, and Courtenay-Latimer sketched some diagrams and drafted a letter for the esteemed ichthyologist J. L. B. Smith, who was based at Rhodes University in the inland town of Grahamstown (now Makhanda).

Smith was on leave at the time and there were some postal delays over the Christmas period, meaning that he only received the letter on 3 January 1939, whilst on holiday in Knysna. Perplexed by Courtenay-Latimer's drawing, it dawned on him that he was looking at a prehistoric fish long thought to have

become extinct millions of years ago. He immediately sent an urgent telegram to the museum asking that all parts of the fish, including its soft anatomy, be carefully preserved for further study. Unfortunately, the formalin had not preserved the soft organs in the summer heat, and these were subsequently discarded.

It would still be several weeks before J. L. B. Smith could finally get to East London and examine the specimen. He formally described it in the *British Journal Nature* and named the genus in recognition of Courtenay-Latimer (*Latimeria*) and the species after the locality at which it was caught, near the mouth of the Chalumna River (now called the Tyolomnqa River) in the Eastern Cape (*chalumnae*).

Smith subsequently embarked on a quest to procure further specimens. This mission was largely hindered by the events of World War II (between 1939 – 1945), however, in 1947 a large-scale search was proposed to the CSIR, but due to financial constraints, it was discarded. Smith decided on another course of action and had printed a leaflet in English, French and Portuguese, offering a £100 reward for another specimen. These leaflets were widely distributed across the East African coastline as well as Madagascar and several other Indian Ocean



One of natural histories most iconic photograph. The second coelacanth known to western science photographed on board Hunt's vessel docked at Pamanzi in the Comoros. Front left is Captain E. Hunt next to J. L. B. Smith with his hand on the coelacanth, and the Governor of the Comoro Islands, P. Coudert, holding the tail on the right. Photo reproduced from *Animal Life in Southern Africa*.

“ We can only hope that our extractive pillaging and polluting of the world’s oceans will not be the final catalyst of extinction for a lineage that witnessed the rise and fall of the dinosaurs. ”

Islands...many at that time under French administration.

The publicity paid off. A trader named Eric Hunt assisted the Smith’s in distributing the leaflets. In December 1952, exactly 14 years after the discovery of the one and only known coelacanth, Smith received news that a second specimen had been caught in the Comoros. This specimen was caught by a fisherman named Ahmed Hussein fishing offshore from the south-eastern Anjouan port of Comoni. Smith desperately made plans to get to the island but there were no commercial flights at the time. He decided to call upon the highest level of government for assistance, ably convincing the Prime Minister of South Africa, Dr D. F. Malan, of the scientific importance, who in turn approved a military Dakota to fly Smith to the Comoros on 28 December 1952.

On 29 December, Smith finally got to see the prized specimen and perhaps one of the most iconic black and white natural history photographs of all time was taken, showing Smith, alongside Captain Eric Hunt and the Monsieur P. Coudert, governor of the Comoros, examining the second-known coelacanth. It was flown back to South Africa, with a brief stopover in Cape Town to show Prime Minister Malan, before returning to Grahamstown. Thereafter, a global scientific campaign began for more specimens, with dozens more being caught around the Comoros. Being under French administration, the authorities did not allow further specimens into the hands of non-French scientists, and most specimens were shipped to museums in France.

In 1956, J. L. B. Smith wrote a book titled *Old Fourlegs*, which was published in London and subsequently translated into several languages, including Afrikaans, French, German, Russian and Slovak. It was apparently the first South African book to be translated into Russian and appeared widely read in that country.

How many species?

Remarkably, the coelacanth (pronounced see-la-kanth) consists of not one, but two living species. The West Indian Ocean Coelacanth (*Latimeria chalumnae*) and the Indonesian coelacanth (*Latimeria mendoensis*). The Indonesian coelacanth was only formally described in 1999 and less than a dozen specimens are known to science. In the Comoro Islands the coelacanth is known as kombessa.

Anatomical uniqueness

The outer appearance of a coelacanth is unlike any other fish. The first dorsal fin looks like that of normal fish, but the second dorsal fin projects from an extended lobe. Likewise, there are two pairs of pectoral and pelvic lobed fins at the base giving the appearance of stumpy limbs, with another basal lobed fin posteriorly positioned. The tail fin is

Evolutionary history

What makes the coelacanth so unique? Coelacanths were thought to have become extinct around 70 million years ago and up until 1938, were only known from the fossil record. The palaeontological record demonstrates that this lineage dates to at least 300 million years and the two extant species have changed very little in morphology over this expansive period. They appeared to be very common in a variety of aquatic habitats, both marine and freshwater, but interestingly, most fossils found to date are much smaller than the living species of today. They belong to an ancient lineage of lobe-finned fishes called the sarcopterygian fish and evolutionary biologists have identified these as probable ancestors of the land-dwelling tetrapods (which eventually gave rise to amphibians and later reptiles and mammals).



Close-up view of a preserved coelacanth.

pointed with the backbone running right through to its tip. The tail is three-lobed unlike any other living fish. The coelacanth is also known to secrete excessive oils from glands underneath the scales.

However, a recent detailed study into the coelacanth genome by Chris Amemiya and colleagues, published in *Nature*, demonstrated that lungfishes, and not the coelacanth, is the most recent common ancestor to the tetrapods. The study also highlighted that coelacanths have decreased substitution rates in protein-coding



A life-size replica of a coelacanth at the St Lucia Crocodile Centre in KwaZulu-Natal. Coelacanth.

genes compared to other vertebrates. This study also demonstrated a unique feature of coelacanths. They lack Immunoglobulin-M (IgM) antibodies which is found in all other vertebrates studied to date. IgM is essential for protective immunity in animals. However, they did find Immunoglobulin W genes which may serve a similar function. The specialised nature of their habitat may have provided a stable refuge over millions of years, therefore limited selective pressures have allowed them to persist

Distribution

The West Indian Ocean coelacanth was for many decades believed to be restricted to deep ocean canyons

surrounding the Comoro Islands. The first specimen caught near East London was thought to have drifted south in the Agulhas Current. Coelacanths are not strong streamlined swimmers and prefer stable, sheltered deep water canyons which provide refuge. However, in subsequent years, through a combination of submersible exploration and deep-water dives,

they have been discovered in several other widespread locations. These include waters off Madagascar, as well as reefs near Sodwana Bay and St Lucia



Latimeria chalumnae embryo with its yolk sac. Muséum national d'histoire naturelle, France. By © Citron, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=21069706>

in northern KwaZulu-Natal, and sites offshore from Mozambique, Tanzania and Kenya. This indicates that this elusive fish is widespread across the western Indian Ocean.

On 22 November 2019 deep-sea divers Mike and Alan Fraser, together with Bruce Henderson and Pieter Carstens, filmed a coelacanth at a depth of 69m off Umzumbi on the KwaZulu-Natal South Coast. This exciting discovery indicates that coelacanths may occur

“ Over exploitation and ocean pollution are the two biggest threats facing coelacanths. The stomachs of dead specimens have revealed plastic and therefore constitutes a serious threat.



A preserved coelacanth on public display at the South African Institute of Aquatic Biodiversity in Makhanda in the Eastern Cape.

further south and that the East London specimen was not necessarily a vagrant.

Natural history

Coelacanths appear to live mainly in and around deep-water canyons at a depth of 100 to 500 metres, although they have been sighted by divers at depths of 50-60 metres. They appear to be largely nocturnal, hunting various fish and cephalopods. Females give birth to living young but do not possess a placenta. The eggs develop within the female. Up to five embryos have been recorded. The gestation period is confusing with some sources stating up to five years – which would indicate the longest gestation of any living vertebrate, and other sources citing a gestation of one year.

Conservation

In April 1987, the Coelacanth Conservation Council was founded by ichthyologists Eugene Balon, Hans Fricke, Rafael Plante and Mike Bruton. The official launch took place in



Research equipment belonging to J. L. B. Smith.



Books and memorabilia on the coelacanth at the South African Institute of Aquatic Biodiversity.



A living coelacanth photographed by Bruce Henderson off Pamula on the KwaZulu-Natal South Coast in South Africa. Wikipedia / Creative Commons Licence CC by 4.0.



Standing on the stairway leading to the entrance of the South African Institute of Aquatic Biodiversity, formerly the JLB Smith Institute of Ichthyology.

Grahamstown (now Makhanda) in June 1987. Every coelacanth known to science is given a unique reference number by the Coelacanth Conservation Council. The first ever coelacanth from 1938 is given the number CCC1. All coelacanths have a unique arrangement of white spots and therefore individuals can be told apart from one another. Using this pattern coding, they can be monitored in their underwater environment.

Over exploitation and ocean pollution are the two biggest threats facing coelacanths. The stomachs of dead specimens have revealed plastic and therefore constitutes a serious threat. The IUCN lists the Sulawesi or Indonesian coelacanth as Vulnerable and the West Indian Ocean coelacanth as Critically Endangered.

Secrets remain

The ocean is vast with thousands of unexplored regions and deep canyons. Despite almost a century of dedicated research into the distribution and natural history of coelacanths, much remains shrouded in mystery. Are they found around Mexico? Or in the Mediterranean? An old silver artifact hanging in a village church near Bilbao in Spain depicted a perfect replica of a coelacanth, and was allegedly procured

in Mexico at least 70 years prior to the East London specimen found in 1938. Given that the second species only came to provenance in 1998, it is conceivable that other species remain hidden in the depths. We can only hope that our extractive pillaging and polluting of the world's oceans will not be the final catalyst of extinction for a lineage that witnessed the rise and fall of the dinosaurs. ■

Coelacanth classification

Kingdom: Animalia
Phylum: Chordata
Subphylum: Vertebrata (vertebrate animals)
Class: Osteichthyes (bony fishes)
Subclass: Sarcopterygii (sarcoptergian fishes)
Order: Coelacanthiformes
Suborder or superfamily: Latimerioidea
Family: Latimeriidae
Species: *Latimeria chalumnae* Smith, 1939 and *Latimeria mendoensis*.

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Marine Turtles

Text & Photos by Warren Schmidt

A small loggerhead turtle.

The vast ocean teems with life, from a spectacular diversity of fish through to crustaceans, molluscs, cephalopods, mammals, and the tiny plankton that sustain this marvellous diversity. Even reptiles call this marine oasis home, especially the marine turtles.

Unfortunately, along with crashing fish stocks, critically endangered whales, dolphins, sharks and manatees, marine turtles are also teetering on the brink. Whilst some conservation scientists may view this statement as alarmist, it must always be remembered that the North American passenger pigeon once blocked out the sun with their sheer numbers, but today the best we can present of this species is a handful of stuffed museum specimens. Complacency causes extinctions and all marine turtles are listed as threatened in varying degrees on the IUCN Red Lists.

Worldwide, there are seven living species of marine turtle. Here, we will look at these amazing creatures which are currently facing a myriad combination of threats, from poaching of eggs to collisions with boats, over-exploitation, ingestion of plastic, global climate change and entanglement in fishing nets and plastic items.

Turtles spend most of their lives at sea where foraging and mating take place. A few species will come ashore to bask, and some also enter shallow coral reefs, estuaries and mangroves to feed. It is the mature females that regularly return to shore to lay their eggs. Females use their hind flippers to carve out a flask-shaped depression in the beach sand to lay eggs. Most nesting takes place at night to avoid excessive temperatures and predators.

Hatching usually occurs at night and the hatchlings dig themselves out of the nest and make their way down to the ocean. In places with coastal development, the light coming from buildings and streetlamps may confuse hatching turtles and attract them to the light source rather than the ocean.

Mortality through predation is extremely high in their first few weeks. Ghost crabs predate on hatchlings and those emerging during the day face the gauntlet of baboons, monitor lizards, seagulls, kites, hawks and other predators. Once in the ocean, many fall prey to various predatory fish. Despite their abundant hatchling numbers, very few from each clutch will make it to adulthood.

The loggerhead sea turtle (*Caretta caretta*) – IUCN Red List: **Vulnerable**

A widely distributed turtle found in the Gulf of Mexico, parts of the Atlantic near West Africa, the Mediterranean, the east coast of Africa – mostly off KwaZulu-Natal and Mozambique, Madagascar and around Australasia. The loggerhead nests on beaches in KwaZulu-Natal and in Mozambique, as well as several rookeries in the Atlantic, including Angola. Females lay batches of 23-198 eggs at 11 to 15-day intervals during the nesting season. Incubation takes 47-66 days.

Loggerheads attain a body length of around 1m and weigh between 100-150 kg. Hatchlings and juveniles feed on bluebottles and jellyfish and as they grow, will take a wider variety of prey items including crustaceans and molluscs.

Hawksbill sea turtle (*Eretmochelys imbricata*) – IUCN Red List:

Critically Endangered

Another widespread turtle found in the Gulf of Mexico and across vast regions



The green turtle prefers the warmer tropical waters off Mozambique, but they do sometimes drift southwards.

of the Atlantic, Indian and Pacific Oceans. Absent in the Mediterranean but found in the Red Sea. A relatively small turtle with an average weight between 35-77 kg. Feeds on sponges, corals, jellyfish, anemones, sea urchins and marine molluscs. Marine plants and seaweed are also consumed.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) – IUCN Red List: **Critically Endangered**

This species is restricted to the Gulf of Mexico and up along the east coast of the United States of America. It only nests on beaches in Mexico and Texas. Olive Ridley Sea Turtle (*Lepidochelys olivacea*) – IUCN Red List: Vulnerable Widespread across the Pacific, Atlantic and Indian Oceans but keeps close to land. In Africa it is more common around the Atlantic of central and west Africa. A small turtle with most nesting in Africa occurring in central and west Africa. They feed on oysters, crabs, shrimps, snails and other marine molluscs.

Green turtle (*Chelonia mydas*) – IUCN Red List: **Endangered**

Widespread across the Pacific, Atlantic and Indian Ocean. Also found in the Red Sea and the eastern Mediterranean around the Greek islands and Turkey. A few individuals occur in South African waters, but they are more common in the tropical waters off Mozambique, Tanzania and Kenya as well as the islands of Madagascar, Comoros, and the Seychelles.

In some regions they form massive seasonal nesting concentrations. Around 7 000 females nest in Oman and 10 000 in Yemen. Europa Island in the Mozambique Island has one of the largest nesting concentrations with between 10-20 thousand nesting annually. One female was recorded nesting at Rocktail Bay in northern KwaZulu-Natal on 16 January 2014 but nesting in South Africa is generally unknown.

Green turtles have a varied diet which includes seaweeds and sea grasses. They will also swim into shallow mangroves and forage leaves, roots and fruits. Hatchlings and juveniles take a greater variety of jellyfish and similar prey before becoming increasingly vegetarian in their diet.

Flatback sea turtle (*Natator depressus*) – IUCN Red List: **Data Deficient**

This turtle is restricted to northern parts of Australia. They feed on soft corals, jellyfish and sea cucumbers.

Leatherback sea turtle (*Dermochelys coriacea*) – IUCN Red List: Vulnerable, but some populations are **Critically Endangered**

Found in the Atlantic, Indian and Pacific Oceans. It is more common in the Gulf of Mexico and central and west Africa. Females frequenting the Indian Ocean nest on beaches in northern KwaZulu-



A large female leatherback returns to the ocean in the early morning hours after laying her eggs on the beach near Sodwana.

Natal and Mozambique. By far the largest and most impressive marine turtle due to their all-black appearance, prehistoric look and size.

Watching a large female measuring over 1,5 metres and weighing over 500 kg hauling herself up a beach to lay her eggs is a sight not easily forgotten.

These turtles differ from the other marine turtles in that they lack scutes or shields, instead having a thick leathery covering. The dorsal surface has seven prominent ridges running across the back and sides. One of the largest leatherbacks recorded measured 291 cm with a weight of 916 kg.



A female leatherback covers her nest.



Leatherbacks can lay anywhere between 50-166 eggs per clutch.

Leatherbacks feed mostly on soft-bodied prey like jellyfish, squid and octopus, but will take sea urchins, crabs and similar items. They have a throat covered in backward-facing spines to prevent soft prey like jellyfish from escaping and may also be used as a sieve.

Most sea turtles are found in the tropics and subtropics as cold waters can incapacitate them. However, the leatherbacks have several anatomical and physiological adaptations that allow them to survive in near-freezing waters. The tough leather-like skin is underlain with fat and they can generate a degree of internal heat through metabolic processes. ■

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Growing research is building a picture of the link between nature therapy as an effective approach to improving mental health in various ways. Ironically, in the backdrop of our '4th industrial revolution' era, where we see climate awareness sweeping the globe, people are turning to the outdoors to balance out and feel well again. Like a sacred sound journey 're-connecting' the listener with something of a primordial time, spaces of healing are shifting towards the outdoors -by trees, mountains, rivers, ocean. Indigenous communities, living in harmony with nature ever since ancient times, hold much in their way of life that can hopefully 're-mind' us of this, or even 're-teach' us. In addition to this affinity for the outdoors, we seek practices born centuries ago, such as yoga and breathwork, mindfulness and meditation as healing systems known to build a sense of union and wholeness. In this light, acknowledging the therapeutic role of nature makes it ever more pertinent that we take much greater care to protect our eco-systems and re-learn how to live within a coherent whole again...

Does everyone have anxiety nowadays?

The statistical reports are out there: anxiety worldwide -across the board -is seeing a prominent rise. For example, according to a recent UNICEF report, anxiety and depression constitute more than 40% of mental-health disorders among young people (those aged 10–19). "This points to an urgent need for better prevention and treatment of youth anxiety and depression worldwide. The overarching message that emerges from these reviews is that there is no 'silver bullet' for preventing and treating anxiety and depression in young people — rather, prevention and treatment will need to rely on a combination of interventions that take into account individual needs and circumstances".

Interwoven with these 'interventions', we need natural spaces to heal our children. Our deeper gut feelings say there is something urgently wrong. Until we shift and work together towards healing our planet and slow down, the best diets, medications, and therapy sessions can only address the issues of mental and physical health in our societies up to a point.

How does nature help mental health?

The calming, harmonious, coherent sounds of nature may help your nervous system recover faster than sounds from traffic and other hectic city or suburbia noises. **Nature helps us with:**

- Greater resilience to stress
- Coping better with post-traumatic stress disorder (PTSD)
- Coping with addiction
- Reconnection with self & strengthening of self-worth
- Nervous system recovery
- Greater work-life balance
- Enhanced creativity
- Improved concentration
- Improved well-being overall

Our last issue of B & E Africa looked at gardening for mental health

and how to attract wildlife into your garden enhancing green spaces as richer —more biodiverse ecosystems —immediately right outside your back door.

We recently interviewed Daniela Luz to understand how natural settings like the beach can help enhance the effect of yoga and breathwork for anxiety relief.



I am an International Certified Mindfulness Mentor, healer practitioner, and experienced meditation and Yoga teacher, currently based in Portugal. From social education and social activism through to Yoga and meditation, I've travelled the world and lived abroad sharing my life mission to empower different communities and underprivileged groups, co-founding and managing social projects in Mozambique, Italy, and Australia. Throughout the years, I have been developing keystone work with international organizations; organizing and participating in Wellness and Healing retreats, events, trainings and workshops; also providing individual guidance also on a therapeutic level. Currently, I also teach online, having students from all over the world.

"I truly believe that the transformational gift of Yoga should be available to as many people as possible. To me, life is a horizontal and vertical journey, both outwards and inwards, with so much to be discovered, once we have the courage to search."

It contends how we humans have a biological need to connect with Nature and that we feel good in Nature because it has helped us to survive. As a species, we have lived for most of our existence outside. It is in our DNA to love the natural world, and our health and well-being increases when we are in it.

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There are also numerous research sources that prove the benefits for both physical and psychological human well-being, such as reducing stress and cortisol in the body; improving our mood; and feeling happier. From our fast-paced society to our busy lifestyles, it's easy nowadays to disconnect from Nature.

The Yoga practice has physical, mental, emotional, and energetic benefits that can be enhanced when one is in contact with Nature.

When outdoors in Nature, practicing Yoga and mindfulness, you can breathe deeply the fresh air at the same time, to reconnect with the elements and with our origins, paying attention to the present moment. As I live near the beach, I practice and teach many times in a beach setting, providing a deeper connection with the 5 elements: water - ocean; air - wind/breeze; earth - sand; fire - sun, charging our "batteries" and contributing to awaken the senses. To listen to the sounds of the waves, the birds singing, to breathe the maritime breeze; to feel the sand on the feet, the warmth of the sun and the wind on the skin - intensifies the benefits and relaxes the self.

To breathe deeply the fresh air from the ocean purifies the lungs and boosts our energy. Salty sea air has negative ions, which are very beneficial to our health as it helps the body absorb oxygen easier. According to researchers, once the negative electrons are in our bloodstream, serotonin is greatly produced, the symptoms of depression are reduced, stress is relieved and we feel energized. Moreover, practicing Yoga on the sand brings more "instability" and therefore stimulates balance, concentration and double strengthens the muscles and ligaments. It definitely brings your vitality back."

What elements of the beach or ocean specifically, can support a person with anxiety? For instance, how can we use the sounds and rhythms of the waves? Can we use any of these natural elements in our breathing techniques and meditation?

The practice of Mindfulness can actually create changes in the brain that are beneficial to your wellbeing and an optimal environment for



mind and body balance and harmony. To be mindful is to be present, to pay close attention to the very precious present moment.

At the beach, explore your 5 senses and pay attention to:

- the colours of the ocean
- the sand on your feet-the sunshine and breeze on your skin
- the smell of the ocean
- the sound of the waves and seagulls...
- the moistness of the air...

By bringing attention to our very present moment, the seaside can be a marvellous place to practice mindfulness, and therefore increasing joy and appreciation of the present. "Wave rhythms promote relaxation, guiding you into a meditative state/mood. Breathing

deeply, with awareness, helps to tranquilize the mind to bring more oxygen to the muscles. Aligning the rhythmic sound of ocean waves with your own breathing rhythms, can be powerful.

Personally, and especially when I am in a calm environment or at the beach I like to ground Myself. Through the meridians, nerves and points of tension, our feet receive electrons transferred by the earth, providing us with vitality and boosting our immune system.

This Grounding exercise can be done in Nature or an indoor setting:

- Stand firmly on your feet and feel your feet on the sand/ground.
- Visualize strong roots coming out from your tailbone, moving down

through the legs, feet, and penetrating the earth, moving down through the different layers of the earth.

- Inhale: visualize your roots absorbing the vital force energy (an earthy red colour energy) and moving up to the top of the head.
- Exhale: visualize yourself letting go of tensions and worries, eliminating this at the roots and allowing this to be transmuted by the earth.
- Repeat as much as you consider necessary.

If one doesn't have access to a coastal setting, what can one do to enhance our Yoga Practice, as another form of 'eco-therapy', to better manage anxiety or burnout?

If you practice Yoga indoors, you can give more attention to certain details and prepare the environment to help you to feel safe and in contact with the elements of Nature. For your Yoga and meditation session, you can choose to have a calm background sound from Nature; to have an element or even the 5 elements of Nature near you; aromatherapy to choose a scent/essential oil to have it in the room or with you. Focus on the breath and body and trust that you are and have everything you need. A very powerful technique that I do every morning at home (and of course when possible outdoors) is Grounding, as instructed above. Our minds are so creative and powerful that we can take ourselves to any place we desire, just by imagining it. Even when we can't go to the ocean, we can still experience the warm sunshine and rhythmic waves within through guided imagery meditation and relaxation.

Guided Imagery Meditation
-feel in contact with the ocean and calm:

- Gently close your eyes and pay attention to the rise and fall of your breath.
- Visualize yourself on a beautiful beach. You can choose your favorite beach or imagine the perfect beach.
- Envision yourself there now.
- Imagine yourself receiving all the sunrays on your skin. Walking into the water... feeling the sand on your feet and toes. Feeling the water on your feet.
- Connect with the rhythm of the waves, helping you to relax. Inhale

and exhale slowly. Allowing your muscles to relax.

- Relax more and more...
- As you breathe out, let any kind of frustrations go away.
- Breathe in: feel calm, serene and confident, whilst observing the waves coming and going.
- Your body is now relaxed; your mind is tranquil now, too.
- Breathe in deeply and slowly and allow the relaxation to flow to any part of your body that it needs most.

Your internal pharmacy returns to its natural pace.

Breathing technique known as 2:1:

This technique consists of lengthening the exhalation and aims to release anxiety and tension. When we are anxious, our breath gets shortened and activates the sympathetic nervous system responsible for the fight or flight response. However, we can mindfully change the breathing patterns.

With this breathing technique, we change the pattern activating the parasympathetic nervous system, responsible for rest and wellbeing:

- Breathe slowly in and out through the nostrils.
- Inhale count to 3.
- Exhale count to 6.
- Repeat for about 5 cycles.
- As you like, you can progress to 4 for the inhale and 8 for the exhale.

I hope this was helpful to you. If you require any questions or further information for private Yoga and meditation sessions online, please contact me via email:

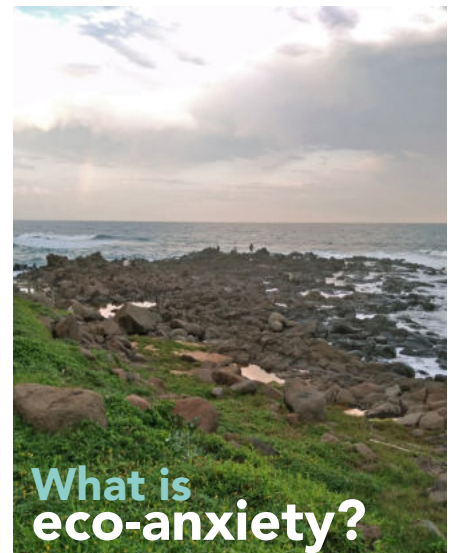
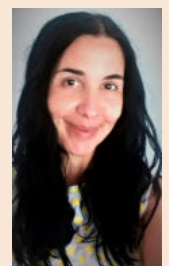
luzretreats@gmail.com

With love,

Daniela Luz

INTERVIEWED & WRITTEN BY: Nicolette Da Costa

Nicolette's background in sociology lead her to the complementary health field where she is a registered Therapeutic Reflexologist & Meridian Therapist. 17 years of being in practice has shown her how natural therapies and sound nutrition can play a vital role in supporting the healing process by bringing about balance and harmony in the system and clearing the body of toxins. Outside of the therapy room, Nicolette has come to appreciate that wellbeing in all senses of the word, individually and societally, today and for the future, is inextricably tied in with Nature. We can not fully care for ourselves and one another without living in synergy with the natural world.



What is eco-anxiety?

More young people are experiencing serious concerns over environmental damage and degradation, global warming, and natural disasters.

Ways to cope:

Ecotherapy may offer support for 'eco-anxiety', by offering an opportunity for building a two-way relationship with nature and giving something back. ([Ecotherapy and the Healing Power of Nature](#)).

Even small actions to reduce our carbon footprint like recycling, composting, and limiting driving can all make a difference if more and more people adopt new attitudes and mindsets. Instead of just hiking, join up with collective groups along a sea- or riverside trails to take care of single use plastics and other forms of pollution clean ups; join in with indigenous tree-planting projects; team up with others in pulling out invasive species of plants; or go on a course of permaculture training.

[\(Learn more in Issue 7 of B & E Africa Magazine\).](#) ■



A stroll along the beach...

Sea snails.

PHOTOGRAPHY & TEXT BY: Warren Schmidt

The greatest gift we can give our children is the appreciation of nature. Perhaps, there is no better outdoor classroom than our extensive and varied coastline. Each rock pool provides another window of discovery, filled with the bustling activity of marine life.

I remember when I was a small child spending what seemed to be hours exploring rock pools around Salt Rock and Umhlanga. I was always amazed by the variety of fish, some of which appeared unusually large for some of the pools.

Dune vegetation is the intermediate zone separating sandy beaches and rocks from the inland vegetation types

and include species with a high tolerance to salt and wind. Many are succulent forms with leaves and stems designed to prevent water loss. The sour figs are common with their red and yellow flowers. Another

gazanias.

Along some shorelines marine mammals may be encountered such as the Cape fur seals which are more common along the west coast. The Cape clawless otter makes

regular beach forays on the south and east coasts.

Birdlife is prolific with terns, gulls, cormorants, plovers, sandpipers and oystercatchers commonly seen along some stretches.

The shallow tidal and rock pools, however, are some of the best places to explore. Numerous small fish can be found in these pools, often darting under some overhang or cover. Rockpools provide nursery areas for

common species along the east coast are the dune

numerous fishes, but more permanent residents include the blennies and



A child's curiosity has no limits.

One of the many species of hermit crabs which use discarded shells as a makeshift house.



A sea-slug or nudibranch, possibly a dotty doris (*Jorunna funebris*).



A small hermit crab inside a conical shell.



Lustrous limpets (*Cellana capensis*).

“ we need a coordinated response to protecting our oceans and need to band together and lobby governments to ensure current legislation is upheld and enforced to protect our marine resources. This includes intensive monitoring of foreign fishing fleets and the big oil and gas companies.

rockskippers. The ubiquitous black-tail and sergeant majors are common in larger tidal pools. Sea urchins with their long ominous radial black spines are common in rock and tidal pools. Barefoot explorers should always tread with caution as the spines can penetrate soft skin and break off.

The spines have a toxin which can cause pain and inflammation and embedded spines can lead to infections. It is always wise to seek expert medical advice for the best treatment protocol. Sea urchins graze algae along the surface of rocks.

Another denizen of the rock pools are the colourful starfish, most five limbed but others with eight. The mouth is situated centrally on the underside. Starfish are grazers, scavengers and predators, climbing on top of their prey or food to consume it. Hidden by day and emerging at night is the fascinating octopus. Scientifically known as cephalopods, these creatures have 8 or 10 arms furnished with hundreds of suckers. Most of the octopus around South Africa are harmless to humans but the blue-ringed octopus from tropical Australia and Asia is one of the most venomous creatures on earth. These octopus carry a powerful neurotoxin called tetrodotoxin and one of the deadliest compounds known. It blocks sodium pathways leading to rapid paralysis and respiratory collapse. Fortunately, they are docile and will only bite when handled.



A crab forages along the sandy shoreline.

Octopus have fascinated researchers by their apparent intelligence and ability to learn. They also have the most remarkable adaptations and can rapidly change colour and pattern to blend perfectly into the background. Octopus have even been observed moving over open ground whilst using their tentacles to hold cover over themselves, made up of shells, rocks and other debris. The collection of seashells has been a favourite pastime for generations.

Unfortunately, over-collecting has resulted in most of the large and impressive

varieties having been taken for the ornamental trade. These shells are the calcium carbonate protective covering of the molluscs and gastropods, the same group which includes snails and slugs. The ocean has thousands of species ranging from whelks, sea snails, limpets all the way to mussels.



A grey-headed gull (*Larus cirrocephalus*) at Cape Vidal.

“ We simply cannot allow this heritage to be pillaged for profit and our children denied the opportunity of marvelling at the wonders of nature because the waters and beaches are sterile and dead.

Many species are highly sought-after delicacies such as mussels, oysters, and the ever-poached abalone.

Crabs are prolific on both sandy beaches and rocky shores. They scavenge above the high tide mark to the deepest ocean. Some species will make their way inland, rummaging through homes and gardens. One can spend hours searching for different crabs. Perhaps the most intriguing include the tiny hermit crabs which climb inside empty shells and use them as protective casings.

Our ocean and marine environments need our protection. Turtles, whales, dolphins, sharks and many other creatures are threatened by human activities including over-exploitation, oil spills, pollution and especially plastic.

More than ever, we need a coordinated response to protecting our oceans and need to band together and lobby governments to ensure current legislation is upheld and enforced to protect our marine resources. This includes intensive monitoring of foreign fishing fleets and the big oil and gas companies.

We simply cannot allow this heritage to be pillaged for profit and our children denied the opportunity of marvelling at the wonders of nature because the waters and beaches are sterile and dead. ■



1976: The author exploring a rock pool at Umdloti.



Prolific along east coast beaches, a sour fig (*Carpobrotus* sp) in flower.



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: hello@biodiversitynature.com
For further information and contact details, visit biodiversitynature.com