

LORIS

VOLUME 30. ISSUE 4



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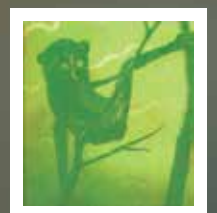
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**YOUTHFUL TALES OF
CONSERVATION**



THE LEOPARD

**CJS TO LAUNCH 100 PENDANTS
CELEBRATING THE SRI LANKAN LEOPARD
(PANTHERA PARDUS KOTIYA)**



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100% of the proceeds will be donated to WNPS, supporting their vital efforts to preserve and protect Sri Lanka's iconic leopard.

WEAR A LEOPARD AND SUPPORT OUR CONSERVATION EFFORTS

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JOURNAL OF THE WILDLIFE AND NATURE PROTECTION SOCIETY OF SRI LANKA

VOLUME 30, ISSUE 4 – DECEMBER 2024 EDITION

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The Editor invites members of the WNPS and the public to write articles to the Loris on matters related to biodiversity, natural history and nature conservation. All articles will be fact-checked by the Loris editorial team. The writing style and aesthetics of the magazine will be the prerogative of the Editor, who will make the final decision on the publication of an article.

The articles and views in the Loris are those of the authors and not of the WNPS.

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Front cover : Rajeev Abeysekara captures this beautiful interaction between a nesting pair of relatively common Brown-headed Barbets, highlighting that natural beauty is not only in the remotest of places but all around us.

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Editorial

ENVIRONMENTAL STEWARDSHIP – CAN WE CHANGE COURSE?

Across the world, organisations and others are being propelled into action under the banner of ESG (Environmental, Social and Governance) which adopts a set of standards to measure an organization's environmental and social impact. With ESG being very tangible and encompassing the data and metrics needed to inform decision makers, there has been a growing willingness to adopt this widely. The approach is certainly a step forward in terms of a more integrated view and it is welcome. But has its popularity destroyed a platform even more fundamental?

The broader concept of Responsible Environmental Stewardship emphasizes the responsible management and conservation of natural resources and seeks the long-term health and sustainability of our environment by balance economic growth with environmental protection and social well-being. It aims to minimize negative environmental impacts while embracing the pillars of Environmental Conservation (Protecting ecosystems, reducing pollution, conserving resources), Sustainable Practices (Implementing eco-friendly technologies, promoting renewable energy) and Community Involvement (Engaging with local communities to promote environmental awareness). The core of Environmental Stewardship comes from "within" people and organisations, rather than from an outside induced pressure of meeting any standards etc. That inner desire becomes the driver when making judgement calls on what actions are taken.

At times, one wonders if Sri Lankans believe that 'Digital Trees' are the answer to our reforestation challenges. There are several massive tree planting tamashas, coupled with illusions created through greenwashing and driven through PR and Social Media efforts. These initiatives have little to show after a while. Digital keyboard warriors feel that "posting" will solve issues. There is limited funding being set aside for genuine Environmental Stewardship and Conservation. The big money being touted from climate funds will not come easily in the shorter term, while it is also creating

a wave of corporate middlemen. Many forums, conferences, articles, policies and WhatsApp discussions usually result in almost no outcomes. Leaders speak passionately about these areas without any core belief in it themselves. Honest Environmental Stewardship is in extremely short supply.

Sri Lanka has a culture of making "New Plans and Strategies" with a fantastic ability to develop them and present rosy pictures. Results of the previous plans however, paint a miserable picture of abject failure, incompetence, lack of resourcing, and bureaucratic bungling among other things. But the biggest question of how well Sri Lanka learns from its mistakes and takes a holistic view and embraces all parties in society, including Youth, as critical contributors towards the way forward, remains. The interconnected nature of biodiversity loss, economic development that balances the needs of marginalised communities, international pressures, corruption, and business interests, often become a tangled mess which Sri Lanka fails to unravel. Adequate financial resources are not mobilised, institutional capacity is badly lagging the needs, and technology is not embraced as a powerful enabler. Combine these with a massive lack of accountability, an unwillingness to diligently report on progress and be transparent about failures, and the amnesia on past commitments and targets set, creates a high probability that new plans could suffer the same fate.

Is there a reason to be hopeful? Politicisation and corruption have spread, and bankruptcy has brought many financial constraints. Navigating complex regulatory landscapes, changing outdated laws and ensuring compliance can be difficult. The struggle to balance economic interests with environmental responsibilities can lead to conflicts and poor compromises. Addressing the expectations of various stakeholders, including foreign governments, can be challenging. Finally, money has always triumphed it all in the past.

Enter a new leadership and government, who has been given a

vote of confidence like never before in our country. This government has the unenviable task of not just trying to pull the country out of this mess, but to navigate these complexities. Can Environmental Stewardship prevail? Will it make it to the priorities on their agenda? Past governments had multiple incompetent corrupt ministers, and it was of little surprise that the very soul of our natural assets was being gifted away to foreign entities and vested interests. Our article on Earth Jurisprudence shines light on the heights we need to ascend to bring back a better balance. Can we, do it? Will they, do it?

We join the nation in thinking a change can be brought about in these areas as well by this government, albeit with challenge. The lack of a clear Environment Champion within government creates the need to engage and educate politicians and influencers on the need to act in a responsible manner with the long-term interest of nature, and the nation, at heart. Many shortsighted past decisions have been exposed in the media or are already in court. We must turn back the clock.

The environmental community should engage extensively with the government if they wish to make this happen. Often divided and leveraged by politicians and business interest to swing official recommendations, reports and statements to suit them, our environmental community and related officials need to find the ability to unite and come together on key issues, in the same manner that a nation has voted en masse. Unless we do so, our lack of unity may unfortunately permit different parties to continue to exploit and destroy our natural habitats. At this time when the nation is experiencing a second independence, where the people are taking back control of their nation, we can rise above this, we must, and we should, do so with pride. Time is not on our side, but indeed the Time is right.



*H.M.D.S. Herath : Recollect, Reminisce, Regret
(Photography - 1st Place - Tales of Conservation)*

Message from our sponsor

Nations Trust Bank is pleased to stand alongside the Wildlife and Nature Protection Society (WNPS) in their long-term mission to protect and preserve Sri Lanka's remarkable biodiversity. As environmental challenges continue on a global scale, our partnership with WNPS reaffirms our commitment to biodiversity conservation.

Environmental stewardship is a core part of our identity and values at Nations Trust Bank. We recognize that meaningful conservation is more than simply preserving landscapes; it involves enhancing the harmony between human activity and nature, promoting environmental initiatives that resonate within communities and inspire responsible action. Our collaboration supports WNPS's dedicated educational and awareness programs, aiming to reach diverse groups across Sri Lanka and spark a deeper understanding of our country's

natural resources and the vital need to protect them.

Together with WNPS, Nations Trust Bank envisions a future where Sri Lanka's landscapes, from its lush rainforests to its vibrant coastal areas, are protected. This preservation is not only for the enjoyment and education of current generations but as an irreplaceable legacy for those to come. We hope that our ongoing initiatives will continue to foster a sense of environmental responsibility, encourage sustainable practices, and advocate for the protection of Sri Lanka's unique ecosystems.



Binuja Dahamyuth Karunarathna : Wild Kids Backyard Wildlife Photography Competition (Runner-up)

THE MONSTER FISH TREND IN SRI LANKA: THE ROLE OF CITIZEN SCIENTISTS AND AQUARISTS

BY JANAMINA BANDARA¹, MEDHISHA PASAN GUNAWARDENA^{2*} AND JAGATH GUNAWARDANA

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Figure 01: The spotted gar (*Lepisosteus oculatus*) in a Sri Lankan aquarium. Photo courtesy: © Vishmitha Nadeera.

The Impact of Exotic Fish Species on Sri Lanka's Freshwater Ecosystems

Sri Lanka and the Western Ghats Mountains of India are collectively considered a biodiversity hotspot due to their remarkable species diversity and richness. But we also often forget that these regions must have lost at least 70% or more of their original habitat to qualify as a hotspot. When it comes to the freshwater ecosystems, Sri Lanka is home to around 127 freshwater fish species, including 61 endemics (with several point endemics) and 30 exotics. Some of these exotic fishes were introduced intentionally to the island mainly in 1950's, for varied reasons such as to boost the inland fisheries (Cichlids, Indian and Chinese carp species) for sport fishing (Rainbow trout) and for use in mosquito control approaches (guppy and mosquito fish). The remainder are aquarium escapees. At present, it is well known that several exotics are being aggressively distributed into the island's ecosystems, causing numerous ecological disasters such as threatening native species by being 'apex' unchallenged predators, disrupting food webs, and creating an ecological imbalance by invasively dominating habitats. Sometimes, these exotic species may even carry diseases and parasites capable

of decimating entire fish populations rapidly. Therefore, delaying intervention in controlling them could lead to irreversible consequences.

According to published studies thus far, nine alien invasive freshwater fish species have been identified within Sri Lankan inland waters. They are the Rainbow Trout (*Oncorhynchus mykiss*), Clown Knifefish (*Chitala ornata*), Sailfin Catfish (*Pterophyllum spp.*), Marble Catfish (*Clarias batrachus*), Guppy (*Poecilia reticulata*), Western Mosquitofish (*Gambusia affinis*), Mozambique Tilapia (*Oreochromis mossambicus*), Common Carp (*Cyprinus carpio*), and Snakeskin Gourami (*Trichogaster pectoralis*). However, the recent discovery of potential invasives, such as the Tinfoil Barb (*Barbonymus schwanenfeldii*), and their rapid spread, suggest that the current list needs to be updated more frequently.

Generally, alien invasive species are organisms introduced to regions outside their natural geographic distribution, which have the potential to cause ecological harm or have already disrupted the ecosystems into which they have been introduced. In the context of Sri Lanka, these

species typically exhibit fast growth and high reproductive rates in their new habitats. They also demonstrate a strong dispersal capacity, the ability to physiologically adapt to novel environments (known as phenotypic plasticity), and a remarkable ability to survive on diverse food sources across varying environmental conditions.

Additionally, recent discoveries of potentially problematic "monster" fish, such as the Alligator Gar (*Atractosteus spatula*), Mayan Cichlid (*Mayaheros urophthalmus*), and Jaguar Cichlid (*Parachromis managuensis*) in Colombo wetlands, as well as non-native Snakehead species and two members of the Serrasalminidae family, including Cachama (*Colossoma macropomum*) and Red-Bellied Piranha (*Pygocentrus nattereri*) from Bolgoda, have highlighted the significant knowledge gap regarding the population distribution of these species within Sri Lanka's natural ecosystems. However, some of these records are based on secondhand accounts rather than firsthand observations, even though they are published as confirmed records. This raises further questions about their accuracy. As a result, the current distribution of these fish remains largely unknown. If these reports are valid, they pose a significant threat to native biodiversity and ecology, emerging as a critical issue for the integrity of local ecosystems.



Figure 02: Non-native Snakehead species (Family: Channidae) in Sri Lankan Monster fish collections. They may appear cute but their potential as deadly hunters remain uncertain! Photo credits: Isuru Gamage, Sandya Perera, Rashitha Hansaka & special thanks to Buddhika Mendis and Sahan Randeniya.

Who are ‘Monster Fish’, and what is the Legislative Framework?

In recent years, there has been a noticeable rise in the "Monster Fish" trend among ornamental fish enthusiasts worldwide and of course in Sri Lanka too. This trend, which involves raising exceptionally large and typically carnivorous species, has become quite popular not only among the younger generation but also among commercial breeders and professional aquarists. It seems like the typical childhood goldfish bowl era has now come to an end. While it's a relaxing hobby to enjoy, caution is necessary when keeping these fishes.

As a result of this demand, various predatory “Monster” fish species, including the Alligator gar (*Atractosteus spatula*), non-native Snakehead species (*Channa spp.*), and Cichlids species, Redtail Catfish (*Phractocephalus hemioliopterus*), Iridescent Shark (*Pangasianodon hypophthalmus*), Arowana (*Osteoglossum spp.*, *Scleropage spp.*, and *Heterotis niloticus*) and Oscar (*Astronotus ocellatus*) are being imported to the island by aquariums. Unfortunately, some of these species end up in natural waters due to annual floodings or intentional release by various parties.

The importation of certain species of freshwater fish has been prohibited by regulations made under the provisions of Section 30 of the Fisheries and Aquatic Resources Act. These regulations have prohibited the import of Piranhas (13 species), Bullhead Catfish (5 species) and Knife fishes (6 species). However, it is seen that these regulatory provisions have not been made use of to prohibit the import of other problematic species like Gars. If these fishes establish natural breeding populations in native ecosystems, they could become problematic in the future. It is also seen that there have been no periodic reviews of the list of Invasive Alien Species prepared by the Ministry of Environment. Therefore, this list needs to be updated and must be revised periodically to include any new species that has become problematic.

Discussions regarding the introduction of a legislative framework to address these issues were held during the "South Asian Conference on Higher Legal Education & Sustainable Development 2023" (see Bandara & Gunwardena, 2023), and the expert panel agreed with our concerns. This trend is alarming because it could lead to the establishment of natural breeding populations that have the potential to disrupt native ecosystems if these fishes escape or are released into the wild. Native species, especially smaller fishes, would stand little chance against the razor-sharp teeth of piranhas when it comes to predation!

Figure 03: Live colouration of Red-bellied Piranha (*Pygocentrus nattereri*) in an Aquarium (Photograph from the internet)



Reckless actions driven by religious beliefs!

As we predicted, during recent religious festive seasons, we noticed some shocking videos which have gone viral on social media, of monster fish being released into natural habitats. The intention behind this action might be a genuine concern about freeing captive fish, but such actions pose a significant threat to natural ecosystems, as explained above. It's good to see that people are becoming more aware of this menace and are speaking out against these actions on social media. However, as these activities become very common, it indicates that some audiences are not getting the message adequately, and thus, the behaviour would continue unless they are properly educated. We believe that even certain religious parties have the responsibility to explain to the public that these actions should be understood scientifically and not really encouraged.

What is the role of citizen science, and why do we need your help?

Currently, the distribution of newly recorded exotic species, including monster fish, raises questions and lacks clarity. Understanding this distribution is crucial for implementing future conservation measures for protecting indigenous species and effectively managing these exotics. Therefore, gathering more information about sightings and distribution is essential. Scientists alone cannot accomplish this task. This is where the contribution of Citizen Scientists and conservation organizations becomes crucial. Collaborative efforts, such as biodiversity awareness sessions, offer an effective platform to present ideas to the public and involve them in various initiatives. As Citizen Scientists, your involvement can make a significant difference. It's vital that you report any confirmed sightings to the scientific community. By working together, we can address this issue more efficiently.

A Message to Aquarium Enthusiasts.

Please remember never to release your exotic pet fish into natural waterways or drainage systems. If you are unable to care for them and can't find another home, humane termination is the only option. While this decision raises ethical concerns and controversy, it's essential to prevent the potential harm caused by releasing them. If your aquarium is located in an area prone to seasonal flooding, consider using nets to prevent fish from escaping into the environment. While maintaining an aquarium can be a relaxing hobby akin to photography, it's crucial to approach it with care and responsibility. Enjoy your aquarium responsibly!

References

1. Ahamed, A.M.R. and Dharmaretnam, M. (2008). Nest distribution of the indigenous *Eetroplus suratensis* and *Eetroplus maculatus*, and the exotic cichlid *Oreochromis mossambicus* in the Batticaloa lagoon, Sri Lanka. In: Ranwala, S. (ed.). Proceedings of the National Symposium on Invasive Alien Species, pp. 145-164. Sri Lanka Association for the Advancement of Science.
2. Barnbaradeniya, C. (2002). The status and implications of alien invasive species in Sri Lanka. *Zoos' Print Journal*. 17. 930-935. DOI: 10.11609/JoTT.ZPJ.17.11.930-5.
3. Bandara, J., and Gunawardena, M. P. (2023) The Legislative Framework Required in Species Management Initiatives Regarding Exotic Freshwater Fishes in Sri Lanka. In Proceedings of the South Asian Conference on Higher Legal Education and Sustainable Development (SACHLE) 2023, Horizon Campus Malabe, Sri Lanka.
4. Bandara, K.V.Sandun & Kumara, Pannipiti Arachchilage Don. (2021). Morphological differentiation of suckermouth armored catfish, genus *Pterygoplichthys* (Siluriformes: Loricariidae) in Sri Lankan freshwaters. 8. 286-293. 10.22034/iji.v8i4.487.
5. De Silva, M., N. Hapuarachchi and T. Jayarathne, (2015). Sri Lankan Freshwater Fishes, 1st Edition. Wildlife Conservation Society, Galle, 391 pp.
6. Jayaneththi, Hareschandra. (2015). Record of Iridescent shark catfish *Pangasianodon hypophthalmus* Sauvage, 1878 (Siluriformes: Pangasiidae) from Madampa-Lake in Southwest Sri Lanka. *RUHUNA JOURNAL OF SCIENCE*. 6. 63-68. 10.4038/rjs.v6i2.12.
7. Pethiyagoda, R. (1999). Fishes in trouble: The decline and fall of Sri Lanka's freshwater fish fauna. *Loris. Journal of Wildlife and Nature Protection Society of Sri Lanka* 22(2): 56-64.
8. Pethiyagoda, R. 2004. Threats to the indigenous freshwater fishes of Sri Lanka and remarks on their conservation. *Hydrobiologia*, 285, 189-201.
9. Rodrigo, M. (2020). In Sri Lanka, the hunt is on for alien fish in native lakes. *Mongabay Environmental News*. <https://news.mongabay.com/2020/07/in-sri-lanka-the-hunt-is-on-foralien-fish-in-native-lakes/>
10. Sudasinghe, H. (2016). The problem of aquarium escapes: a new record of the Tinfoil Barb from Sri Lanka. *Wild Lanka*, 4(1), 17-25.



R. Dilochchini : Shadows of Extinction
(Drawings/ Paintings -1st Place- Tales of Conservation)

CONFLICT

DUGONG DISAPPEARING

DEMURE DAMSEL OF THE SHALLOW SEAS

by Mark Hager



After years of searching, while scuba diving, Dr. Tilak Jayaratne captured this rare picture of a dugong off Mannar

One morning a while back, with the house full of extended family, I got a video up on my computer. 'What is that?' came the cries. An aquatic pig, nuzzling truffles from the seabed? What's front, what's rear? Is that thing real? She's very real but unfortunately also very rare in Lanka these days, though she used to cavort by the thousands in our northwestern waters. What's become of her (and him of course)?

Dugongs represent the last surviving species in a once-flourishing extended family. Close cousins radiated 30-35 million years ago (mya) but then declined with climate cooling and oceanographic changes. The dugong is now the planet's sole exclusively saltwater mammalian herbivore. Their closest living relatives, three remaining species of manatee, spend all or part of their time in fresh water. They inhabit the Caribbean, Amazonia and west Africa. Dugongs and manatees together belong to the order Sirenia, so designated because ancient sightings of them may lie behind myths of sea sirens or mermaids—part woman, part fish—that entrance and bewitch sailors. The Malay word 'duyong' means 'mermaid.' Dugongs show a knack for perching upright on their tail fins in shallow water, clasping their nursing pups to their pectoral breasts with their forearm flippers.

Sirens are today's closest living relatives to elephants (along with hyraxes). Many dugongs even have tusks. From a pig-size common ancestor some 50-60 mya, elephant forebears evolved their distinctive trunks while sea sirens took up and perfected their aquatic lifestyles. Dugongs thereby lie closer to elephants than to other marine mammals like whales and dolphins, who are related to today's hippos, or seals and walruses who descended from bear-like ancestors. All three of these clusters took to the waves following the cataclysm wiping out dinosaurs and their proliferating aquatic cousins 65 mya. Mammals

jumped into exploit biological space vacated by vanishing marine reptiles.

Three meters long and half a ton in weight when full-grown, dugongs feed almost exclusively on seagrass found in calm, shallow seawater and in brackish estuaries and lagoons, or in coastal bays and mangrove environments. Extremely dense bones give dugongs ballast, counteracting the buoyancy from their blubber. Holding their breath for ten minutes or so, they dive as deep as 30 meters, snuffling through seagrass beds using their prehensile snouts—physiologically analogous to elephant trunks—to yank up spears of grass and their especially nutritious rhizome roots. An adult will swallow down some 30 kilograms a day!

Dugongs are hard to study. They frequent waters that tend to be turbid. Eons of predation by sharks, killer whales and crocodiles have made them timid by nature. They die easily in captivity due to difficulty in providing exactly the right breed of seagrass.

They have rather poor eyesight, vision not being terribly helpful in how they live their life. Like whales and dolphins, however, they have exceptional hearing so as to capitalise on superior sound propagation through water. Dugongs communicate among themselves with chirps, whistles, barks and trills. They engage each other in affectionate nuzzling, including fin-to-fin and nose-to-nose caresses. Calves bond closely with mothers, frequently riding on their backs.

Seagrasses happen to be the only marine flowering plants. Semi-nomadic, dugongs move regularly from overgrazed seagrass beds to ones offering more to eat. Though they consume seagrass, they also help propagate it by ingesting seeds and pooping them out elsewhere as they migrate. Pooped-out seeds may propagate over hundreds of

kilometres. Studies show that they germinate way faster and more reliably than those simply drifting down into the seabed. They are also freer of fungal and bacterial infection. This symbiosis between sea cows and seagrass may help mitigate climate change since seagrass operates as a vital carbon sink.

They are quite alone in their genus, distinct from that of manatees. Dugongs had a closer cousin until recently though, called Steller's Sea Cow (SSC), named after German seaboard physician and naturalist, Georg Wilhelm Steller, who 'discovered' and studied them in 1741. While serving with the massive Russian exploratory voyages known as the Great Northern Expedition, Steller found himself shipwrecked with others and stranded that year on Bering Island in the Bering Sea's Commander Islands.

Shaped much like dugongs but even more tubular, SSC was substantially larger, reaching lengths up to ten meters, one of the largest non-cetacean mammals ever to share the planet with *Homo sapiens*. They evolved from tropical dugongs, ancestors of today's lonely survivor. Fossils show them ranging widely across North Pacific coasts during the frigid Pleistocene (the Ice Age), with their thick blubber and low surface-to-volume ratio protecting them from the cold.

They dined mainly on 'canopy kelp' (not seagrass), growing up from the seabed to just below the surface, allowing access through shallow dives at most, which were all they could manage in their blubbery buoyancy. Some contend that their buoyancy kept them from submerging at all so that they had to feed exclusively from the surface. They probably used kelp forests as a refuge from predatory orcas and sharks. Their buoyancy may have made it hard for orcas to drown them, but their diving difficulty left them an easy target for human hunters.

Steller and his companions survived their shipwreck in part by hunting the placid sea cows while Steller himself took notes for his monograph 'On the Beasts of the Sea.' He made a theme of their lovely gregariousness. Adult SSCs would protect their juveniles by keeping them in front as they swam, or between themselves and shore. When hunters captured one particular female, her pod mates began ramming and rocking the boat. Her male consort followed the boat far toward shore though she was already dead.

No one can say for sure whether populations existed elsewhere or whether the Commander Islands SSCs represented a last remnant in a pre-existing shrink toward extinction. Warming post-Pleistocene seas may have compromised her habitat. Heavy hunting by Steller's shipmates and other Russians certainly did them no favours. They made valuable food for sea crews and fur traders. Indigenous hunters may also have been in on the bounty of course, even before Steller arrived. By 1768 they were declared extinct, though random reported sightings continued for a time.

SSCs were probably absent from most of their former range by the time Europeans arrived. Scientists sampling remains identify high genetic inbreeding in the Commander Islands population, suggesting long-term isolation. Experts speculate that indigenous hunters may never have reached the highly remote Commanders. Some scientists posit that over-hunting of otters for fur dealt SSC its final extinction. With otter decline, their main prey-urchins, proliferated and munched through kelp forests, depriving SSCs of their requisite sustenance.

As recently as a few decades back, numbering in many millions, today's dugong occupied a quasi-contiguous range covering littoral zones and

islands throughout the greater Indian Ocean and appendages like the South China Sea, Red Sea and Persian Gulf. This dispersal covers perhaps forty countries, from Mozambique in the west to Australia and nearby Pacific islands in the east. In recent decades, numbers have plummeted drastically, with dugongs now absent in extensive portions of their former range, increasingly confined to isolated pockets.

Though pitiful by former standards, our Gulf of Mannar population may be the largest remaining in South Asia.

Dugongs are considered extinct in nearby Maldives as well as in Mauritius, Taiwan and China. In Vietnam, Cambodia, Philippines and Japan, they hang on only in increasingly confined zones. Confinement augments risk of inbreeding, which may reduce adaptability to environmental changes.

Sri Lanka's dugong now stands 'critically endangered,' meaning it faces extremely high extinction risk in the immediate future. There may be fewer than 100 survivors left to swim our waters. Once reported in swarms of hundreds, they are now generally spotted only one at a time. It is far easier to glimpse a dead one than a live one.

The bad news starts with a slow dugong reproductive cycle. They give birth only once in five years or so, and only to single calves. One cause of dugong decline is heavy hunting. Their meat is prized by those familiar with it - the fat can be rendered into clean-burning oil and tough hides can be put to many uses. Easily accessible in shallow water, they typically do not move quickly as they dive and re-surface. In earlier times they would often have done so in companionable close-knit clusters, easy for rapid mass killing.

Fishing, even with traditional techniques, can also decimate dugong numbers. Unable to surface when snared in nets, they quickly drown. 'Blast fishing', detonations, which kill animals and plants for dozens of metres around, pose an even graver danger. Dugong corpses in Puttlam Lagoon show telltale bleeding from snout and eyes. Despite its illegality, blast fishing appears to be on the rise in Sri Lanka, stoked by organized crime networks trafficking in explosives and coordinating to evade detection.

Perhaps the main ongoing threat to dugong survival however lies in habitat destruction. Though dugongs here and elsewhere have long been classified a protected species, protecting their habitat poses a vast challenge. Seagrass beds require fine-tuned conditions of light, sea floor composition and water chemistry. Assault on this requisite balance comes from many sides. Sea-floor trawl fishing and dredging damage seagrass beds directly and increase water turbidity, which is detrimental to growth. Sewage, herbicide runoff from farms, and heavy metal leaching from mines pollute coastal waters. Mangrove clearance and landfill for construction poach on grazing ranges. An estimated 7% of dugong habitat disappears every year. That's half of their remaining habitat lost every decade.

Aside from these distressingly routine habitat insults, Lankan dugongs may have sustained a singular blow from the 2004 tsunami. Studies indicate that the 2011 tsunami in Japan destroyed up to 70% of seagrass coverage in areas it struck. Could something comparable have happened here? The northwest shores escaped with light human life and property loss as tsunami waves dissipated their energy in shallow seas. But salvation for people and homes may have been a disaster for the dugong habitat

as the demonic waves churned against the sea floor. Seiches (large waves bouncing shoreline to shoreline) reportedly reverberated through the Palk Strait and the Gulf of Mannar on Boxing Day in 2004. Shredded grass beds, greatly increased turbidity and mangled mangrove stands would have been probable consequences, along with leaching of sediment and microbes into the sea as waves receded from the land.

If the tsunami bludgeoned dugong habitat, it might mean either good news or bad. The good news might be that the habitat will slowly recover from the one-off catastrophe and that dugong numbers will rebound accordingly. The bad news might be that the tsunami dealt a death blow to habitats and that we will soon see (or more likely not see) the last of our local dugongs.

From 2015 to 2018, the United Nations Environment Project ran a chapter of its 'Dugong and Seagrass Conservation Project' on Sri Lanka's northwest coast, coordinating with its local partners, the Department of Wildlife Conservation and Dilmah Conservation. Besides mapping seagrass beds and dugong sightings, the Project aimed to preserve and restore habitats by identifying potential protected areas and by nudging coastal communities toward benign fishing practices and engaging them in dugong and seagrass stewardship (As fish and shrimp nurseries, seagrass beds support sustainable yields for fisheries and livelihoods.). In exchange for such services, the Project sought to support participating families in developing diversified livelihoods like production of marketable art and craft items. The potential for dugong and other eco-tourism received attention through this.

No one should feel complacent that this praiseworthy intervention will save our local mermaid. Shortfalls in management, monitoring and enforcement will probably continue. Especially in a time of budget austerity, dugong protection will almost surely lack the needed funding.

The silver lining, if any, may lie in Australia. Most of the Earth's estimated 100,000 living dugongs reside along its shores. Substantial numbers inhabit Shark Bay in the west (10,000), Torres Strait (25,000) and the Gulf of Carpentaria (20,000) in the north, and Queensland (10,000) in the northeast.

Dugongs worldwide rate as 'vulnerable': high risk of extinction in the wild. But Australia may represent a robust pocket of sustainability. Western and northern coasts lie far from human population centres, coastal development, industrial pollution and agrarian run-off. Queensland dugongs benefit from the protected status of the Great Barrier Reef. Efforts currently underway hope to extend the Queensland range southward as far as the populous Gold Coast.

For the further future, we can at least imagine more ambitious repopulation efforts from Australia to Asia, perhaps even to the Indian Subcontinent. Logistical challenges would loom large of course, and attempts would surely fail if hostile conditions and practices persist. Could Sri Lanka be home to a successful effort? If not, we may be watching our saddest wildlife story ever.

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Further Reading

Books

Jones, *Empire of Extinction: Russians and the North Pacific's Strange Beasts of the Sea, 1741-1867.*

Ripple, *Manatees and Dugongs of the World*

Marsh, *Ecology and Conservation of the Sirenia*

Domning, 'Sirenian Evolution,' *Encyclopedia of Marine Mammals* (Third Edition)

Domning, *Sirenian Evolution in the North Pacific Ocean*

Articles and Posts

Hines, *Sirenian Conservation*

https://en.wikipedia.org/wiki/Evolution_of_Sirenians

<https://en.wikipedia.org/wiki/Sirenia>

<https://en.wikipedia.org/wiki/dugong>

<https://www.britannica.com/animal/dugong-mammal>

Domning, *An Ecological Model for Late Tertiary Sirenian Evolution in the North Pacific Ocean*

Bechley, *Fossil Friday*: <https://>

Sea Cows and the Abrupt Origin of Sirenia and Desmostylia

<https://www.dugongconservation.org> (Dugong and Seagrass Conservation Project)

https://www.dilmahconservation.org/biodiversity/Dugong_Conservation

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One afternoon after heavy rain, Thilina Ratnayake was able to capture this beautiful endemic Sri Lanka Green Pit Viper near the Kudawa entrance of Sinharaja

The restoration of 'THE GATHERING' AT MINNERIYA:

Cooperation has always been the key

Text by Rohan Wijesinha
Photographs by Ranoukh Wijesinha

As the scorching afternoon sun drifts towards the Western horizon and takes with it the day's fire, they begin to arrive; a steady stream of giant beings, to feed on the verdant grasses emerging from the receding waters, and to slake their thirst. The young ones vent their natural exuberance as they joust, run and tumble, released from the chains of the torpor of the day. The adults, more sedate in their approach, meander outwards, feeding as they amble to preferred places on the plain. These are the elephants of 'The Gathering' who, this year, have returned once more, though not in the number that used to come, for unseasonal rains have raised the water levels again. However, a couple of hundred, and sometimes more, forage on the temporary meadows. They are back thanks to the cooperation of statutory agencies, scientific researchers, conservation groups, and individual perseverance.

The blessings of Ganesha¹

The original builders of Minneriya, in the 3rd Century CE, could never have imagined that their vision would provide a new harvest of bounty to the people of the region, two millennia later; not only from rice and vegetables as originally envisaged, but also from the currencies of many Nations. For now, when the waters drop low and expose the grasses that grow from the muddied ground, hundreds of wild elephants are drawn here to seek a plentiful supply of food and water. The plains come alive to hordes of these gentle giants, who are attracted to enjoy Nature's feast, all in a time of her fury. Contrary to popular belief, these gentle giants converge on Minneriya not just for the water in the reservoir, but mainly for the fresh grasses that grow from the once submerged grasslands. Fresh grass is higher in protein than mature grass and this is the lure.





No ordinary assembly of elephants this, but the largest there is to be seen of Asian elephants in the world. It attracts crowds of visitors from all over the globe to view this unique sight. With them, they bring prosperity. It had been estimated in 2018, that over the four to five months of 'The Gathering', Rs. 8.7 billion was earned for the local economy, thanks to these elephants². It is not just the Department of Wildlife Conservation (DWC) that receives payment from these visitors for entry into the Minneriya National Park and nearby Kaudulla, but also the safari jeep drivers, guides, local hotel and restaurant owners, their staff, transport companies, shops, and others...and so this bounty trickles into every facet of life here, and into almost every home of the region. What would once have been a time of dearth, is now a time of plenty!

Under threat

'The Gathering' had recently come under threat from the excess waters released from the newly completed Moragahakanda Reservoir upstream. This storage reservoir was constructed to send water to the North Western and North Central Provinces, not Minneriya. However, although it has been completed, the water transmission network (through canals and a 28 km-long tunnel) will not be finished until 2030. Therefore, the water stored in Moragahakanda was diverted to keep Minneriya full throughout the year; to provide water to irrigate fields. This was more of a political decision than a rational, technical one. For three years, there were no grassy plains for the elephants to feed on. This was done despite a questionable market for an additional harvest, and the economic reality that any profits made by the local populace would hardly match what they earned from 'The Gathering'. In addition, vast

swathes of the remaining grasslands had been taken over by a water-borne Invasive Alien Species, 'Agada' (*Xanthium indicum* - Common cocklebur), which stifled the growth of the grasses and reduced whatever remaining fodder there was for the elephants. As a result, human-elephant conflict (HEC) in the area increased about six-fold as hungry elephants sought sustenance from where it was available - human cultivation.

Fortunately, thanks to progressive thinking, there were ways of managing the situation while saving human and elephant lives. However, these plans required time and cooperation between all those concerned. Thanks mainly to the mediation of Dr Sumith Pilapitiya, the former Director General of Wildlife, who had studied the elephants of Minneriya for the previous five years, the Department of Wildlife Conservation (DWC),





especially the then Wardens of Minneriya and Kaudulla, the Mahaweli Authority of Sri Lanka, Irrigation Department and the National Water Management Committee, negotiations were undertaken. Once the latter parties understood the weight of the problem, they agreed to control the release of water into Minneriya during the dry season to ensure that there were seasonal grasslands for the elephants.

It is important to note that the request from the conservation community was NOT to deprive farmers of water for the Yala and Maha cultivations, but to keep the water levels of the Minneriya reservoir low during the interim period between the Yala and Maha seasons. For in the previous three years, 'The 'Gathering' had not happened. In fact, there were days when no elephants were observed in the Park. Correspondingly, those who derived a living from this amazing natural, annual occurrence, already reeling from the restrictions of the COVID-19 pandemic and the Easter bombings, found that their incomes were drastically reduced. No elephants, no tourists!

Battling aliens

In a further act of cooperation, this time between the DWC and the Federation of Environmental

Organisations (FEO), a programme was begun to remove the 'Agada' which is not consumed by elephants or other herbivores. This had to be done by hand, and at the right time, to ensure that the weed did not take root again (bulldozing, as is the common method of clearing this and other invasive species, only results in the rapid re-growth of the alien, in greater volume than before). Local villagers were employed to undertake the work, thereby earning an income at this time of economic hardship. Remarkably, most of the funding for this project was thanks to the generosity of the ordinary citizens of Sri Lanka. This project has proved extraordinarily successful with over 90% of the grasslands now cleared of 'Agada'. This means more food for the elephants, and for the other grazers who also drift out to the grasslands as the evening progresses and, correspondingly, more income for the local community.

Prior to this, the FEO, the DWC, the Sri Lanka Association of Inbound Tour Operators (SLAITO) and the Sri Lanka Tourism Development Authority (SLTDA) collaborated to conduct a Nature Interpretation Programme (NIP) for training Safari Guides and Jeep Drivers on the natural wonders of the Park and how to present it to visitors to make their sojourns in the Park more

meaningful and knowledge-filled. An integral part of the programme was to encourage all stakeholders to respect the wildlife and strictly adhere to the rules of the Park - vital in providing a quality service to visitors, and for the conservation of these unique Dry Zone wilderness habitats. Over 1200 Safari Jeep Drivers were trained during the initial series of programmes, and frequent revision sessions were conducted for these and any new drivers to the area. All of them were issued with certificates of participation and future entrance to the Park will be restricted to only those who have undertaken this training. The Wildlife & Nature Protection Society (WNPS) has conducted similar training programmes for the drivers and guides of the Yala National Park.

This demonstrates how much can be achieved without politics and platitudes, when all those concerned come together for the greater good of all in the region, and for the country. However, these have to be followed up on, and any rules strictly and impartially enforced. That is the sole responsibility of the DWC.

Walking the talk

To collect more information on the impact of the levels of water in the Minneriya Tank on the elephants who depend on it, Dr. Prithiviraj Fernando and his organisation Center for Conservation and



Picture by Rohan Wijesinha

Research (CCR), have conducted long term studies on their body conditions. FEO, too, has been collecting weekly data on the number of elephants and water levels in the reservoir. **Unsurprisingly, there is a high correlation between the water level, the elephant population and the body condition of the elephants during this time. The higher the water level, the poorer the body condition, and fewer elephants; less food, less to attract them.**

Apart from this, the WNPS is conducting several other, science-driven initiatives in other parts of the country, in partnership with the DWC, local communities and other NGOs, on elephant conservation in various areas, as have other conservation groups. The issues are now too numerous and widespread for one agency alone to make effective interventions. Working together, however, and actively engaging with the local human populations who have elephants as neighbours, has to be the way forward. The WNPS has taken the extraordinary step of having one of its employees live in an area of conflict, Ehetuwewa, to educate and create awareness among the local community on the importance and ways of coexisting with elephants. After all, there are two sides to any story.

The WNPS, through the hard work of its Executive Committee,

has also found that the corporate world is more than willing to fund conservation initiatives of many kinds. All they demand in return is accountability for the funds provided, and acknowledgment of their generosity. They all, in one way or another, derive benefit from this island's unique biodiversity, and are more than willing to protect it.

For the future

There are nine large tuskers who visit Minneriya, at various times, when in musth, searching for females in estrus. They may be some of the last of their kind to wander free on the plains of this National Park. If they are to continue to grace this treasured wilderness, then this cooperation, collaboration and understanding must continue not just at Minneriya, but in every location that hosts the biodiversity of this Nation. If not, in the future, these regal beings may be contained in a holding stockade with other large males, to waste slowly away, while listening to the dying screams of their kith and kin, blown in on the bitter winds, as they perish for want of food and space.

Forced back into poverty, the people, too, will have no Gods to worship anymore; just the Demons who cursed them by destroying their living heritage, for eternity. That is unless they work together, and now, to protect the wonder that is the

Asian Elephant, 'The Gathering', and all the wild creatures and wilderness areas that this island is blessed with. We must learn to co-exist, not just with each other but with all of the other cherished beings we share this land with. Together, we can do it.

“Private sector, both individual and institutional, must be given greater opportunity to legally and constitutionally engage in conservation in Sri Lanka...Let it not be considered after environmental bankruptcy but rather as an essential measure to prevent that destiny.”

Sriyan de Silva Wijeyeratne, Past President of the Wildlife & Nature Protection Society. (Conservation must be broad based urgently, Daily FT, August 27, 2024)

¹ The elephant-headed deity who is considered the God of New Beginnings, Wisdom and Luck; Remover of Obstacles.

² Srilal Miththapala- https://www.researchgate.net/publication/368642221_The_Gathering_of_Wild_Elephants_at_the_Minneriya_National_Park_-_Challenges_ahead



JKN Hansani : In harmony's shadows (Digital Arts- 1st place - Tales of Conservation)



The Green-billed Coucal:

A Lesson (or Not) in Flagship Status but an Education in Neglect

Dr. Dilantha Gunawardana

Introduction

The Green-billed coucal (*Centropus chlororhynchos*) is a moderately-built endemic avifaunal species found in the wet zone lowlands and in the mid-elevation hills of Sri Lanka. The appearance of the coucal resembles that of a crow and there are two coucals in Sri Lanka - the forest-dwelling Green-billed coucal and urban-resident Greater coucal. The exterior appearance of the Green-billed coucal comprises of a purple-black patina, chestnut-rufous upper wings and a light green beak [1]. The native resident habitat of the Green-billed coucal is provided in the map of Sri Lanka presented in Figure 1, clearly showing its limited extent of occurrence in the south-western parts of the country.

THE NUMBERS

2500 - 9999 mature individuals

Extent of Occurrence (breeding/resident): 13,300 km²

In the local Sinhala language, the Green-billed coucal is called “Bata Atti Kukula” or “Wal Atti Kukula”, which draws from its forest residency and its life in the wild, often in the understory of bamboo clumps. Binomial nomenclature details the species by the scientific name, *Centropus chlororhynchos* [1,2,3,4], which puts an emphasis on its protruding green beak with *chloro* meaning green and *rhynchos* stressing the bill [Figure 3].

While being ghostly attests to its enigmatic nature, there is a lot to study and learn from this species, which is losing its battle due to declining range, plummeting numbers and fragmented habitats. Living in the borderlands between obscurity and rare sightings, it presents challenges not just for conservation science, but even when catering to the tantalizing curiosity that accompanies any biologist. It is high time to fill the missing pieces of the jigsaw puzzle and help this enigma to recapture its numbers in the wild- a former glory that was tainted with anthropogenically-misguided actions, which could still unleash a trigger-happy journey towards extinction.

IUCN Status

The species is listed as ‘Vulnerable’ in IUCN nomenclature and was last assessed for The IUCN Red List of Threatened Species back in 2021 [2, 4, 7] [Figure 2].



Figure 2: The IUCN status of the Green-billed coucal

Habitat

The habitat of this wondrous, green-billed avifaunal species continues to dwindle with deforestation, disturbances in vegetation and fragmentation and degradation of forests, leading to the continued decline of the forest-resident species. The Green-billed coucal is known to be a year-long resident of rainforests and pristine vegetation at mid-elevations in the wet zone of Sri Lanka, where it occupies a bushy undergrowth [3]. It is also found at elevations below 760m in altitude [4].

This captivating species is known to avoid disturbed habitats, and



Figure 1: The native resident habitat of the Green-billed Coucal (BirdLife International and Handbook of the Birds of the World (2023) Bird species distribution maps of the world)



Figure 3: Green-billed coucal [Photo Credits: Ayanthi Samarajewa]

this requirement puts them at odds with a fragmenting range, leading to a decline in numbers [3]. The main types of activities leading to disturbed habitats which greatly affects the coucal are listed in Figure 4. Noteworthy is the fact that most are anthropogenic activities.

Lifestyle

The species of coucal tends to hide in the undergrowth of wet zone rainforests, making it extremely difficult to sight - and study -, and is documented to be heard more often than seen. The common call is a double "boop-boop" and that note can be embellished with a call that sounds like "chuiip" or "kerchuiip", which draws comparisons to the sound of a pebble dropping into water, creating an inborn ripple [1].

The shy species is documented to capitalize on a diet of lizards, frogs, butterflies, spiders, snails, grasshoppers and fruits [4]. The Green-beaked coucal is likely to be sighted after rainfall, when it comes out into open areas such as clearings, to dry its plumage. Dawn and the early hours of the day are also periods of activity for the green-beaked wonder, which can be seen outside of its coveted hiding places [3].

There is very little evidence on the breeding behavior of this bird, due to difficulties in sighting, their declining

range, and the paucity of numbers of this shy species. It is inferred that the breeding season for a forest-dwelling coucal spans from January to July of the same year [3]. A domed nest made of twigs (mostly bamboo), leaves and grass, is considered the quintessential nest, raised above ground, where 2-3 bright chalk-toned eggs form the clutch [3].

Potential as a Flagship Species

The concept of flagship species has two-fold meaning in conservation biology; Firstly, the endangered species is an ambassador to a specific ecosystem and its presence is an indicator of ecosystem health,

THE GREATEST THREATS

1. Clearance of wet zone forests
2. Illegal logging
3. Firewood collection
4. Slash and burn agriculture
5. Gem mining
6. Human settlements
7. Fire and arson

Figure 4: The greatest threats to the Green-billed coucal

ECOSYSTEM SERVICE

There is a good possibility that both coucal species in Sri Lanka are important controllers of the giant African snail (*Lissachatina fulica*), an invasive species introduced in the 1900s. The giant African snail is considered as a pest for agriculture, but the impact of the snail on local fauna and flora has not been studied in extensive detail. The giant African snail has been documented to infiltrate lowland forests in the wet zone of Sri Lanka, which makes the Green-billed coucal an increasingly important player in providing an ecosystem service as a biocontrol species.

while declining numbers are indicators of disturbances and fragmentation [5] and second, the flagships species has spiritual, aesthetic and cultural identities to garner public attention and appeal, especially in conservation and associated fund raising [5]. In addition, the protection of the flagship species helps in the management of the ecosystem as well as protecting other related species that are closely connected to the flagship species [5].

There are six criteria suggested to score for the selection of a flagship species, with a maximum score of 70 as outlined in the study by Qian et al., 2021 [5]. The criteria are tabulated in Table 1. If 4/6 criteria are fulfilled, the species can be elevated into a flagship species.

IUCN STATUS	
2021 -	Vulnerable
2016 -	Vulnerable
2013 -	Vulnerable
2012 -	Vulnerable
2008 -	Vulnerable
2004 -	Vulnerable
2000 -	Vulnerable
1996 -	Endangered
1994 -	Endangered
1988 -	Threatened

Figure 5 - The IUCN status from 1988 to 2021 of the Green-billed coucal

According to the above criteria, the green billed coucal scores within 4/6 areas [conservation status, endemicity, rarity and ecological function value] and possibly fits into the category of a flagship species [5].

The author suggests performing a simpler Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis on the potential of this species of bird as a flagship species, which is also a feasible endeavour, considering that such analyses form the foundation of decision making in many areas of business and finance but are of less utility in the sciences. This is to infuse SWOT analyses in conservation biology as a method of finding the suitability of a flagship species, and not just pluck a species from the evolutionary tree based solely on charismatic appeal.

A SWOT analysis also serves as a more nuanced and multi-pronged approach and not a categorical scoring system based on an oligopoly of factors. While at the same time being more adaptable and inclusive

TABLE 1: CRITERIA FOR NAMING A FLAGSHIP SPECIES [5]

1	“Conservation status of the species, according to IUCN endangerment categories, grouped further into 3 categories and scored as follows: (1) Critically Endangered (CR) and Endangered (EN) - 10 points; (2) Vulnerable (VU) - 5 points; (3) Near Threatened (NT) - 2 points. IUCN's criteria are clear and objective.”
2	“The endemic status of the species, divided into 2 categories scored as follows: (1) endemic to the country - 10 points; (2) endemic to the region - 5 points.”
3	“Rarity of the species, divided into 3 categories and scored as follows: (1) small population size and existing in a very limited area - 10 points; (2) small population, but having a large distribution range - 5 points; (3) relatively large population, but existing in a very limited total area - 2 points.”
4	“Ecological function value. Species that have been chosen as umbrella or focal species are good candidates in this respect.”
5	“Public interest. A high degree of public interest in a species has proved useful in many nature conservation projects. These high public profile species are sometimes described as being charismatic or ambassadorial”
6	“This category is divided into two categories, (1) high cultural value and (2) high socio-economic value, each of which can be awarded 10 points. This means that the total score for this criterion can be 20 points, rather than 10 points as with the other criteria.”

to other criteria that are missing in the scoring matrix [5], these criteria include behavioral aspects and roles that are central to studying a species, availability of poor-quality data, as well as the poverty of data. There are also difficulties in collecting data on a shy species, demonstrated local dosage effects on populations due to diffusive ecosystem disturbances (ie- the impacts on population depletion will vary depending on the magnitude of the threats and population size), and their borderline conservation status/position may not unveil the true nature of the perils of endangerment,

The neglect of objectivity in strategy and data gathering could lead to ill-founded downstream conclusions and the ignorance of domino effects may have repercussions on conservation policy. Also the rallying of conservation biology into an emotional science could overstate the ensuing importance.

In summary, a SWOT analysis is more holistic and open ended in scope. However, the inherent weakness is that objectivity may be partially compromised to the practice of a diversified list of contenders to the determination of flagship status.

In a SWOT analysis here, being endemic, a local limited distribution under forest cover [relatively rare], and an aversion to disturbance [an ambassador of such phenomena] are strong factors in favour of a flagship status. In addition, having local cultural names that make it easily recognizable, its current vulnerable status, and being an ambassador to fast receding wet zone forests, support this cause. Also, gaps in knowledge, poverty and low quality

DID YOU KNOW?

1. There is interspecific competition between the Greater coucal and the Green-billed coucal in disturbed habitats, and it could well be that the Greater coucal is winning the battle.
2. The competitive exclusion principle (Gause's Law), states that two species competing for the same resource, cannot keep their populations at stable/constant values. The weaker species may perish in numbers even leading to extinction.
3. An evolutionary shift towards a novel niche is means to survival in the face of direct competition for the same resource.

SWOT ANALYSIS FOR FLAGSHIP STATUS

Strengths	Weaknesses
<ul style="list-style-type: none"> • Unable to lead a healthy lifestyle in disturbed habitats and consequently is an ambassador species of such phenomena • Marketable on the theme of conservation • Numbers are declining and conservation is the need of the hour • Has unique features such as a green beak, with green being a rare feature of avian beaks • Finds new niches in disturbed forest habitats by following vegetation corridors • Has a distinctive visibility • Largely confined to the wet zone and lowland rainforests • Traditional and local communal names that are distinct 	<ul style="list-style-type: none"> • Range decline • Vulnerable and not Endangered like most of the other flagship species [Note: in 1994 and 1996 - Classified as an Endangered Species] • Not mega fauna • Not a charismatic species • Has a poor audience even among conservationists • Difficult to study due to its shy and sensitive nature • Poor availability of data • Most available data is of poor quality
Opportunities	Threats
<ul style="list-style-type: none"> • Numbers are dwindling and requires conservation • There are gaps in knowledge especially on breeding and behaviour • A bioindicator species for wet zone forests • Has a cousin, an urban species, which can be useful for comparison purposes • Distinctive identity in the cuckoo family, building their own nests • Scientific value • Umbrella species • Forest species such as the forest elephants are now gaining iconic statuses 	<ul style="list-style-type: none"> • Extinction • Scattered populations • Cultural insignificance

of data, scientific value, and its potential as a biocontrol species, are some of the factors that further propel the Green-billed coucal towards a possible flagship status. Still, the lack of strong visibility, low public and conservation interest, the absence of a crowd-pulling charisma, a weaker push towards a more visible conservation approach, and the difficulties of studying this shy species, sadly

makes a flagship status rather unlikely for the elusive species.

It should be noted here that the Green-billed coucal was identified as endangered twice in the 1990s [4] and their numbers are currently inferred to be declining [Figure 5]. The poor quality of data on this forest-resident is also a hindrance to conservation efforts.

Empirical neglect due partially to the low strength of visual charisma of the Green-billed coucal, compared to other examples, such as the Red-faced malkoha and Sri Lanka blue magpie [both endemic and classified as vulnerable in IUCN status], of which the brighter plumage appears to garner more scientific attention in conservation circles, is proof that conservation science can be termed as a beauty pageant in some ways, and the Green-billed coucal is no exotic crowd puller. Still, in a world of avian bombshells, standing out may not necessarily require a combination of colorful decorations, and being enigmatic will do.

Green-billed coucals require saving and a magnanimous and super-heroic effort on the parts of conservationists is necessary to bring their numbers back up. The bedrock of existence of this species is not in any way outright precarious, but the worst may well be yet to come. The lesser known of the two coucals should perpetuate indefinitely within their range, and let's not gift them an early gravestone - time can dilute a species beyond repair, fertilizing our anemic consciences with bystander guilt. The ephemeral and ethereal social nature of this cryptic species mandates the study of an enigmatic wonder, before their numbers are too meek to state.

In closing, on an envelope's pedestal rests the Green-billed coucal in philately, but more importantly, this enigmatic species has an irreplaceable niche in both lowland forests and vegetation in midrange altitudes and perhaps in flagship status. A herculean beak envied by

crows and parrots – admittedly the wizards and comics of our opulence in avifauna, reconciles with a titular pistachio green providence, manipulating helical mollusk shells, to harvest a banquet of lip-smacking escargots; a spiritual indulgence for a bashful coucal, but junk food for a more cosmopolitan cousin.

The crusade for conservation will never be Noah's Ark; there are bound to be species that fall through the cracks and the Green-billed coucal is one such contender. The footpaths of Sinharaja may still hold potential as future catwalks and an ungainly bird that can chirp "I am Limited Edition" can draw comparisons to how Cindy Crawford took a mole to a celebrated cause; a green-beaked, dark in complexion avifaunal species may not turn heads but can twist hearts of future conservationists, in that beautiful science that accepts every species, first as individuals, then as personalities. *Ultimately, Green bills are worth more than dollar notes in Conservation Science, and we are custodians of our nature, flagship or not.*

Afterword

It's a treat for the human eyes, when you finally encounter this shy creature that is more silhouette than shadow, more camouflage than contrast. A big, feathered Goth of the shrubs and the lower canopy - with the luminous glow of nature's green lipstick, about to capitalize on obese snails, jumping out on anthropogenic walkways, where a Kodak moment can be frozen instantaneously from the click of a camera button. This is unlike the city slicker, the Greater coucal, with its flaming satanic halo around its eye, which sweeps across over short distances, like a caped superhero. The Greater coucal and the Green-billed coucal share, among other features, a common evolutionary node, a noteworthy resemblance, and the love of an escargatoire.



(Photo Credit Sriyan de Silva Wijeyeratne)

A 20-rupee stamp in Sri Lanka has the Green-billed coucal printed on it, the one with a gluttonous snail-tooth gifting snail mail "wings" but more importantly, the overarching celebration of the continued existence of an endemic but vulnerable species that shies away from plain sight.

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References

1. <https://ebird.org/species/grbcou2#:~:text=Identification&text=A%20mid%2D-sized%20coucal%20of,skulking%20and%20difficult%20to%20see> [Accessed 19th June 2024]
2. <https://www.iucnredlist.org/species/22684257/93021858> [Accessed 19th June 2024]
3. <https://lk.lakpura.com/pages/green-billed-coucal> [Accessed 19th June 2024]
4. BirdLife International (2024) Species factsheet: Green-billed Coucal *Centropus chlororhynchos*. Downloaded from <https://datazone.birdlife.org/species/factsheet/green-billed-coucal-centropuschlororhynchos> on 13/10/2024.
5. Qian J, Zhuang H, Yang W, Chen Y, Chen S, Qu Y, Zhang Y, Yang Y, Wang Y. Selecting flagship species to solve a biodiversity conservation conundrum. *Plant Divers*. 2021 Jan 29;42(6):488-491. doi: 10.1016/j.pld.2021.01.004. PMID: 33733016; PMCID: PMC7936098.
6. Birdlife International and Handbook of the Birds of the World (2023) Bird species distribution maps of the world. Version 2023.1 Available at <http://datazone.birdlife.org/species/requestdis>
7. The National Red List: Conservation Status of Birds of Sri Lanka - 2021. Biodiversity Secretariat, Dayananda, Salindra & Fernando, Saminda & Herath, Tharanga & Perera, Nishanthi & Perera, Sandun & Seneviratne, Sampath & Sumanapala, Amila & Wickramasinghe, Sriyani & Weerakoon, Devaka. (2022).

THE CROCS OF KIMBULAWALA

Buddhima Gunawardena

“BEWARE OF CROCODILES!” - This has become a familiar warning plastered on signboards along the banks of the many canals and lakes around Kimbulawala. Located in Sri Jayawardenapura, Kotte, and fed by the waters of the Diyawanna Oya, Kimbulawala has become well known among the public for its picturesque walkways overlooking lush paddy fields and scenic wetlands. The man-made canals connect the Diyawanna Oya in the north and the Kimbulawala Lake in the south (as shown in Figure 01), encircling the cultivated paddy fields in the centre. This wild oasis in the heart of the city is also a refuge for many species of animals. Birdlife is a particular highlight, with many resident and migratory species being easily observed in the area. Massive

development pressure is evident in the area as easily visible in these images, with congested concrete structures rapidly expanding into the green regions of the not-too-distant past.



Figure 01 - Map of the Kimbulawala area (from Google Earth, 2024)

These wetlands are also home to an apex predator. The saltwater crocodile, *Crocodylus porosus*, is the largest living reptile. The Adult males of the species potentially reach lengths of up to 23 feet and weights of upto almost a ton¹, although the average length they grow to is around 17 feet^{1,2}. Females are much smaller, rarely exceeding 10 feet in length¹. These reptiles have adapted well to the canals and lakes that Colombo has to offer, as there is little natural habitat left for them to thrive.

During my many hours spent on birdwatching at Kimbulawala, I have also been fortunate to see these majestic reptiles, including coming across two of them quite regularly. The larger one, whom I estimate to be 10-12 feet long, is an impressive regular sight along the walkway bordering the Diyawanna Oya and is quite a sight to behold, basking with his jaws wide open. This crocodile has become well known among the local residents as well as those who visit to indulge in both the scenery and the street food on offer. Many others even stop their vehicles to catch a glimpse of this incredible animal. I chanced to observe this croc one afternoon in July (Figure 02) and had him to myself for a good

hour or so before I was joined by several others, who were curious to know what I was doing sitting by the edge of the water, camera in hand. Their curiosity soon turned to wonder as they too noticed this massive croc, half submerged, and resting just a few meters away, separated from us only by the fence put up around the walkway. It truly was a remarkable sight right here in the heart of the city.

The smaller croc on the other hand is a lot shyer and more elusive, and I consider myself lucky to have had quite a few encounters with him as well. I have most often seen this little individual in the canals around the Kimbulawala paddy fields, and also whilst moving down towards the Kimbulawala lake. Quick to take to the water, he rarely stays out in the open where he can be seen and as such had become quite difficult to photograph.

Then one gloomy September afternoon while observing the birds around the Kimbulawala lake, I happened to spot the big croc I had grown so accustomed to seeing in the Diyawanna Oya, right here in this little lake (Figure 03). It seemed that he had decided to swim down the canals connecting the two waterbodies,

perhaps seeking a change of scenery. Regardless of his intentions, I was more than happy to take the opportunity to snap a few pictures while he was around (Figure 04).

About 15 minutes into this impromptu photography session, I suddenly realised that the large croc and I were no longer alone..... the little croc was there as well! He was keeping close to the water's edge and well away from his larger compatriot (Figure 05). He and I were both very much mindful of who really was in charge of the lake in this situation!

I continued to watch as the large croc decided to move towards the edge of the lake. The little one very wisely decided to make himself scarce, being quick to submerge and disappear from sight. I did not see him again for the rest of that afternoon. I continued to observe the large croc, who had now swum quite close to shore and allowed me the opportunity to take many more photographs (Figure 06).

Watching one of these amazing reptiles in its natural habitat, so at ease in its aquatic environment, is an experience. It never ceases to amaze me how these reptilian behemoths



Figure 02 - A charismatic grin



Figure 03 - An unexpected visitor to the Kimbulawala Lake



Figure 04 - Enjoying a swim in the Kimbulawala lake

can vanish in the blink of an eye, only to resurface elsewhere, with just their eyes and nostrils peeking out from the water. It's a testament to the millions of years of evolution that have turned them into such accomplished predators. I spent a couple more hours with this croc before leaving him to his business, watching him quietly slip away through the water (Figures 07 & 08). As the evening sky darkened, I headed back home with plenty of photographs and a great appreciation for the untamed wild that could still be quietly observed right here in the urban heart of Colombo. Their presence is yet another reminder of the fact that we humans share this planet with a myriad of other species. While a certain degree of awareness and caution are required when living alongside predators such as these, coexistence is most definitely possible.

References:

- 1) <https://oceana.org/marine-life/saltwater-crocodile/>
- 2) <https://www.nationalgeographic.com/animals/reptiles/facts/saltwater-crocodile>



Figure 06 - A close up



Figure 07 - Almost invisible among the vegetation



Figure 05 - The little croc



Figure 08 - Calmly cruising away

A.M.B.Marasinghe: Unwelcome Visitors (Photography - 2nd Place - Tales of Conservation)





ODE TO THE

Uththami Ranasinghe - Grade 11 C
St. Bridget's Convent, Colombo.



Lahiru Jayamanne captures the Kuruttupandi female out for a stroll with one of her cubs near Menikwila (Wilpattu)

LEOPARDS

Ode to the leopards,
Creatures of the wild,
Whose grace and beauty leave us beguiled,
With spots that adorn their majestic frame,
They roam the lands,
An emblem of fame.

In distant lands,
Where jungles thrive,
The leopards stealthily come alive,
Their golden coats,
Adorned with spots,
A sight that leaves us in awe and thoughts.

Oh, elusive leopards,
Masters of disguise,
In shadows they hide,
With watchful eyes,
Their silent steps,
A ballet of grace,
In pursuit of prey,
They set the chase.

But alas, their numbers start to dwindle,
As man encroaches,
Their habitats crumble,
Their homes destroyed,
Their forests burned,
Leopards, once abundant, now concerned.
We must rise,
Like sun at dawn,
To save these creatures,
Before they're gone,

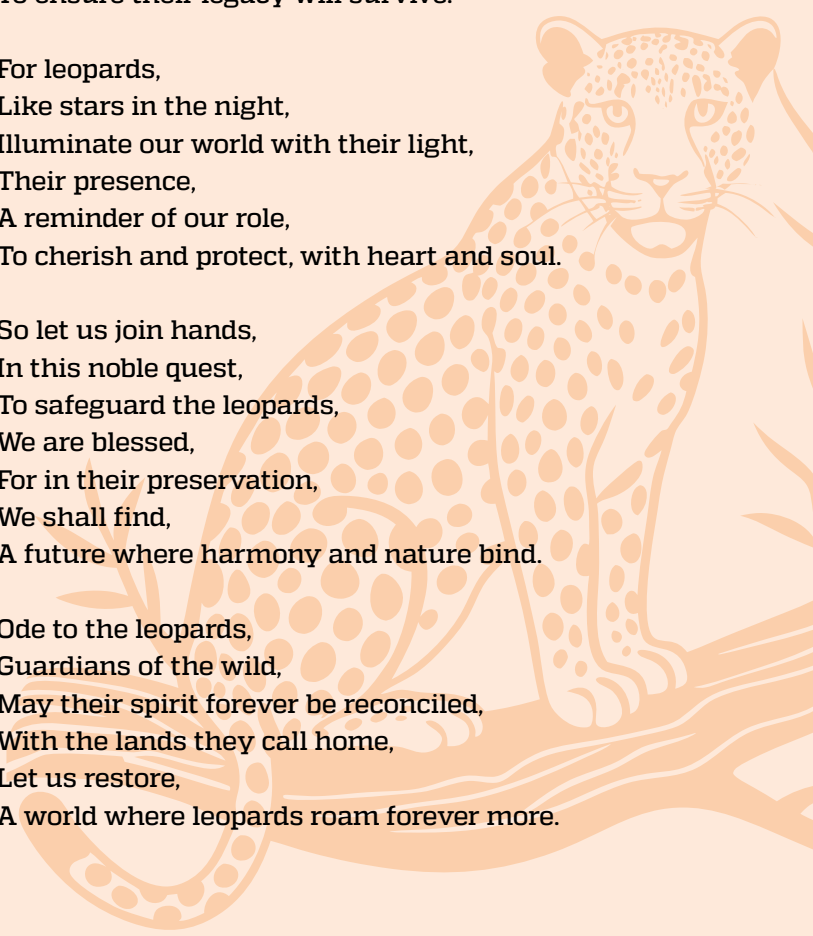
For in their absence,
We lose a part,
Of nature's grandeur, a work of art.

Let us protect their sacred ground,
Where they can roam,
Safe and sound,
Through conservation,
We shall strive,
To ensure their legacy will survive.

For leopards,
Like stars in the night,
Illuminate our world with their light,
Their presence,
A reminder of our role,
To cherish and protect, with heart and soul.

So let us join hands,
In this noble quest,
To safeguard the leopards,
We are blessed,
For in their preservation,
We shall find,
A future where harmony and nature bind.

Ode to the leopards,
Guardians of the wild,
May their spirit forever be reconciled,
With the lands they call home,
Let us restore,
A world where leopards roam forever more.



M O V I N G

O N

A HERPETOLOGIST'S QUEST FOR BIODIVERSITY

Ranil Senanayake, Belipola Arboretum.

In this article, the author—a pioneer of Analog Forestry, reflects on the ecological significance of environments, while drawing from his experiences in India as a herpetologist. He highlights the challenges and rewards of fieldwork, while taking a trip down memory lane. Interestingly, one of the endemic species referred to here which is the Sri Lankan golden-backed frog (*Hylarana gracilis*), has recently been spotted in the Eastern Ghats of India as reported in May 2024 on Newswire. The Editorial Board also sourced some older images of the author from their networks in India, which would surprise the author (Editor).

Travelling around India in 1972 as a herpetologist was a total adventure. Carrying backpacks with collecting gear in third-class train compartments was a challenge. But the visible presence of a large, hairy, red and brown Mexican Red Kneed Tarantula (*Brachypelma smithi*) guaranteed a seat on long journeys. I was a Field Associate of the American Museum of Natural History (AMNH), Department of Herpetology, New York. But as such positions went in those days, funding was limited, and field work was done frugally. Thus, Frida (the spider) was a huge help for us to obtain space when travelling third class.

I had worked with Charles Bogart of the AMNH and published the description of *Bufo atukorali* (Yala Toad or Atukorale's Dwarf toad) in '66 and was interested in the congeners in India. It seemed that the isolation since the Pleiocene - a period which lasted from 5.3 to 2.6 million years ago- was sufficient to speciate from *B.fergusonii* (Ferguson's Toad), found on the mainland. I was using sonograms to differentiate species by call, leading to more adventures to recount later.

It was on these trips that my friend Cedric De Silva told me of a guy named Rom Whittaker who was establishing a snake park in Madras. He had helped with pit digging at Meenambakkam, but said that the snake park was to be relocated to the Guindy Deer Park.

So, in 1973 during one of my field trips in India, I made a special visit to see the snake park. I had my own collection of reptiles in Sri Lanka and for a long time had been considered a bit of a 'freak' due to my love for snakes. So, understandably, it was gratifying to find a like-minded soul. Walking through the entrance I was greeted by a long haired blonde guy, who said "Hello, I'm Rom" and then proceeded to walk me through the collection. While we chatted excitedly about snakes, lizards and frogs and were comparing the exciting forests we knew, one word came up repeatedly - 'Agumbe' a mystical rainforest in the Western Ghats. My adventurous soul wanted to travel there, but that was not to happen until Rom was married, and once I had access to a full sonographic lab in Sri Lanka, I returned to India to record amphibians.

After a stint at the University of California I returned to the Snake Park in 1976, determined to visit Agumbe. The snake park had grown tremendously, and I was planning



Belipola as it looks today

one in Sri Lanka. The main design question was glassed enclosures or pits? Rom's work was great as it gave me the pointers for my own design. Rom and Zai already knew of my interest in visiting Agumbe and had kindly organised a trip for me.

Agumbe was all that I thought it would be, and more! As a monsoon-pulsed Dipterocarpus forest with a distinct dry period, it was different from the Dipterocarpus rainforests in Sri Lanka that had regular rains. The fungal diversity that manifested as fruiting bodies (mushrooms) was phenomenal, in all colours and shapes, making the forest floor seem

like a fairyland. The show was not restricted to the day- walking the forest at night to record frogs, I saw colonies of the mushroom *Mycena illuminosa*, some glowing green, the others glowing crimson, like ground lanterns. The thick heavy mist, that made all of our clothes and sleeping bags moist, also encouraged the frogs to sing actively.

It was here that I first heard the call of *Hylarana aurantiaca* (Golden Frog) and was able to use the sonograms to separate *Hylarana gracilis* (Sri Lanka Golden-backed frog) from *H. aurantiaca* on my return to Sri Lanka.

But the reality of all these field trips was that the diversity was always declining. The official foresters with their monoculture plantations were making things worse. So, in 1981 after many battles with the bureaucrats, I decided to work towards a forest restoration method that helps bring back native biodiversity. Retreating to the mountains of the Uva Province, in search of some degraded land to demonstrate my theories, I was struck by the lack of old trees and preponderance of grasslands. These landscapes seemed to be ecologically 'out of place'. It was confusing until I came



The author at the Crocodile bank in India in 1977



The author at Belipola with visitors from WNPS PLANT



Belipola Arboretum

across a document containing the standing orders issued by Governor Brownrigg, who, as the Commander in Chief and Governor, issued orders to Major McDonald, the Commanding Officer of the Kandyan provinces, in respect of putting down the rebellion of 1820. It stated that:

“All men above 18 should be killed, all houses pulled down and burnt. All trees bearing fruits of use to human beings felled. All grain should either be destroyed or confiscated. Irrigation tanks and canals should be breached.”

Reading these words, chilled me to the bone, “how could human beings do this to others?” Today, watching what is unfolding in the Gaza, I understand that this dehumanising of the ‘Other’, was the standard procedure for colonial occupation. These activities are still supported and justified by the old colonial countries. The knowledge of what happened in the Uva prompted me to settle down there. So, purchasing a degraded tea estate of 17 acres, I began the work on restoration, resulting in the establishment of the Belipola Arboretum, which produced the forest restoration method termed Analog Forestry (www.analogforestry.org), now spread to over 20 nations.

Analog Forestry began by following the successional designs of the natural, maturing ecosystem and looking for the ‘best fit’ of utility species that would grow well in the environment chosen, while providing the ecosystem services of the original. The design is made robust by considering the following postulates Soule’ (1985) for the restoration of wildlife habitats:

- 1) Many of the species that constitute natural communities are the products of co-evolutionary processes.
- 2) Many, if not all, ecological processes have thresholds below and above which they become discontinuous, chaotic, or suspended.
- 3) Genetic and demographic processes have thresholds below which non-adaptive, random forces begin to prevail over adaptive, deterministic forces within populations.
- 4) Nature reserves are inherently disequilibriumal for large, rare organisms.

An Analog design seeks goals along a continuum of actions that range from natural ecosystem restoration to anthropogenic ecosystem enhancement. In natural ecosystem

restoration, the design seeks to shorten the time taken for system maturity, and in anthropogenic, the design seeks to enhance the productivity of that system so that there is a corresponding increase in biodiversity.

Today I look at the wasteland produced by the so-called ‘economic development’ drive. The habitats of many of the species that thrilled me in those early days have gone, and without their homes, they too will disappear. We must respond to the loss. One of the best ways is to restore the habitats that are being lost. But the even-aged monocultures that are being promoted as forestry or agriculture do not allow for such opportunities. Further, once people have settled on a piece of land to live on, it will never go back to being a forest. Thus, the only way to bring back the forest is to create something analogous to it in architectural structure and ecological function, using trees and plants of economic value instead of the original forest plants. In such ‘analog’ forests, microhabitats for much of the original species are created and conservation and production can advance together.

These early lessons on the critical need of specialised microhabitats by different species guide the designs of the forests that we need to create for tomorrow.

SPECIAL ENCOUNTERS IN THE



By Nedra Wijeratne

Our magical 50th:

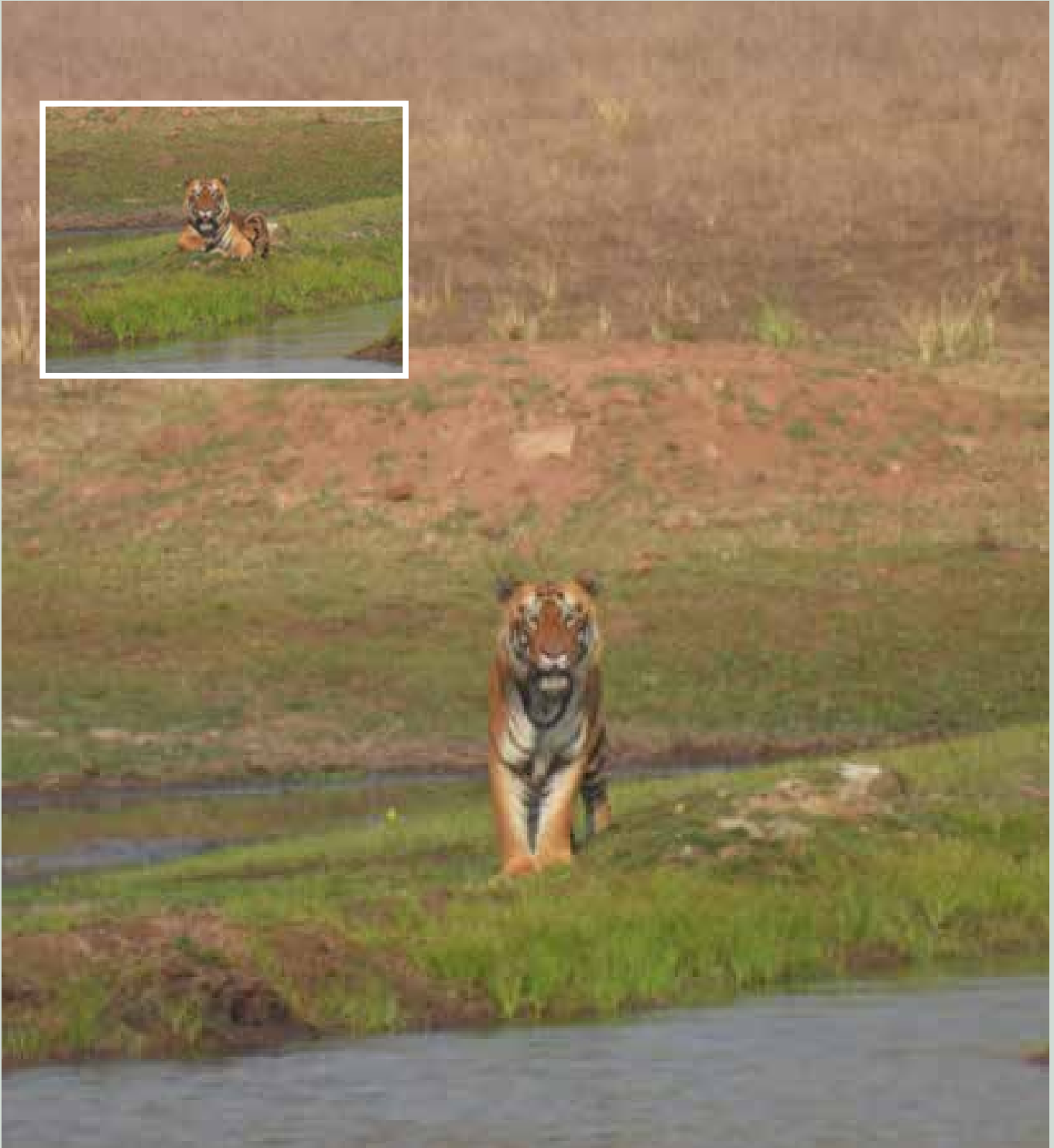
A Family Reunion and Blackie

To celebrate our milestone golden anniversary, my husband Ananda and I decided to visit the wilds of Tadoba, the oldest and largest National Park in the state of Maharashtra, India. This was a far cry from the drab registry office in Kandy, Sri Lanka, where we got married 50 years ago!

One of the highlights of this trip was meeting up with Sonam the tigress, the most renowned of the Lake Teliya sisters, with her three 4 month-old cubs, at daybreak by the lake.



Whilst Sonam was wallowing in the lake, her 3 cubs were playing around, joyfully darting in and out of the water. Suddenly a Sambhur alarm call rang out at the far side of the lake, and Sonam immediately got out of the water. She watched closely as a male tiger walk majestically up to the water on the opposite bank - thankfully, it was none other than Bajrang, the cubs' father. This was the fourth litter that he had fathered with Sonam!



Sonam then led the cubs towards Bajrang, who lay down on the bank watching them. The mother and cubs swam across the water to where he was, with Sonam going up to him. They nuzzled each other's faces, and she then went back to the water. The cubs however hung around their father without actually going up to him. Nonetheless, what a lovely reunion scene it was!



After about 15 minutes Sonam and her cubs crossed to the other side of the water, looked back at him and then went into the forest alongside our jeep. Simply magical! About 5 minutes later, Bajrang got up, crossed the water and followed behind them, careful to keep his distance from the jeeps. Apparently in the afternoon, both parents were found cooling down in the lake for some catch-up time without the kids!

(PS - Sadly, at the end of 2022, Bajrang was ousted from the area by Bheem, to mate with Sonam. The cubs whereabouts remain unknown - they would have been approximately 1 year old. Sadder still was the news that Bajrang was killed last year by Chota Matka, the ruling tiger of Tadoba - son of the famous Matkasur.)

“Tiger conservation needs to be looked at with respect to saving the species as a whole and not just an individual tiger”

The next morning, on our way to one of the buffer zones from the Moharli core zone, lo and behold who comes walking down the tarred road but the only black leopard in Tadoba, known as Blackie - an exclusive sighting for us as he disappeared before the other jeeps could catch up! A black leopard or a melanistic leopard is extremely rare to come across. Melanism is caused by a mutation which eliminates a gene that regulates the production of melanin. This leads to an overproduction of the pigment, which turns the coat colour black while still retaining the rosettes and spots. A very unusual but memorable anniversary celebration indeed to last us for the rest of our lives together!

(PS- Although we returned to Tadoba on 3 occasions since, we never came across him again, making this a once-in-a-lifetime experience!)



A Mother's Love

A few years ago, we visited Kala Wewa for the very first time, courtesy of Cinnamon Nature Trails, in the hope of witnessing the renowned tuskers. As the reservoir was inundated with water, we drove up to the edge but were only able to observe from the shoreline as a large herd of elephants, including a couple of tuskers, meandered about on the opposite side. As we arrived, we heard an elephant calling in distress from the scrub jungle behind us. Soon after that, another elephant, presumably the mother, who was on the other side of the Wewa with the rest of the herd, immediately swam across to our side. She vocally reassured the calf whilst swimming, which took about 15 to 20 minutes. As soon as she came ashore, seemingly unbothered by the group of us within a few yards of her, she hurried to the calf behind us in the jungle and the vocal greeting between mother and child was indescribable- Goose bumps all round!!

After another 15 minutes of calming her calf, both mother and calf swam back across the lake, with the mother again coaxing the calf on who was lagging and was submerged a couple of times, especially in the middle of the Wewa. The rest of the herd of about 33 (we were able to get closer to them eventually), who were also watching this episode, gathered at the water's edge to vociferously welcome both the mother and the calf who struggled to swim the last few yards to the shore. The mother looked equally exhausted and came over to the calf a few minutes later to fondle him with her trunk in a very reassuring gesture. Cue more goose bumps!

A truly amazing experience of maternal love in the animal kingdom - a very poignant moment for me personally as I had recently lost my only child.



A THOUSAND SPECIES AND COUNTING:

WNPS PLANT'S

Journey in helping revive Lanka's declining biodiversity

*Pavi Attanayake, Sashini Paranagama and Madhushanka Bandara,

Preserving Land and Nature (PLANT),

The Wildlife and Nature Protection Society, Battaramulla, Sri Lanka

Conservation is a broad field that touches on many aspects of biodiversity, from species protection to habitat preservation. Among the various approaches, the ecosystem conservation model stands out for its focus on the interrelationships within natural environments, recognizing that protecting entire ecosystems is often the most effective way to preserve an individual species. *"The ecosystem approach goes above and beyond the species level and paints a much larger picture ecologically"* [LaRoe., 1993]. Ecosystems are complex and involve inter and intra relationships that could be difficult to comprehend, and these relationships play a bigger role in the survival of the species. However, at a species level sometimes these relationships are overlooked or not properly understood, creating challenges in species conservation.

The Ecosystem Approach and the vision behind PLANT

One such solution to conservation challenges would be protecting the ecosystems along with the species. Amidst a rapid decline of forests in Sri Lanka, Preserving Land and Nature (Guarantee) Ltd or PLANT, was established by the WNPS to preserve and protect the intricate wildlife spaces in Sri Lanka as a private sector led conservation initiative. WNPS PLANT focuses on the region where over 90% of Sri Lanka's endemic

species are found. Their ambitious initiative, Emerald Trails *"...hopes to help create almost uninterrupted or reasonably connected corridors of protected natural spaces and forest ecosystems within the Southwestern quarter of the island"* (www.plantsl.org).

To restore the lost forest connectivity, PLANT works to obtain lands through partnerships, donations, and direct acquisitions, transforming these areas into privately protected spaces. Once under stewardship, these lands are managed to minimize human disturbances to the natural environment, support natural regeneration, and accelerate rewilding efforts. In degraded areas, teams employ techniques such as assisted natural regeneration



Peltopelorus trigonocephalus

to kickstart ecosystem recovery and improve both structural and functional connectivity of forest corridors. The initiative aspires to improve habitat connectivity, support gene flow, increase biodiversity, and combat climate change, while promoting coexistence between wildlife and people. Small forest patches with extremely high biodiversity are the hallmark of Sri Lanka's unique wilderness and WNPS PLANT is leading the charge to protect such locations.

"WNPS PLANT is commencing with big dreams, but we are acutely aware that these are realized in small steps of one land, one tree, one acre and one species at a time. PLANT essentially is based on the fundamental principle that we can

conserve only by coming together as Sri Lankans and pooling our efforts for the greater good. This is about a Conservation Social Revolution" (Sriyan de Silva Wijeyeratne, Chairman PLANT and Former President, WNPS).

Why record biodiversity?

In any conservation effort, it is essential to understand the species that inhabit an area. By recording the flora and fauna present, it is easy to get insights into the health of the ecosystem and the success of restoration activities. The presence or absence of certain species, especially indicator species, can reveal much about the condition of a habitat. These species act as bioindicators,

offering valuable information about the environmental quality, biophysical conditions, and climatic changes within their ecosystems. Biodiversity surveys are crucial, and researchers conduct baseline rapid biodiversity assessments to monitor the species composition in different areas, providing a foundation for measuring some of the impact of its restoration work. Over time, as degraded ecosystems are restored, biodiversity naturally increases, signaling a successful recovery. Recording such changes helps PLANT track its progress and make informed decisions about future interventions.

Understanding the existing biodiversity in an area allows PLANT to better prioritize its conservation efforts. This is important from a management perspective in

ecosystem restoration. For example, in degraded areas, initiatives to replace invasive species with native plants will better support natural regeneration. This level of detail ensures that restoration projects are both targeted and effective, maximizing the ecological benefits for both wildlife and the surrounding community. By periodically documenting the species in PLANT's protected areas, the team can fine-tune the restoration techniques and assess the success of its interventions over time. This evidence-based approach strengthens the initiative's commitment to restoring ecosystems in a way that promotes resilience, diversity, and sustainability.

The journey to 1,000 Species

Since its inception, PLANT has prioritized evidence-based restoration mechanisms, drawing on existing conservation knowledge and practices within Sri Lanka. Rather than reinventing the wheel, the team adopted a learning-focused approach, building on past successes and failures to refine its restoration techniques. However, this does not mean the team hesitates in experimentation. It continuously tests new methods, documenting both successes and challenges to improve its restoration models.

Starting from scratch, PLANT has now secured its own lands or partnered with the private sector or with individuals to engage in the conservation of 26 locations, with a protective footprint of over 2,500 acres of land. This feat includes creating approximately 360 acres of newly regenerating forests. In just over three years, the team has raised over Rupees 100 million to support this work and are deeply indebted to many partners for their commitment towards a longer-term vision rather than a short-term win. Today, as Sri Lanka's largest privately led conservation initiative, the focus is on ecosystem restoration and habitat connectivity.

Rapid Biodiversity Assessments (RBAs)

PLANT practices the ecosystem approach, and Rapid Biodiversity Assessments (RBAs) are revealing some exciting insights showcasing the impact on species conservation through this approach. After concluding 9 RBAs, the team is proud to share that as of now, it is already protecting 1,052 species of flora and fauna under its conservation umbrella. RBAs are just multi-day exercises, and more in-depth studies in these locations could easily reveal far more species. This work is creating a sustainable and scalable model for ecosystem restoration across Sri Lanka. PLANT exemplifies how privately led conservation efforts can become more mainstream and play a key role in safeguarding biodiversity and ensuring the long-term sustainability of ecosystems. The authors are indebted to the many photographers who captured these images during these surveys.

Each RBA is a stringent process involving days of fieldwork, both during the day and at night, to sample various taxa across different habitats. The different expert research teams led by either Prof. Sampath Seneviratne, Prof. Enoka Kudavidanage or Dr. Tharaka Kusuminda conduct these surveys, compiling detailed reports that outline the species present, and make recommendations for future management. Their work has laid

the foundation for the restoration work and strengthening the ecosystem model. These reports are analyzed by the field operational team, and the data is entered into a species monitoring database. By establishing this baseline, the team plans to assess the effectiveness of its restoration efforts through follow-up surveys conducted over time.

Beyond assessments, data is gathered through direct observations during site visits, and camera traps placed within some properties. Data collection allows teams to track changes in biodiversity, offering a clearer picture of how degraded ecosystems respond to restoration. Additionally, the team documents every plant species introduced to the field during reforestation efforts, ensuring the monitoring of the mix and nature of species across its sites. Every RBA conducted has been revelatory. The findings highlight the incredible biodiversity that exists outside the country's formal protected area network. Many of the areas covered by PLANT are understudied, with little available data on their ecological significance. **From within nine properties surveyed so far, PLANT has recorded an astonishing 1,052 species of flora and fauna, with many of these representing a fraction of the total biodiversity likely present. Some species recorded are new locality records, indicating that they were found outside their previously known ranges.**



Calotes ceylonensis



Strobilanthes rhytisperma



Stemonoporus gracilis



Saccolaimus saccolaimus

These findings are more than mere numbers—they represent compelling evidence of the critical role PLANT and other private sector partners can play in Sri Lanka's conservation landscape. It underscores the significance of an 'Ecosystem Approach' as a conservation model and response within Sri Lanka.

Flora: A Botanical Treasure Trove

Surveys have recorded an impressive 530 plant species from 118 families, and this includes 81 endemic species (15.2%) and 219 native species (41.3%). Among these, researchers have identified 4 Critically Endangered (CR) species, 25 Endangered (EN) species, and 53 Vulnerable (VU) species, all thriving under these protective efforts.

Some of the most significant species include *Strobilanthes rhytisperma*, *Calophyllum cuneifolium*, and *Vanilla moonii*, all Critically Endangered (CN) and endemic to Sri Lanka. (PLANT RBA Report- Aranaya and Nisarga). These plants are range restricted and highly vulnerable due to their small populations. *Strobilanthes rhytisperma* was recorded in 2019 (after 48 years) by a group of scientists upon only knowing it from specimen collected in 1971 (Nilanathi, Rajathewa, and Jayawardana., 2021). These

species require further studies to understand their ecology and diverse habitat preferences.

Bu Hora (*Dipterocarpus hispidus*), another endemic species found in PLANT properties, has inspired usage within the PLANT logo with its towering, evergreen presence in forest patches. **PLANT has also successfully reintroduced *Stemonoporus gracilis*, a Critically Endangered species, to two of its properties with the assistance of the Peradeniya Botanical Garden. PLANT is closely monitoring their progress and is thrilled to report that they are thriving in its custody. *Stemonoporus* is the most species rich endemic Dipterocarp genus in the country (27 species) and *Stemonoporus gracilis* is part of a monophyletic group shared by four other species. Its only known location is in the Kitulgala region (Rubasinghe, Yakandawala, and Wijesundara., 2008) and currently, PLANT is conserving it within two new locations.**

Fauna: Guardians of the Wild

PLANT RBA's have documented an incredible 522 faunal species across 9 locations, spanning mammals, birds, reptiles, amphibians, freshwater fish, land snails, butterflies, dragonflies, damselflies, and other insects. Among these species, 158 are

endemic (30.2%) to Sri Lanka, 350 are native (67%), and 15 are migratory birds (2.8%). Notably, PLANT's efforts are protecting 24 Critically Endangered (CR) species, 75 Endangered (EN) species, and 75 Vulnerable (VU) species, as per records so far.

The range of wildlife protected through PLANT is remarkable, from majestic tuskers and elusive leopards to delicate and vital butterflies and land snails. **One extraordinary finding was reporting a new locality record of a Pouched tomb-bat colony (*Saccolaimus saccolaimus*) in one of its properties (PLANT RBA Report- Aranaya and Nisarga) - a species that was rediscovered in 2011 - a full 75 years after its original discovery (Nanayakkara, Vishvanath, and Kusuminda., 2012). This finding was published as the cover story in the *Journal of the Department of Wildlife - Wild Lanka*, in December 2023, submitted by the research team led by Prof. Sampath Seneviratne (Tharindu D. Ranasinghe et al., 2023).**



Devario monticola



Cnemaspis samanalisensis

Additionally, PLANT recently recorded the fish species Agra danio (*Devario monticola*) in the Maskeli Oya region (PLANT RBA Report- Maskeli Oya). According to Batuwita et al (2017), *Devario*



Cnemaspis upendrai

monticola is a point endemic species confined to Agra Oya (Batuwita et al., 2017). However with this finding, PLANT records a population of *D. monticola* in Maskeli Oya, marking the first time it has been observed outside its described range.

Cnemaspis samanalensis and *Cnemaspis upendrai* are two critically endangered endemic day gecko species recorded outside their known ranges in Maskeliya during the RBA conducted by the research team led by Dr. Tharaka Kusuminda. Also recorded was the Round eared tube nosed bat (*Murina cyclotis*) for the first time in the South-Eastern mid country intermediate zone. This is the seventh record of this species in Sri Lanka according to the research team (PLANT RBA Report-Ravana's Secret, Ella).

The corrugated water frog (*Lankanectes pera*) is an endemic species with a highly restricted climatic distribution with a total predicted area of only 360km². They are also considered to be restricted to the Knuckles Mountain Range (Senevirathne et al., 2018). During the Maskeli Oya RBA, this species was recorded from one location close to the peak wilderness range. Sri Lanka Ebony Gem (*Libellago corbeti*) is another recently described endemic

and critically endangered damselfly that is considered to have expanded its original range (Sumanapala, Podduwage, and Dayananda., 2016). PLANT has recorded this species in one of its own properties, namely Minuwan Ella (PLANT RBA Report-Minuwan Ella). Apart from them, PLANT has recorded 32 (94.1%) out of Sri Lanka's 34 endemic bird species, across its properties, showcasing the biodiversity richness within these areas.

The herbivore and predator monitoring helps understand the predator-prey dynamics that maintain ecosystem balance. The movements of megafauna within its properties have also revealed critical wildlife corridors, and the presence of indicator species allows the team to gauge the overall health of the ecosystems.

Challenges and Lessons Learned

Reaching the milestone of recording over 1,000 species is both an achievement and a stepping stone. It reinforces PLANT's conservation goals and underscores the urgency of protecting Sri Lanka's delicate ecosystems, outside of protected areas. However, this journey hasn't been without its challenges. PLANT is a large-scale initiative driven by a small but dedicated group of individuals, relying heavily on the support of volunteers, research



Murina cyclotis

scientists, partners, donors, and local communities. Funding limitations prevent it from becoming a stronger team with more paid full-time employees. There is also no state recognition or different status for these kinds of private protected lands, unlike in some other parts of the world. The concept is also unique and new to many people and often viewed with skepticism. Despite these limitations, PLANT continues to persevere, innovating and adapting as it learns from its restoration experiences and the ecosystems it protects. Engaging local communities in restoration efforts has been vital. By involving them, PLANT not only offers additional income opportunities but also nurtures a deeper understanding of the ecosystems they live in. Fostering this sense of ownership ensures long-term sustainability and encourages a shared commitment to conservation.

Way Forward

The journey to record and protect over 1,000 species underscores the vital role that the Ecosystem conservation model plays in safeguarding Sri Lanka's rich biodiversity and how the private sector can be a strong contributor. PLANT's evidence-based approach, focused on restoring habitats and protecting endemic, native, and threatened species, showcases the power of targeted, science-driven conservation. Success



Lankanectes pera

is not just in numbers—it lies in the stories of survival, regeneration, and the intricate connections between species and their ecosystems that its efforts have nurtured. By involving local communities, fostering partnerships, and committing to long-term protection, hopefully a legacy that extends beyond today will be built—one that will engage even more partners and secure the future of Sri Lanka's natural wealth.

As it looks to the future, the journey ahead is filled with promise, despite the gloom which hangs over conservation efforts. Each new species recorded, every piece of land protected, and every community empowered through conservation efforts represents a step towards a healthier, more connected, and biodiverse Sri Lanka. The work of PLANT is still in its early days and as it continues to restore ecosystems, protect endangered species, and reconnect fragmented forests, it needs passionate individuals, dedicated partners, and supportive communities to help expand its efforts. Whether through donations, volunteering, or spreading awareness, your involvement can directly contribute to the conservation of Sri Lanka's wildlife and the preservation of its vital ecosystems.

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Pseudophilautus femoralis

References

- BATUWITA, S., DE SILVA, M. and UDUGAMPALA, S., 2017. A review of the genus *Devario* in Sri Lanka (Teleostei: Cyprinidae), with description of two new species. *FishTaxa-Journal of Fish Taxonomy*, 2(3).
- LaRoe, E.T., 1993. Implementation of an ecosystem approach to endangered species conservation. *Endangered Species Update*, 10(3&4), pp.3-12.
- Nanayakkara, R.P., Vishvanath, N. and Kusuminda, T.T., 2012. Re-discovery of Pouch bearing sheath tailed bat *Saccolaimus saccolaimus* Temminck (Chiroptera: Emballonuridae) from Sri Lanka after 75 years. *Asian Journal of Conservation Biology*, 1(2), pp.134-137.
- Nilanthi, R.M.R., Rajathewa, R.A.M.P.M. and Jayawardana, N., 2021. New Addition, Different Habitats, Distribution Range and Diversity of Genus *Strobilanthes* (Acanthaceae) in Sri Lanka.
- Rapid Biodiversity Assessments (RBA) Reports of the PLANT
- Rubasinghe, S.C.K., Yakandawala, D.M.D. and Wijesundara, D.S.A., 2008. Phylogenetics of the endemic genus *Stemonoporus* Thw.(Dipterocarpaceae). *Journal of the National Science Foundation of Sri Lanka*, 36(4).
- Senevirathne, G., Samarawickrama, V.A.M.P.K., Wijayathilaka, N., Manamendra-Arachchi, K., Bowatte, G., Samarawickrama, D.R.N.S. and Meegaskumbura, M., 2018. A new frog species from rapidly dwindling cloud forest streams of Sri Lanka—*Lankanectes pera* (Anura, Nyctibatrachidae).
- Sumanapala, A., Podduwage, D. and Dayananda, S., 2016. New locality records and range extensions for several threatened species of Odonata in Sri Lanka. *Check List*, 12(4), pp.1-10.
- Tharindu D. Ranasinghe, Janani Chathurya, Ayeshma S. Adikari, Pawani Thathsarani, Prabhashani Harischandra, Tharuka Murthi, Tharuka Sewwandi, Vimukthi Gunasekara, Uthpalawarna Jayaweera, Sampath S. Seneviratne, (2023). A description of a colony of critically endangered pouched tomb-bat (*Saccolaimus saccolaimus*) from a private forest reserve in Kalutara District. *WILDLANKA*. 11(4):Pages 493-502
- The National Red List: Conservation Status of Birds of Sri Lanka - 2021. Biodiversity Secretariat, Dayananda, Salindra & Fernando, Saminda & Herath, Tharanga & Perera, Nishanthi & Perera, Sandun & Seneviratne, Sampath & Sumanapala, Amila & Wickramasinghe, Sriyani & Weerakoon, Devaka. (2022).
- Biodiversity Profile - Sri Lanka. 2019. Sixth National Report to the Convention on Biological Diversity, Biodiversity Secretariat, Ministry of Mahaweli Development and Environment (MoMD&E), Sri Lanka. pp.200



A Crested Hawk Eagle in the process of killing a Peahen, was robbed of a meal by this Land Monitor Lizard, (Namal Kamalgoda, Wilpattu)



First Record of the Invasive Freshwater Acute Bladder Snail *Physella Acuta* (Draparnaud, 1805): Gastropoda, Physidae

MALIK FERNANDO

Introduction

During a Sri Lanka Natural History Society field trip to the Nuwara Eliya area in August 2011, one area explored was the Bomburuella forest where Pedro Camp, for Scouts, is situated. This forest lies to the east of Lake Gregory and Mahagastota. Walking along the forest road I spotted some water snails on the sides of a cemented aqueduct that ran alongside. I was able to collect two snails with difficulty. Collection was difficult for two reasons—the snails, that were on the side of the aqueduct near the water surface, had the annoying habit of releasing their grip on the cement and falling to the bottom the moment I made contact with them; they were also extremely fragile and crushed easily when I did manage to take hold (I was not using a collecting net, being quite unprepared for these finds).

Reference to the literature on Sri Lankan water snails available to me at the time did not reveal a match and the two shells remained unidentified and forgotten until recently when I was able to establish their identity with reasonable confidence. They turned out to be air breathing acute bladder snails, *Physella acuta*, well known for their invasiveness and worldwide spread. This is probably the first record of this water snail in Sri Lanka (Figure 1) and is of concern as it is globally considered a highly invasive snail [3]. Their presence in an upper watershed means that they have the potential to spread to the rest of the water basin too.

Physella acuta [1] was first collected by Draparnaud (1805) from the river Garonne in France and named *Physa acuta* [2]. It was subsequently collected from North America by Say (1817) and described as *Physa heterostropha*.



Figure 01: The two water snails collected from the Bomburuella Forest, 6th August 2011. Shell lengths 8 mm and 9 mm. Approximate location 6° 57' 30.49"N 80° 47' 50.51"E Elevation: 1921 m above mean sea level.



Figure 02



Figure 03

Later studies synonymised this with *P. acuta* [3]. The species has been described by many workers from many countries under many names and the synonymy is long. The currently accepted name—*Physella acuta*—follows a revision by Starobogatov in 1970. The native range of the species is considered to be North America.

Collection

Two snails were collected into polythene bags and transported to Colombo, where they were photographed in the living state. The shells measured 8 and 9 mm in length, both with eroded apices. One shell sustained a crack during the process of collection, but this did not affect the activity of the snail. The process of euthanising the animals and cleaning the shells was difficult because of the fragility of the shells; one shell was damaged beyond repair. The remaining shell was photographed (Figure 2) and subsequent attempts to remove remnants of the soft tissue still adherent resulted in this shell breaking into two. The two fragments are preserved in the dry state as the voucher specimen.

Identification

The snails were identified according to Taylor (2003) [4], a defining characteristic being that the shells are left-turning, whereas the majority of gastropods have right-turning shells. The genera included under the air-breathing Pulmonate family PHYSIDAE Fischer & Crosse, 1866, are differentiated on the microscopic structure of the male portion of the genitalia; the members of the family being hermaphrodites, they possess both male and female genital tracts. The definitive identification at the species level needs DNA studies. As it was not possible to perform these investigations, the index snail was identified on a combination of its shell morphology and the soft tissue characteristics as seen in the living animals.

Description

Shell sinistral (coiled to the left), small, ovate with a large body whorl, short, pointed spire and a wide-open aperture greater than half the shell length (Figure 2). The shell is thin, smooth, glossy, translucent and extremely fragile. In life, the soft tissues show through the shell, colouring it chocolate-brown with circular white spots. The collected specimens had 3 and 4 whorls, measured 8 and 9 mm in length with eroded apices. Shell width was not measured.

The visible soft tissues were a translucent light brown speckled with dark brown and consisted of a long foot with a pointed posterior, a head with two lateral lobes, a pair of tapering rod-like tentacles, and a pair of eyes near the base of the tentacles (Figure 3). The mantle of the genus is prolonged into marginal lobes that cover the shell. In this species, the lobes are elongated finger-like processes that are present as two series—an anterior columellar series (Figure 4) and a posterior apertural series (Figure 5).

Discussion

The native range of *P. acuta* is North America, from where it has spread to other parts of the Americas, Europe, Africa, Asia and Australia, but is absent in Antarctica. It is considered a highly invasive freshwater snail species globally. The species was first reported in India from Pune in Maharashtra in 1994, and subsequently from other states in the northern and eastern parts of India from both flowing and standing freshwater bodies. In 2020 the snails were found in a freshwater canal in Kerala [3]. The canal where they were found was polluted with commercial effluents and untreated sewage, with the snails attached to aquatic weeds and the hanging roots of floating plants (*Eichhornia crassipes*). In North Dinajpur, West Bengal, India they were found in rural ponds [5].

Taylor (2003) remarks that Degner (1921) first described the reaction of *Physa* to contact with predatory leeches or other snails. This was a violent twisting of the shell back and forth in an attempt to dislodge the other snail and, in the case of a leech contact, the snail detaches its foot from the substratum in addition to twisting the shell.

This reaction would explain the curious response of the snails releasing their attachment to the substrate and falling to the bottom of the aqueduct, when their collection was attempted.

The predatory potential of water bugs and leeches on *P. acuta* was documented in Kolkata populations [5].

Physidae, including the species *P. acuta*, are known to be common hosts of avian schistosomes (Trematoda: Schistosomatidae) responsible for causing ‘swimmer’s itch’ or in medical terms, cercarial dermatitis. This is a transient itch caused by the penetration of infective larval forms (cercariae) of trematodes, or parasitic flat worms, into the skin, resulting in a local allergic reaction [6]. Cercariae are the infective larval forms that develop inside aquatic snails, the intermediate hosts. When liberated into the water they search for a suitable warm-blooded host to continue development, and may enter a human. However, the larvae are unable to mature in humans and die, triggering an allergic reaction. Avian schistosomes from water birds are said to be responsible for most outbreaks worldwide [7]. The presence of *P. acuta* in water bodies used by humans, say for bathing, or agriculture, like paddy farming, could have medical implications.

The spread of this New World snail to the Old World has been investigated by Vinarski (2017), who traces its appearance in Western Europe and into Central Asia, based on published reports of the 19th and 20th centuries as well as shells in malacological collections in scientific institutions [8]. Many early reports showed that the snails were first identified in Europe in the heated water tanks of botanical gardens displaying exotic plants, and that they were found years later in natural habitats of those countries. For example,

the first record in the UK was from a water tank in the Royal Botanic Gardens, Kew, in 1860. The date of its first appearance in outdoor habitats is unknown. In the 1900s it was still considered a dweller of tanks in botanical gardens, but by 1976 it was known from several localities in central and southern England.

The import of terrestrial and aquatic exotic plants to Europe from the New World was common in the 17th century, with many universities with medical schools being proud of their botanical gardens. By the early 20th century, *P. acuta* was present in almost every Northern and Eastern European country. Public aquaria, in the modern sense, came into being in the mid-1850s and soon private fish tanks became fashionable in well-to-do households in Western Europe. Freshwater snails, including *P. acuta*, were common and desired inhabitants. Private aquaria and tanks in botanic gardens were considered the main source of *P. acuta* invading natural habitats. Vinarski concludes that “... the human-mediated drivers of dispersal include canal building, the aquarium trade and, more recently, alteration of natural freshwater habitats”. However, he also points out the possibility of spread by birds—both short distance between water bodies within a country, as well as long-distance, between continents.

The presence of *P. acuta* in an aqueduct that is probably an irrigation canal in the Nuwara Eliya area is hard to explain. As reported in the Biodiversity Profile of Sri Lanka compiled for the 6th National Report to the Convention on Biological Diversity [9], 23 exotic land snails are already recorded in Sri Lanka. There is one recorded exotic freshwater species reported from wet zone habitats (*Pomacea diffusa*, the Golden Apple Snail) that is known to be popular in aquariums, and a similar



Figure 04: Showing the anterior columnellar group of mantle lobes (arrowed).



Figure 05: Showing the posterior apertural group of mantle lobes emerging from under the outer lip of the shell and spreading over the spire towards the apex.

species (*Pomacea canaliculata*) that may also be present, both resembling the native *Pila globosa* (Swainson) [10]. With agriculture being the dominant income generator, Sri Lanka must pay more attention to exotic species and ensure stringent screening and pre-entry procedures. To get a clearer picture of the relevance of this observation, we need to know more about the occurrence of *P. acuta* in the country. We hope that this communication will stimulate other researchers to search for this snail.

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References

1. MolluscaBase eds. (2024). MolluscaBase. *Physella acuta* (Draparnaud, 1805). Accessed through: World Register of Marine Species at: <https://www.marinespecies.org/aphia.php?p=taxdetails&id=234093> on 2024-07-25
2. Draparnaud, J.-P.-R. (1805). Histoire naturelle des mollusques terrestres et fluviatiles de la France. 2 pp. (Avertissement a sa Majesté l'Impératrice), 2 pp. Rapport, i-viii (Préface), 1-164, pl. 1-13, 1 p. Errata. [< 22 September]. Paris (Levrault & Schoell), available online at <https://www.biodiversitylibrary.org/page/52682088> page(s): 55.
3. Jayachandran, P.R., R. Radhika, B. P. Aneesh, K. S. Santu, M. Jima, and S. B. Nandan (2021). Biological Invasion of Medically Important Bladder Snail *Physella acuta* Draparnaud, 1805 (Gastropoda, Physidae) in the Freshwater Habitat of Kerala, India. Proc Zool Soc <https://doi.org/10.1007/s12595-021-00419-w>
4. Taylor, D.W. (2003). Introduction to Physidae (Gastropoda: Hygrophila); biogeography, classification, morphology. Rev. Biol. Trop., 51, 1-263 (2003).
5. Paul, P. and G. Aditya (2021). Invasion of the freshwater snail *Physella acuta* (Draparnaud, 1805) in selected ponds of North Dinajpur, India. J. Environ. Biol., 42, 577-581 (2021).
6. Madsen, H. and Stauffer, J. R. Jr. (2022). Zoonotic Trematode Infections; Their Biology, Intermediate Hosts and Control (Chapter), In Jorge Morales-Montor, Víctor Hugo Del Río-Araiza, Romel Hernández-Bello (Eds) 2022. *Parasitic Helminths and Zoonoses - From Basic to Applied Research*, IntechOpen (Accessed 20.7.2024).
7. Horák, P., Mikeš, L., Lichtenbergová, L., Skála, V., Soldánová, M. and Brant, S.V. (2015). Avian Schistosomes and Outbreaks of Cercarial Dermatitis, Clin Microbiol Rev. 2015 Jan; 28(1): 165-190. doi: 10.1128/CMR.00043-14. Accessed 12.8.2024.
8. Vinarski, M.V. (2017). The history of an invasion: phases of the explosive spread of the physid snail *Physella acuta* through Europe, Transcaucasia and Central Asia. *Biol Invasions* (2017) 19 (4):1299-1314. DOI 10.1007/s10530-016-1339-3. Accessed 12.8.2024.
9. MoMD & E (2019). Biodiversity Profile - Sri Lanka, Sixth National Report to the Convention on Biological Diversity, Biodiversity Secretariat, Ministry of Mahaweli Development and Environment, Sri Lanka.
10. Peiris, A., Naggs, F., Preece, R.C., Taylor, H., & White, T.S. (2015). *An illustrated guide to the freshwater Mollusca of Sri Lanka*. Joint Conchological Society / Malacological Society Publication, SRP Ltd, Exeter.

TIGER TALK WITH THAPAR

Con Chats
with Sriyan



Closing in on a 50-year love affair with Ranthambore, Valmik Thapar has dedicated his life to the cause of India's Tigers, and his work evolved into wildlife within the subcontinent and beyond. Many of his books profile the amazing dimensions of the charismatic Indian Tiger, but the list also includes six books on Africa's rich wildlife. Possessing his older books, I had long been a fan of this outspoken conservationist. Naturally, when I learnt I was going to have the opportunity of meeting him thanks to Sanjay Kulatunge (he was here to speak at the Cinnamon Nature Trails event "Gathering of Giants"), I immediately worked all angles to get a timeslot to garner some thoughts for one of my Conservation Chats (Con Chats). Valmik and Chitral Jayathilake, were both extremely obliging, and soon I found myself chatting to the big man himself and being enthralled with his vast experience, and candid views. Shared below are parts of our conversation time lined August 2024.



For starters, what brought about your trip to Sri Lanka this time?

I'm here because Chitral convinced me while he was in India to come and speak at his event on Elephants, and I agreed. It was a Gathering of Giants, and looking a half-giant myself, I thought it best to speak on Tigers. In the parks, I saw some of the elephants but was disappointed with how tourism is managed there. Large convoys of vehicles go to see a small herd of elephants and then come back the same way. There is a lack of imagination of how an entire ecosystem is looked at, how it should be zoned with different entrances and exits etc. There is a lot of work to be done on how visitors could be managed. However, I always love the experience of coming to Sri Lanka. It is beautiful, the wildness is fantastic, there is a wildlife climate in the air and people are interested in engaging and sharing experiences. Generally, the atmosphere is very pleasing.

Some of those inputs such as zoning and ways of better managing parks etc, have been given by many of us, but they are not readily adopted by the authorities. I am sure you may have faced similar experiences there. How was that journey, as it can be frustrating?

I've been working with wildlife for 49 years, and for 25 of those, I've been trying to work with the government, from the top down. I know it's like banging your head against a wall, but eventually, you find a path through the minefield. Hopefully, the Supreme Court will support you along the way, because they often have more common sense than the political leadership. In this process, you gather a group of allies, gain momentum, and eventually, the government reacts and starts changing. Sri Lanka has bureaucratic obstacles, so independent communities need to intervene. Don't just deal with the bureaucracy; ask for a meeting with the President of Sri Lanka. Explain that around 30% of the country is forest cover,

and we need a different approach to protecting, managing, and investing in it. We need to generate revenue from wildlife tourism and overhaul the entire wildlife management system. I'm sure any president would listen to this because if you do it right, you can double your revenue. The treasury gets more money, which can be reinvested into the parks, and you can achieve your climate change goals. You're essentially telling the head of state that there's a better way to do things and that the current approach has too many obstacles. It takes a lot of effort to get a meeting with the president because many people prefer the status quo. But you have to take those risks for the natural world. Without them, you won't achieve anything.

In your 1992 book, you were very vocal about the lack of funding for local communities and the challenges they faced in Ranthambore. You mentioned that communities were often ignored in large projects, and money would get stuck somewhere. Now, three decades later, how do you see the community aspect playing out?

When I wrote the book Tiger's Destiny in 1992, there was no tourism, and no money was coming in. The start of tourism was when Prime Minister Rajiv Gandhi visited Ranthambore. Now 32 years later everything has changed. Ranthambore today turns over INR 60 Crore a year from its ticket entry (US\$ 7-8 million) of which 35-40% goes back to the management of the park, and 10% goes to the Community.

Some projects in villages can fail but there is a connection between the success of the park and how much money flows through it. I would like to see a stronger connection. There is a big change from 1992. Also back then, there was just one Tiger Reserve but now Ranthambore Tiger Reserve is 1700 square km and connected to three other Tiger reserves. In total that is over 6000 square km and a tiger today can travel over 100 km across from Ranthambore. This corridor creation is a new development that has happened in the past two years, and some tigers have already made the journey, and we want more tigers to do so and create a more



even spread of tigers across the landscape. Despite the problems and challenges in India, smaller NGO's and Individuals have managed to form a viable partnership with the government to make such a landscape possible. Success in conservation is dependent on how much habitat you protect. The larger the better, which creates a more viable genetic pool for tigers through the possibility of them moving to another state. At that level I am satisfied. I am not satisfied with the management of tourism. We get a huge entry fee but don't manage it properly because people do not have the imagination to do it properly. That is our major problem now, but as far as tigers are concerned, they are doing as well as they could be doing in the context of the world today.

That is good news. I would be failing if I didn't ask about Project Tiger and what your take is on that - I recall you were critical at one stage. The project has had its ups and downs-what is your latest take on the project?

In 1992, I did not believe that we would have too many tigers left by the end of the century. I have to say that the unexpected happened and it has been a pleasant surprise. We still have between 2600 to 3100 tigers, although the number fluctuates but we have this number scattered across India's landscape.

Project Tiger converted itself into the National Tiger Conservation Authority, to become more powerful. That was not necessarily a good thing as forest tigers are a State subject and of the 33 states, 18 states have tigers. When the Central government tries to intervene then they get into conflict, especially in opposition-controlled states. Out of the 53 tiger reserves, at least 12 are in good order and lots need to be done in 20. In 6-8, the landscape is declared a tiger reserve but there are no tigers yet. But bits and pieces of land are being added somehow

to tiger reserves, so although we are also losing pieces to businesses, maybe there is a way to find a balance.

I would like to see more younger people involved in day-to-day conservation in India working in partnership with the forest department. I want to see a change where more independent-minded people, who are not necessarily government servants can be decision-makers in the field and not just be advisors. Advice is terrible in our South Asian bureaucracy since their recommendations go into a pending file and remain pending for a lifetime. But you can contract work for five years to a wildlife scientist, an anti-poaching expert or anyone who works with local communities -anthropology, sociology etc , and they will do a viable job. I want to see more young people joining hands and getting the respect they deserve and being empowered to do the right thing in the right places.

What are the barriers young people have to be more engaged in our societies? The WNPS too had challenges years ago, but we were able to morph. What do you see as the barriers in our countries?

The engagement has to happen by the government officers reaching out. They are constitutionally responsible

for making decisions about the use of our land. So, reaching out has to come from a change in mindset. They like servile independence where people will polish their shoes, not report them, not talk about their corruption etc. What we need is strong people who will talk about it, so that forest ranges who come will become good managers who are intelligent and take and share advice, do projects together, learn etc. To let wildlife breathe, you have to learn wildlife and be a student of wildlife, and never an expert. I have travelled through my life believing that and I am still learning. If you keep that humility in a wildlife officer, scientist, NGO etc, that is good enough. Then, nature is magic.

You began in Film with a creative eye - what was your journey from filmmaker to a conservationist - was it part of the same journey or did that evolve or shift?

I did sociology at Delhi University and got a first-class, but I lost interest in academics. I got busy doing still photography (not wildlife related), and later moved into documentary filmmaking. During that stage, we had a sponsor who wanted two short films done which were around animals and birds essentially. During that process, Ranthambore came into my life and I wanted a change too, so I rooted myself in early 1976. It



has been 49 years there and I am a student there, learning about tigers, and it is the root of everything I do. I tried to make a film on Ranthambore, but we could never sell it. I did several other award-winning documentary films though. I then moved to writing and in 1981-82, I did my first collaborative book "With Tigers in the Wild" which was mainly black and white pictures. Then I picked up momentum and did a whole bunch of books like- Tigers: The Secret life, The Cult of the Tiger and so on. Now I don't stop and have done 44 books in all kinds and shapes in 49 years. The last ones are not tiger related and I have done The Natural History of Cheetah in the Serengeti, and just produced two volumes of Wildlife Treasure in Miniature Paintings in the Moghul and Persian paintings. I did it for pleasure and worked with museums worldwide on the research part. We rave about the books the colonials did but take a close look at what the Moghuls and Persians did centuries before. There were 351 birds painted including 65 International bird species, because all these rulers and others had aviaries, and they imported birds.

How do you describe yourself today- Writer, Conservationists? What is a good descriptor?

I am part of the Wildlife family. I am half wild and the people who protect it are like family. My friends are retired forest guards, retired forest drivers and so on. They come to see me when I spend time in Ranthambore, and we talk about the old days and some of the horrors of today, and why the younger generation cannot do what we did, why they live in fear of government, how they don't know to fight the government and get knocked down and harassed. I write my books and in the last twenty years, my wife and I have raised a son, and he is now an adult, so I have more time to do the occasional talk, the African Trip and 2-3 months in Ranthambore which is more than enough. A book a year keeps me busy and happy.

We see this fear factor in South Asia so much - any words of advice? Not too long ago the prime wildlife park in the south (Yala) became a vehicle rally track, right under the noses of everyone to see. These are the kinds of fear factors that politicians can bring into the equation. Any words of wisdom?

I think you need to find allies. Who are your wildlife allies? Don't worry about them being in different political parties (leftist, mainstream or opposition). In India, in the late 1990's I got 350 of the 530 Parliamentarians to sign a petition wanting reforms in the Wildlife setup so that we can work together in terms of management and administration. The young MP's helped me even though everyone through it was not possible. It was a memorandum to the PM asking him to make any changes needed to keep the tiger safe. If I can do that from scratch, you can do anything if you get allies around to neutralise the fear. But there have to be senior conservationists in Sri Lanka who give time to the younger generation to guide them. The Wildlife Elder is a "Must" today. You need to give them a path on how they should deal with issues. They should pick the phone and connect youth to the minister etc and say "Please give them a path and we are also watching as the elders". The youth have more to fear

than us now. How you align your partnerships is key. This is not an easy one. Some years will be good and others bad- that is the story of South Asia.

Good advice indeed. Some of the things which have impacted all of us are Mobile Technology and Digitisation and it has altered so much of the parks' behaviour, social dynamics and of course research and observation methods as well. Give me some random thoughts on these areas

I personally hate social media and selfies. I think the handphone is good when there are important and urgent things to be done. But the way it is used now where people take photographs and rush to put it on social media, people taking selfies when you are in the middle of elephants or tigers is crazy and it has gone beyond a point of no return. In Tadoba Tiger Reserve, they have banned phones inside the park. It is a distraction, and it causes possible accidents with people falling over etc. Even Ranthambore is carefully looking at it. When we get new technology, instead of using the best of it, we often use the worst of it. A smartphone given to Forest Guards can also be a distraction. Hence stupidity within government in all our countries is inherited and is a part of life. We need to use our



Valmik speaking in Habarana

common sense and intelligence to neutralise that stupidity and move towards our objectives however difficult that process is. There is no other way. Never give up!!

Great lessons and inspiration for us personally as we are at mid-stages of this battle. Tell me what the story is on the Cheetah reintroduction and what is your take on it?

I am probably one of the few people in India who have seen more than 450 different cheetahs in my lifetime due to my frequent trips to Africa. The folks who have made this reintroduction plan are unlikely to have studied wild cheetahs adequately. We have spent around US\$25 million in two years bringing 22 cheetahs into India, from Namibia and South Africa. Some countries have been very keen to sell off some of their Cheetah's in cages etc and they found India to be very accommodating.

Nine of the cheetahs brought here have died. Two or three have had cubs, so they are in enclosures. The 3-4 who were released into a sanctuary immediately left the sanctuary since unlike leopards and lions, cheetahs do not remain in the area. Then they started going to areas 100 kilometres away, where there were no forests and into villages, began eating goats and living around people. Cheetahs are gentle, elegant, fragile creatures and not vicious. Historically, they were man's friends, and they even killed and allowed people to take half their

kills. Many predators benefit from cheetah kills. Here they are running around trying to find prey since we do not have thousands of Tommy Gazelles etc. We are taking deer from everywhere and throwing them to the cheetahs. So, a total hotchpotch operation has been launched but it has got the Prime Minister's priority. The money is being spent, the cheetahs are in enclosures and to me, it is a failed conservation project, which is also being hidden from journalists. We should stop it and create a Drive-In where visitors can come and see the cheetahs in their enclosures. Let's not fool the world with how a cheetah can live here when we have story ground, river beds, large hillocks etc. At the high speeds of Cheetahs, one wrong foot on a loose stone will ruin its life. Those who take decisions on whether we should bring the animal or not have not studied it enough. That is my view.

We have some challenges with our leopard population, and the issues of snaring etc are getting worse in the hills. Any lessons either from the tiger experience or from leopard conservation there?

My opinion is that you have lots of problems in how your department manages wildlife in terms of tourism, and science and research, and understanding the growth of the animals or their diminishing population, whichever way you look at it. I believe that any elected president should hold a roundtable discussion with wildlife experts, government officials, and their team. They should listen to different perspectives and commit to implementing decisions proposed by independent experts based on their combined years of experience.

The President and Wildlife Department should listen to the combined wisdom of these experts. NGOs need to be united on the main 5-6 principles. Division will

weaken your position, and the government may use it to divide and rule. Protecting our natural world is crucial for human safety. A unified approach will make the President and government listen. In India, we are not united, so we all work quietly in our own corners where our heart is. We lost our unity in the last decade or so as governments changed.

Finally, how can the public contribute to wildlife conservation and play a better role as consumers of wildlife and through better behaviour and inputs?

I think your public is very wildlife-centric as a nation and you have some of the most beautiful spaces. You surely have problems of poaching, man-animal conflict etc. Encourage your activist and leftist NGO's to bring this natural world phenomenon to the fore. Have meetings with them, and bring them together in the same format, even though you all work differently. Get local communities encouraged to protect rather than exploit. Give them nice programs, rewards, compensation incentives etc. Wildlife folks need to befriend them. Don't go with your big cameras, go in a jeep and say you have no time for community. You need to spend time understanding the human problems as well. I haven't seen enough to comment on behaviour here, but the public who go to see the animals in Yala and Minneriya etc need to control themselves and be respectful of animals. It is sheer disrespect when you surround them with dozens of jeeps etc. You need to convince your wardens to do that and spread the traffic etc. into different areas. There has to be a wildlife traffic policeman as this rush is abusing the natural wealth you have been generously given by nature.



A TRIBUTE TO FEMININE LOVE TOWARDS NATURE

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The bond between nature and women is a profound and multifaceted relationship that has been explored through various cultural, social, and ecological perspectives. For instance, it is often conceptualised through the metaphor of Earth as a mother, which encapsulates profound themes of fertility, nurturing, and interdependence. This metaphor underscores the symbiotic relationship where the nurturing aspects of nature are paralleled by the caregiving roles of women (Hogan, 2011). Fertility, a central theme in this bond, is reflected in women's traditional roles in seed saving, soil health maintenance, and food production, which are crucial for biodiversity and ecosystem sustainability. This intrinsic connection is not merely symbolic but rooted in practical, everyday interactions that highlight the essential role women play in nurturing and sustaining both human communities and natural ecosystems. Based on such a strong bond, women have stepped up within the sphere of conservation of nature by engaging in well-recognized ecological movements. One such prominent movement is Ecofeminism.

Ecofeminism is a movement that intertwines ecological and feminist perspectives, highlighting the parallel between the exploitation of nature and the oppression of women (Puleo, 2017). It argues that the patriarchal structures responsible for environmental degradation are also those that perpetuate gender inequality (Öztürk,



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2020). This movement advocates for a holistic approach to justice, emphasising the interconnectedness of social and ecological issues.

Ecofeminism emerged as a distinct movement in the late 20th century, synthesising ecological concerns with feminist critique (Phillips & Rumens, 2015). Its roots

can be traced back to the broader feminist and environmental movements of the 1960s and 1970s. During this period, activists and scholars began to recognise the parallels between the exploitation of the natural environment and the subjugation of women, both of which were seen as consequences of patriarchal systems that prioritise domination and control. The term "ecofeminism" was coined by the French feminist Françoise d'Eaubonne in her 1974 book *Le Féminisme ou la Mort*, where she called for a feminist revolution to address the environmental crisis. D'Eaubonne argued that the same patriarchal values driving the oppression of women also fuelled environmental destruction (Bosworth, 2023). She posited that women's intrinsic connection to nature, through their roles in reproduction and nurturing, positioned them uniquely to lead the fight for ecological sustainability.

Ecofeminism gained momentum in the 1980s and 1990s, with contributions from activists and theorists like Vandana Shiva, Wangari Maathai, and Karen Warren. Vandana Shiva, a prominent Indian scholar, environmental activist, and ecofeminist, has been instrumental in highlighting the intersections of gender, ecology, and social justice (Shiva, 1993).

Her work emphasises the role of women in preserving biodiversity and promoting sustainable agriculture. Shiva's activism began in the 1980s with her involvement in the Chipko movement, where rural women in India protected forests from deforestation by hugging trees (SUGi Project, 2023).

She founded the Research Foundation for Science, Technology, and Ecology in 1982, and later, Navdanya, a movement promoting biodiversity conservation and organic farming (Navdanya, 2023). Navdanya has helped establish over 100 community seed



Chipko Movement
©SUGi Project



Dr. Wangari Maathai
©The Green Belt Movement

banks across India, safeguarding indigenous seed varieties against corporate monopolies. Shiva's writings, such as "Staying Alive" and "Earth Democracy," critique globalised, industrial agriculture and its detrimental impacts on the environment and small farmers, particularly women (Ellis-Petersen, 2023).

Wangari Maathai, a Kenyan environmental and political activist, made significant contributions to ecofeminism through her pioneering work in environmental conservation and women's empowerment. In 1977, she founded the Green Belt Movement, an initiative focused on tree planting, environmental conservation, and women's rights (Muthuki, 2006). The movement encouraged rural women to plant trees to combat deforestation, restore degraded environments, and secure sustainable livelihoods (Hunt, 2014).

Under Maathai's leadership, millions of trees were planted across Kenya, helping to address soil erosion, improve water resources, and promote biodiversity. She emphasised that women, as primary caregivers and farmers, were disproportionately affected by environmental problems and thus had a crucial role in ecological restoration (DeLap, 2013).

By engaging women in tree planting and environmental stewardship, Maathai not only improved the natural environment but also empowered women with knowledge, skills, and economic opportunities (Scott, 2013). Her efforts earned her international recognition, including the Nobel Peace Prize in 2004, making her the first African woman to receive the Honor (The Green Belt Movement, 2024).

Karen Warren, a prominent philosopher and ecofeminist scholar, has significantly shaped ecofeminist theory through her rigorous academic work and advocacy. In her influential book *Ecofeminist Philosophy: A Western Perspective on What It Is and Why It Matters*, Warren articulates the philosophical foundations of ecofeminism, arguing for an ethical framework that recognises the intrinsic value of both women and nature (Glazebrook, 2002).

She introduces the concept of "logic of domination," which she posits as a mindset that justifies exploitation based on perceived superiority (Warren, 2013). Warren's work highlights the necessity of dismantling hierarchical thinking to achieve social and ecological justice (O'Shea, 2018). Through her writings and teachings, Warren has provided a robust intellectual foundation for ecofeminism, inspiring both academic inquiry and practical activism aimed at creating a more equitable and sustainable world (Kretz, 2018).

When it comes to the Sri Lankan context, ecofeminism



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manifests through grassroots initiatives that intertwine environmental conservation with women's empowerment. In rural areas, women are pivotal in agriculture and natural resource management, making them key actors in ecofeminist projects. Organisations like the Green Movement of Sri Lanka advocate for sustainable farming practices, emphasising organic agriculture and biodiversity preservation (The Green Movement of Sri Lanka, 2023). These initiatives often involve women in leadership roles, recognising their traditional ecological knowledge and fostering their economic independence.

Ecofeminism can be further improved by expanding its scope to address intersectional issues more comprehensively, including race, class, and global inequalities. Strengthening connections with other social justice movements, such as anti-colonialism and disability rights, can enhance its inclusivity and effectiveness. Increasing grassroots engagement and empowering local communities, especially those most affected by environmental and gender injustices, can lead to more impactful and context-specific solutions. Additionally, fostering interdisciplinary research that combines insights from environmental science, feminist theory, and social activism can provide a more robust understanding of the complex relationships between gender and ecology. Enhancing collaboration

between global and local ecofeminist organisations can also help in sharing knowledge and resources. Finally, incorporating educational initiatives that raise awareness about ecofeminist principles and their practical applications can build broader support and drive systemic change towards a more equitable and sustainable world.

References:

- Bosworth, K. (2023). Everything You Need to Know About Ecofeminism. *Open Science*. <https://mdpiblog.wordpress.sciforum.net/2023/02/08/everything-ecofeminism/#:~:text=In%201974%2C%20Fran%C3%A7oise%20d'Eaubonne,humans%20attempt%20to%20oppress%20nature>.
- DeLap, K. Q. (2013). From Root to Tree: Wangari Maathai's Green Belt Movement—The Grassroots Approach to Addressing Human Rights Violations. *Environmental Claims Journal*, 25(2), 144-153.
- Ellis-Petersen, H. (2023). Fighting giants: eco-activist Vandana Shiva on her battle against GM multinationals. *The Guardian*. <https://www.theguardian.com/global-development/2023/apr/28/fighting-giants-eco-activist-vandana-shiva-on-her-battle-against-gm-multinationals>
- Glazebrook, T. (2002). Karen Warren's ecofeminism. *Ethics and the Environment*, 7(2), 12-26.
- Hogan, K. M. (2011). Mother earth as a conceptual metaphor in 4 ezra. *The catholic biblical quarterly*, 73(1), 72-91.
- Hunt, K. P. (2014). "It's More Than Planting Trees, It's Planting Ideas": Ecofeminist Praxis in the Green Belt Movement. *Southern Communication Journal*, 79(3), 235-249.
- Kretz, L. (2018). The oppression of nonhuman life: An analysis using the lens of Karen Warren's work. *Environmental Ethics*, 40(3), 195-214.
- Muthuki, J. (2006). Challenging patriarchal structures: Wangari Maathai and the Green Belt movement in Kenya. *Agenda*, 20(69), 83-91.
- Navdanya. (2023). Conserving diversity and reclaiming commons. <https://www.navdanya.org/>
- O'Shea, E. A. (2018). Distinguishing Harms to Derive Commitments: Karen Warren and Aldo Leopold on Ecofeminism and Domination.
- Öztürk, Y. M. (2020). An Overview of Ecofeminism: Women, Nature and Hierarchies. *Journal of Academic Social Science Studies*, 13(81).
- Phillips, M., & Rumens, N. (2015). Introducing contemporary ecofeminism. In *Contemporary perspectives on ecofeminism* (pp. 1-16). Routledge.
- Puleo, A. H. (2017). What is ecofeminism. *Quaderns de la Mediterrània*, 25, 27-34.
- Scott, K. (2013). Peace Profile: Wangari Maathai and the Green Belt Movement. *Peace Review*, 25(2), 299-306.
- Shiva, V. (1993). *Monocultures of the mind: Perspectives on biodiversity and biotechnology*. Palgrave Macmillan.
- SUGi Project. (2023). *The Chipko movement*. <https://www.sugiproject.com/blog/the-chipko-movement>
- The Green Belt Movement. (2024). *The Nobel Peace Prize*. <https://www.greenbeltmovement.org/wangari-maathai/the-nobel-peace-prize>
- The Green Movement of Sri Lanka. (2023). *Mainstreaming agrobiodiversity conservation and use in Sri Lanka*. <https://gmsl.lk/mainstreaming-agro-biodiversity-conservation/>
- Warren, K. J. (2013). *The power and the promise of ecological feminism*. na.



Thenumi Vihasna : Wild Kids Backyard Wildlife Photography Competition (Overall Winner)

Rights of Nature vis-à-vis Human Rights to Nature: Earth Jurisprudence and Ecocentric Property Law (Wild Law)

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Jurisprudence refers to the knowledge of the law - the norms and rules that govern our lives. In legal parlance, it is defined as the branch of philosophy concerned with the law and the principles that guide the judiciary in making decisions.

Earth Jurisprudence

Earth Jurisprudence is an emerging branch of legal philosophy that critiques law from an Earth-centered perspective and proposes new approaches to law, economics, and governance. It perceives human beings only as a part of the wider Earth Community and was developed as a philosophy and practice of law that gives greater consideration to nature. It rightly recognizes the interconnectedness of Earth's natural systems, the inherent rights and value of nature, and the dependence of humanity and all living beings on a healthy Earth as a response to the present environmental crisis. Earth Jurisprudence has drawn its knowledge base from different disciplines of studies like basic sciences, earth science, and Common Law Jurisprudence.

It was first proposed in 2001 by the cultural historian and poet Thomas Berry, who is considered the 'Father of Earth Jurisprudence'. He held the view that 'we must understand that our own well-being can be achieved only through the well-being of the entire natural world around us'. Thomas Berry proposed that society's laws should derive from the laws of nature (Great Jurisprudence /Great Laws), explaining that 'the universe is a communion of subjects, not a collection of objects to be owned and used or misused'.

The rationale of Earth Jurisprudence is rooted in the philosophy of "Deep Ecology" in which all living beings have a moral and ethical claim regardless of their utility value to humanity. For most of human history, human societies across our planet have seen life from an Earth-centred, rather than a human-centred, perspective. This is evident among indigenous and traditional communities whose languages, customary laws, and governance systems are rooted in the understanding that nature regulates the order of living processes in which humans are inextricably embedded. It is becoming patently clear that the prevailing human laws should be realigned with the laws of Mother Earth if we are to live in harmony on our home planet well within its planetary boundaries. The starting point is the recognition that the laws of the Earth are primary. They govern life on the planet and human laws should be derived from these. For indigenous peoples, the relationship between land and species is regarded as sacred and involves reciprocity.

Eastern religious and philosophical traditions embrace a holistic conception of spirituality that includes the Earth. It was Arahath Mahinda, the son of the emperor of India over two thousand years ago, who said to King Devanampiya Tissa at Mihintale "O' great king, the beasts that roam the forest and birds that fly the skies have the same right to this land as you. The land belongs to the people and all other living things, and you are not its owner but only its guardian."

Earth Jurisprudence calls for us to transform the currently held human-centred (anthropocentric) perspectives to Earth-centered (ecocentric) perceptions of our place on Earth and how we should conduct our lives.

Earth Jurisprudence has been increasingly recognised and promoted worldwide by legal scholars, the United Nations, lawmakers, philosophers, ecological economists, and other experts as a foundation for Earth-centred governance, including laws and economic systems that protect the fundamental rights of nature. Therefore, the primary purpose of legal and governance systems must be to ensure that people protect and contribute to the integrity, health, and well-being of the entire Earth Community.

Rights of Nature

A novel approach to environmental protection has emerged in the law, known as the 'Rights of Nature' (RoN). The RoN or Earth rights is a legal and jurisprudential theory that describes inherent rights as associated with ecosystems and species, akin to the concept of fundamental human rights. The rights of nature concept challenges that the twentieth-century laws are generally grounded in a flawed frame of nature as a 'resource' to be owned, exploited, degraded, and eventually abandoned by human beings and some of their artificial creations, including corporations. They are recognized as 'legal persons' with rights, while other organisms and nature are mere objects to be owned or consumed.

In contrast, the RoN crusade considers all beings, organic and inorganic—including organisms, species, ecosystems, land, air, water, and Earth itself—to be members of a planetary community. These beings are in relationships of interdependence with one another. They all have rights, and responsibilities, in their own ways. i.e. rivers have river rights, birds have bird rights, and humans have human rights.

Rights of Nature proponents argue that nature is a legal subject possessing inherent rights-based laws grounded in the rights of nature that direct humanity to act appropriately. The ideology takes the view that human beings need to stop treating nature as an object, resource or property and accordingly change their perception of nature.

This school of thought is underpinned by two basic lines of reasoning. First, since the recognition of human rights is based in part on the philosophical belief that those rights emanate from humanity's own existence. Logically, so too do inherent rights of the natural world arise from the natural world's own existence. A second and more pragmatic argument asserts that the survival of humans depends on healthy ecosystems, and so protection of nature's rights, in turn, advances human rights and well-being.

From a rights of nature perspective, most environmental laws of the twentieth century are based on an outmoded framework that considers nature to be composed of separate and independent parts, rather than components of a larger whole. The increasing importance of this new way of thinking, situated at the intersection of environmental law and ethics, is directly influenced by growing concerns about the climate and biodiversity crises that we experience today.

For example, the Gaia hypothesis, named after the ancient Greek goddess of Earth, posits that Earth and its biological systems behave as a huge single entity /organism. This entity has closely controlled self-regulatory negative feedback loops that keep the conditions on the planet within boundaries that are favourable to life. Therefore, the Rights of Nature recognizes that non-human elements should be treated as legal entities with the right to exist, thrive, regenerate, and evolve.

Like Human Rights, the Rights of Nature are inherent, inalienable rights that arise from the mere existence of the rights holder. This means that every being or aspect of nature (including people) must, at a minimum, have the right to exist, the right to occupy space, and the right to interact with other beings in a manner that allows them to fulfil their unique role in ecological and evolutionary processes. This implies transforming nature from a legal object into a legal subject, possessing its own inherent rights, regardless of its use for humanity. It would then be an ecocentric paradigm shift in our legal system which shows striking similarities with human rights law. The Rights of Nature is one legal tool, among others, through which this paradigm shift can be realized.

Recent recognition of the Rights of Nature within Western legal systems is an important steppingstone towards an ecocentric orientation. Until now, the legal approach towards nature has been too 'anthropocentric' and heavily focused on neoliberal sustainable development concepts. It means that nature is perceived from a human perspective and as an object of law (e.g., as property or a source of raw materials). Something that is considered property confers upon the property owner the right to exploit it for profit and in turn, damage or destroy it. Thus, those (including state agencies) who "own" wetlands, forestland, and other ecosystems and natural communities, are largely permitted to use them however they wish, even if that includes destroying the health and wellbeing of nature. Laws and contracts are written to protect the property rights of individuals, corporations, and other legal entities. As such, environmental protection laws legalize environmental harm by regulating how much pollution or destruction of nature can occur within the law. Under such law, nature and all its non-human elements have no legal standing.

Rather than treating nature as property under the current law, the rights of nature acknowledge that nature in all its life forms has the right to exist, persist, maintain, and regenerate its vital cycles.

Nature as Rights-bearing Entities and Wild Laws

A fundamental principle of Earth Jurisprudence is that all components of Nature, including plants, animals, rivers, and even entire species or ecosystems, should be granted legal personality in the same way as human beings. Earth Jurisprudence or Wild law is an emerging theory of law and governance that seeks to evolve a law that recognizes our relationship with the broader Earth community (<https://www.wildlaw.net>).

Wild Laws are human-made laws that are aligned with the laws of Nature and promote the flourishing of life, diversity, and healthy relationships. When we talk about the Rights of Nature, it means our recognition that ecosystems and natural communities are not merely property that can be owned, but rather, they are entities that have an independent and inalienable right to exist and flourish. Laws recognizing the Rights of Nature change the status of ecosystems and natural communities to being recognized as rights-bearing entities, right holders, or Juristic persons. Any harm to these bodies would be treated in the same way as if inflicted on human beings.

The recognition of the Rights of Nature has been established through several constitutional, legislative, and judicial enactments in several countries that aim to provide legal protection for non-human entities and natural systems. People, communities, and governments have the authority to defend those rights on behalf of ecosystems and natural communities.

Rights of Nature Legalized

The Rights of Nature should have their foundation in environmental laws, which are based on the idea that the natural world has inherent value and rights that should be recognized and protected. Since the early twenty-first century, governments and courts around the world have adopted a rapidly growing number of laws declaring that nature has rights. Rights of Nature campaigns for aligning legal standards and principles with planetary boundaries and the law of Nature. Those campaigns include, among others, the Universal Declaration for the Rights of Mother Earth (2010), the Universal Declaration of Rights of Rivers, the Universal Declaration of Ocean Rights (UDOR), and the World Charter for Nature.

Several countries have recognised the Rights of Nature by establishing several constitutional, legislative, and judicial enactments aiming to provide legal protection for non-human entities and natural systems. By the end of March 2023, the Eco Jurisprudence Monitor (<https://ecojurisprudence.org>) documented 468 Rights of Nature (RoN) initiatives—which are efforts to adopt a RoN legal provision—across 29 countries, being more expressive in North America and Latin America, and less in Europe, Asia and Africa.

The first laws establishing legal structures that recognized the Rights of Nature were adopted by local municipalities in the United States in 2006. Tamaqua Borough, Schuylkill County, Pennsylvania, was the first community to enact the Rights of Nature. Since then, more than three dozen communities in the US have adopted such laws. In November 2010, the City of Pittsburgh, Pennsylvania, became the first major municipality in the United States to recognize the Rights of Nature.

In September 2008, Ecuador became the first country in the world to recognize the Rights of Nature in its constitution. Ecuadorian constitutional provisions promulgated in 2008, recognize the right of nature to exist, persist, evolve, and regenerate. Bolivia has also established the Law of the Rights of Mother Earth in 2010.

Sustainable Development in Harmony with Nature

It needs to be emphasized here that although people have been talking about “sustainable development” for decades, very little has been done to change the structure of the law to achieve that goal. Laws recognizing the Rights of Nature finally will codify the concept of sustainable development. They disallow activities that would interfere with the functioning of natural systems that support human and natural life.

Implementing and fulfilling a true human right to a healthy environment is dependent on the health of the natural environment itself. The human right to a healthy environment can only be achieved by securing the highest protections for the natural environment - by recognizing in law, the right of the environment itself to be healthy and thrive.

Emerging Global Trends

Many jurisdictions worldwide are now increasingly recognising and integrating the principles of earth jurisprudence into their domestic legal frameworks either through the changes in their respective constitutions, legislation, or judicial activism. The Rights of Nature are legally protected in Bolivia, New Zealand, Ecuador, India, and several American communities. These new laws regarding the Rights of Nature are branching out to protect endangered species and animals. Many countries around the world,

including Switzerland, Portugal, France, Columbia, and Brazil, have specified a set of obligations to the government regarding nature and its protection.

Courts in the United States, Costa Rica, and India have ruled on cases about endangered species, stopped activities that harm them, and ruled to save these populations, including the snail darter, papilla, northern spotted owl, Asian lion, and the Asiatic buffalo. These judicial decisions all have the same goal— enforcing the idea that all of life has value and should not be used as human property; humans as well as the state have a responsibility to avoid causing harm to these species.

There are several examples of landscapes that are being governed or have been protected through legal models based on the Rights of Nature, e.g. Galapagos Marine Reserve (Ecuador), Manglares Cayapas Mataje Ecological Reserve (Ecuador), Te Urewera National Park and Whanganui River (New Zealand), Atrato River (Colombia), Magpie River (Canada), Mar Menor (Spain), among others.

New Zealand was one of the first countries in the world to create and pass laws acknowledging that nature is no longer subject to human ownership. Two pieces of legislation - The Urewera Act of 2014 and the Te Awa Tupua (Whanganui River Claims Settlements) Act of 2017 have granted legal personhood rights to Te Urewera National Park and the Whanganui River.

The Whanganui River will have its own legal identity with all the rights, duties, and liabilities of a legal person. The local Māori tribe wanted to treat the river as a living entity instead of treating it as property with others having

ownership over it. Since the river has been granted legal recognition, if someone wants to harm the river, this would be the same as harming that particular local tribe. Likewise, Te Urewera National Park owns itself and has legal standing, similar to the Whanganui River. This was followed by court recognition of legal personhood for the Ganges and Yamuna Rivers in northern India. Rights of Nature legal provisions also now exist in Colombia, Mexico, and dozens of municipalities in the United States, and are being debated in several other nations. In April 2018, the Colombian Supreme Court ruled that stronger efforts must be made against deforestation in the Amazon, and the country as a whole must be protected from the effects of climate change. In this ruling, the Colombian Amazon is granted personhood and thus is regarded as an entity with rights. This is the first such ruling in Latin America.

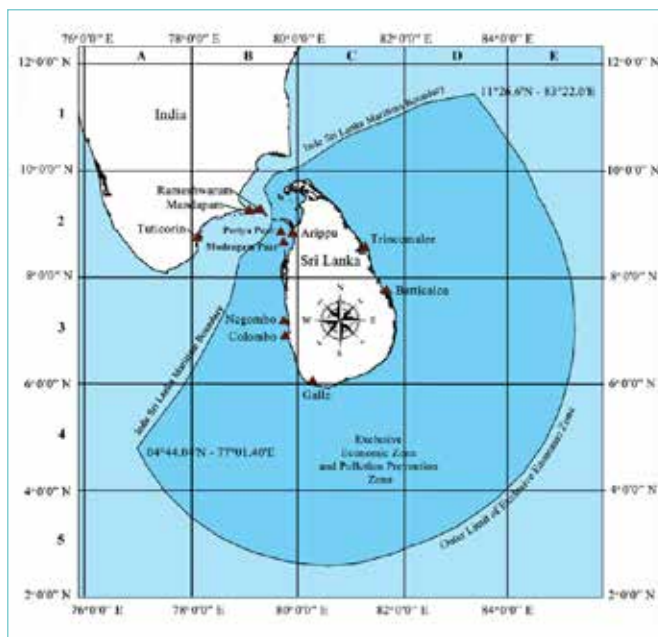
Sri Lankan Context: Inclusion of Earth Jurisprudence into the Domestic Legal Framework

Sri Lanka is a biodiversity-rich country like New Zealand, Ecuador, Colombia, India, etc. However, it is caught between the devil and the deep blue sea for being located in a geostrategic position abundantly endowed with strategically important natural resources. While being at the center of the Indian Ocean Sea Lanes of Communication (SLOC) with extensive land and ocean-based mineral resources including premium grade graphite and rare earth elements, some political analysts are of the view that Sri Lanka suffers from a 'Paradox of Plenty' or perhaps, a geostrategic 'Resource Curse'. This phenomenon often afflicts countries blessed with abundant natural resources, like Sri Lanka.

An imminent threat to our unique biodiversity and plentiful geodiversity is upon us during this critical period of struggle to emerge from the economic crisis of recent times. Some political analysts argue that the 'staged default' in 2022 would enable the IMF and its creditor partners to effectively take control of strategic geopolitical positioning by influencing Sri Lanka's economic policy initiatives and compromising its sovereignty. We will be seeing the outcome of this hard bargaining in the near future, with the change in the Presidency and a new government being appointed.

Sri Lanka seems to be under severe pressure to part with some of its greatest natural treasures both on land and in the sea around us, under the plans being hatched during the painful process of 'debt restructuring'. Under the prevailing law, these priceless landscapes and seascapes are perceived from a human perspective as an object of law - a natural resource or property having a commodifiable,

and disposable value meant to benefit human beings and treated as such. Sri Lanka's Exclusive Economic Zone (EEZ) extends over 519,000 square kilometers, eight times larger than its landmass, and remains largely unexplored. The country has also submitted a claim for an extended seabed area of 1.4 million square kilometers, rich in mineral resources, oil, gas, and fisheries.



Map of the Sri Lankan Exclusive Economic Zone (EEZ) (Source: Maritime Boundaries Geodatabase, Flanders Marine Institute).

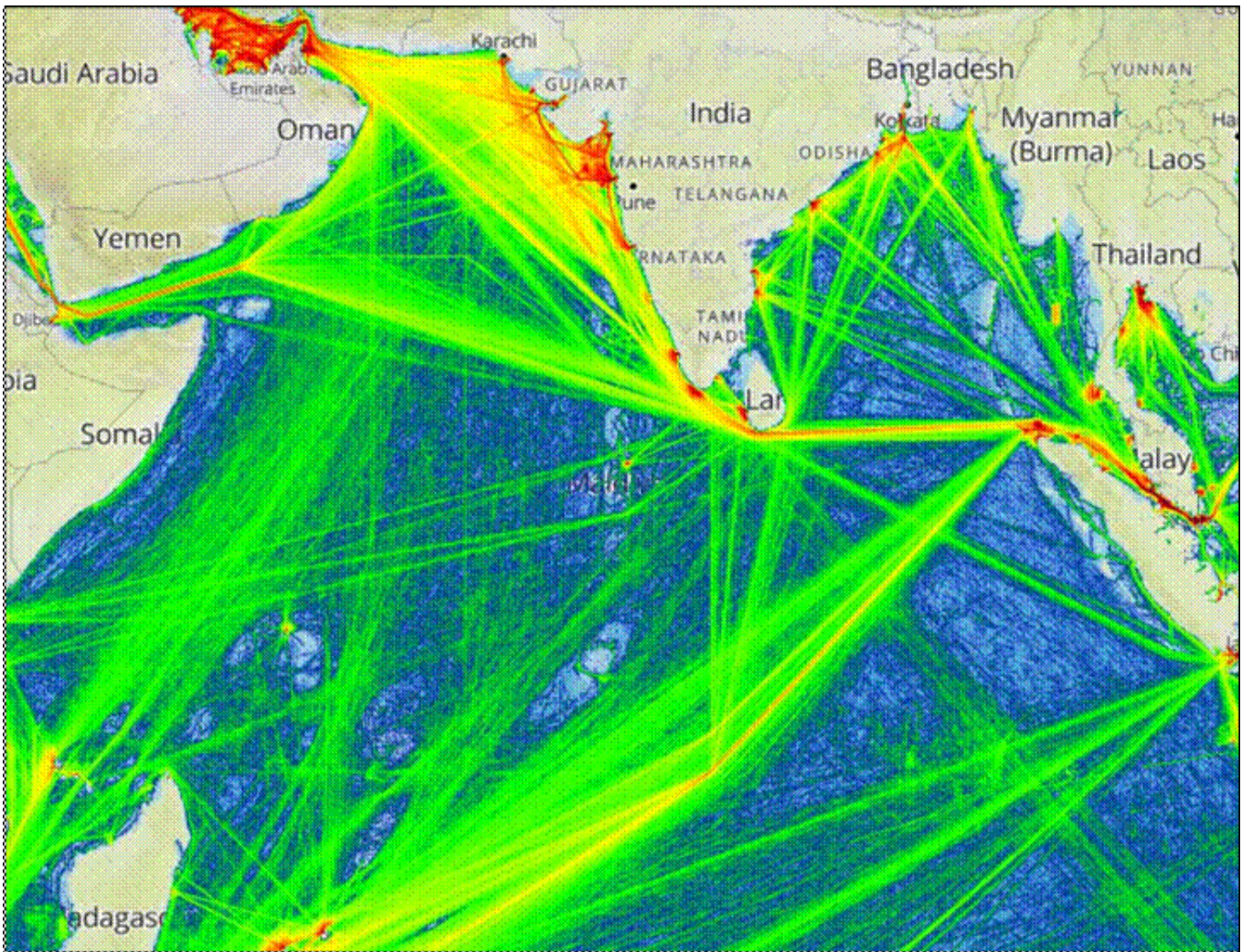


Cobalt-rich Afanasy Nikitin Seamount, which is in the central Indian Ocean, east of the Maldives and about 1,350 km (850 miles) from the Indian coast.

It has been proposed to develop a Blue Economic strategy in existing sectors, including oil, gas wind, solar, and geothermal exploration, and in emerging sectors like deep seabed mining for minerals. The race for minerals on the seafloor, seen as the next frontier of exploration has already begun and been likened to a new 'blue gold rush'. Countries like China, Russia, and India are looking to extract a range of minerals like zinc, cobalt, and copper available on the seabed in the Indo-Pacific Oceanic region. These minerals are needed for modern hi-tech industries like electronics, automobiles, and clean energy. However, seabed mining, on the other hand, can result in irreversible harm to marine ecosystems, disrupting fragile habitats and jeopardizing marine biodiversity.

To safeguard its oceans and prevent their exploitation, Sri Lanka must urgently adopt an ecocentric legal framework rooted in Earth Jurisprudence. The current anthropocentric approach to jurisprudence, prioritising human interests over environmental concerns, poses a significant threat to the country's natural resources. Sri Lanka can align its legal system with the principles of sustainable development and ensure the well-being of both its people and the environment.

So far, very little has been done to change the structure of law to achieve an ecocentric sustainable development, judging from the outcomes of Environmental Impact Assessments and subsequent legal proceedings on the sustainable use of our natural resources. Laws recognizing the Rights of Nature need to be brought in to codify the



Maritime Sea Lanes of Communication in the Indian Ocean (Source : <https://www.adb.org/sites/default/files/project-documents/50184/50184-001-tacr-en.pdf>)



The MV X-Press Pearl disaster in May 2021 (Image Courtesy: Sri Lanka Air Force Media Unit)

concept of sustainable development. Given the considerable commercial value attached to these virtually uncharted marine natural resources, they would have been, in all probability, a vital element in the ongoing debt restructuring negotiations with diverse stakeholders, as Sri Lanka stands to benefit significantly from an emerging blue economic strategy.

Marine Pollution and Earth Jurisprudence

The MV X-Press Pearl disaster which caused unprecedented damage to the Sri Lankan oceans and all those who form a part of these oceans will adversely affect the ocean and marine lives for many years to come. Therefore, it is unequivocal that these nonhuman beings shall be empowered to protect themselves against anthropogenic environmental disasters.

An excellent discourse on how Earth Jurisprudence could be integrated into the contemporary legal framework in Sri Lanka to protect its oceans and ocean species has been published by Dr. Asanka Edirisinghe of General Sir John Kotelawala Defense University (<https://celp.cmb.ac.lk/team/mrs-asanka-edirisinghe/>). Unfortunately, Earth Jurisprudential principles are not comprehensively reflected in the contemporary legal framework aimed at the protection of oceans in Sri Lanka. The 1978 Constitution of Sri Lanka needs a revision in recognizing legal personhood and rights of nature. At a time when we are contemplating a new constitution for Sri Lanka, the ancient wisdom of Sri Lanka emphasizing deep relational values in nature needs to be appropriately incorporated in a section on Earth Jurisprudence.

Dr. Edirisinghe recommends that Sri Lanka must integrate Earth Jurisprudential principles of legal personhood and rights of nature, great jurisprudence, community ecological governance, and restorative justice into the ocean protection legal framework.

The environmental community should rally around Dr. Edirisinghe's clarion call that the time has come when these crucial principles on Earth Jurisprudence must be integrated into the corpus of the contemporary law in Sri Lanka, following the examples set by the international community, to preserve oceans and all its members - the next frontier of exploitation - for the sake of the entire Earth community.

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MANGROVE CHRONICLES:

TRACKING 20 YEARS OF CHANGE IN GALLE-UNAWATUNA MANGROVES USING REMOTE SENSING AND GIS

Amasha Yatagama

Mangroves, once undervalued as swamps, are now recognized as vital ecological powerhouses that are crucial for the stability of coastal ecosystems. Thriving in tropical intertidal zones, they trap sediments and pollutants, protecting seas from harmful runoff. Notably, they absorb three to four times more carbon than terrestrial vegetation, making them essential in combating climate change. However, despite their importance, mangroves are under threat. In Sri Lanka, the mangrove cover has drastically declined due to both natural and human activities. Shrimp farming in the 1980s led to significant losses, and other anthropogenic activities like pollution, river diversion, and industrial discharge have further endangered these ecosystems. According to statistics from the Global Mangroves Watch portal, the world's mangrove coverage is estimated at an impressive 14,735,899 hectares. Within this global expanse, Sri Lanka contributes approximately 19,657 hectares, which constitutes a modest yet significant 0.3% of the nation's total land area (Department of Forest, 2010).

Unawatuna mangrove cover is a "state forest" under the Department of Forest Conservation of Sri Lanka, thus restricting any human activities except legal traditional fishing for domestic consumption. It is

nestled between the hot, humid coastal stretch of the Galle district of Sri Lanka and is a vital urban green space. Dominated by species like *Rhizophora apiculata*, *Excoecaria agallocha* and *Bruguiera gymnorrhiza*, these mangroves are a haven amidst urbanization. Despite the pressures from nearby cement factories and improper waste disposal from residencies, the area remains a crucial carbon sink, absorbing CO₂ emissions from the bustling city.

Remote sensing, the art of using satellites or aircraft to detect and monitor the Earth's features, combined with the powerful capabilities of Geographic Information



Systems (GIS), is revolutionizing how we map and track vegetation changes. These technologies shine particularly bright in inaccessible regions like mangroves, offering unprecedented insights and aiding conservation efforts.

High-resolution satellite images, capturing the minutest details, allow for precise analysis of individual features, making them invaluable for detailed environmental studies. Medium resolution images strike a perfect balance, providing enough detail for regional analysis while covering large areas. Low-resolution images, though less detailed, paint a broad picture of our planet, essential for global-scale monitoring. To ensure accuracy, atmospheric corrections are applied, refining the data we get from satellites like Landsat, which are pivotal for detecting changes in mangrove coverage.

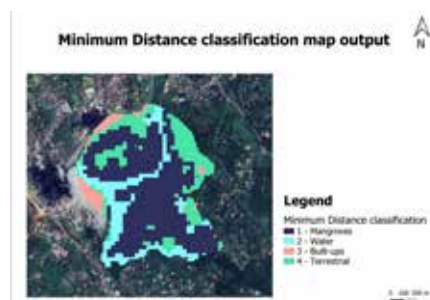
Remote sensing and GIS deliver consistent, multi-temporal land cover information, though the cost of very high-resolution imagery can be a hurdle. Enter virtual 'field visits'—an ingenious solution where platforms like Google Earth provide detailed imagery for data training and validation without the hefty price tag.

Examining Galle Unawatuna in recent years

Since this study focused on the Unawatuna mangroves in Galle, Sri Lanka, these techniques were employed to assess the mangrove extent and its temporal and spatial variations from 2003 to 2023. The study employed a two-step methodology to determine the current extent of mangrove coverage and detect temporal variations over the past 20 years using supervised classification methods.

This study was done in 2023 by the author under the supervision of Prof. Sevvandi Jayakody, (Chair Professor, Department of Aquaculture and Fisheries, Faculty of Livestock Fisheries and Nutrition, Wayamba University of Sri Lanka) and Ms.

A.P. Abeygunawardana, (Lecturer (Probationary), Department of Animal Science, Faculty of Animal Science and Export Agriculture, Uva Wellassa University of Sri Lanka). Aimed at comparing the accuracy of supervised classification methods for mangrove cover detection, researchers focused on the Unawatuna mangroves in Sri Lanka. Using Landsat 8 OLI satellite images from 2003, a comprehensive analysis was conducted to distinguish mangrove vegetation from terrestrial vegetation, water, and built-up areas. Through advanced image processing and classification techniques, including Minimum Distance, Maximum Likelihood, Spectral Angle Mapping, and Random Forest, the accuracy of these methods was assessed and compared.



Map output of year 2023

The study also delved into the temporal variation of mangrove coverage over the past two decades. By analyzing satellite images from 2003, 2007, 2011, 2015, and 2019, the researchers were able to track changes in mangrove distribution, confirming their findings with historical data. This dual approach of high-accuracy classification and long-term temporal analysis provides valuable insights for the conservation and management of mangrove ecosystems.

The Mangrove coverage is declining since 2011

The results revealed fluctuations in mangrove coverage over the past two decades, with estimated coverages of 47.00 hectares in 2003 and 61.00 hectares in 2007 peaking at 76.37 hectares in 2011,

and declining to 51.57 hectares in 2023. The transformation of the area can be attributed to the surge in urbanization, the construction of the Southern Expressway, the impacts of global warming, and emissions from a nearby cement factory. These findings underscore the need for ongoing restoration efforts and highlight the effectiveness of medium-resolution satellite images and open-source GIS software in monitoring mangrove health. However, the maps are affected by cloud cover, which may at times impact the clarity and accuracy of the data presented.

Year	Mangrove coverage/ Area (ha)
2003	47.0025
2007	61.1100
2011	76.3650
2015	62.1000
2019	60.3000
2023	51.5700

Through an analysis of past research, the temporal changes of the Unawatuna mangrove site from 1956 to 2004 were brought to light. Satyanarayana et al. (2011) revealed that the mangrove coverage was 49.5 hectares in 2004, a figure closely aligning with our present study's 2003 estimate. This research study was published at the 7th International Research Conference of Uva Wellassa University of Sri Lanka 2023 in abstract form.

Unawatuna mangroves act as the green lungs of Galle, absorbing CO2 emissions from the city and helping to mitigate the impacts of climate change. However, the pressures of urbanization, nearby industrial activities, and improper waste disposal threaten their survival.

The current study emphasizes the importance of integrating Remote Sensing and GIS techniques to detect spatial and temporal variations in mangrove coverage, providing vital data for conservation and sustainable management.

Table 02. Previous research studies on Unawatuna mangroves for the temporal variation

Research Study	Species Distribution	Area calculated (Mangrove cover)	Satellite Product
Dahdouh-Guebas, F., Verheyden, A., De Genst, W., Hettiarachchi, S., & Koedam, N. (2000). Four Decade Vegetation Dynamics In Sri Lankan Mangroves As Detected From Sequential Aerial Photography: A Case Study In Galle. In Bulletin of Marine Science,67(2)	<i>Bruguiera gymnorhiza</i> (L.), <i>Bruguiera sexangula</i> , <i>Excoecaria agallocha</i> , <i>Heritiera littoralis</i> and <i>Rhizophora apiculata</i> , a few occurrences of <i>Lumnitzera racemosa</i> and <i>Sonneratia caseolaris</i>	1956- 47.9 ha 1974- 49.5 ha 1994- 53.6 ha	Aerial photographs of Galle
Satyanarayana, B., Koedam, N., De Smet, K., Di Nitto, D., Bauwens, M., Jayatissa, L. P., Cannicci, S., & Dahdouh-Guebas, F. (2011). Long-Term Mangrove Forest Development In Sri Lanka: Early Predictions Evaluated Against Outcomes Using Vhr Remote Sensing And Vhr Ground-Truth Data. Marine Ecology Progress Series, 443, 51–63. https://doi.org/10.3354/meps09397	<i>Excoecaria agallocha</i> , <i>Bruguiera gymnorhiza</i> and <i>Rhizophora apiculata</i>	1956- 47.9 ha 1974- 49.5 ha 1994- 53.6 ha 2004- 49.5 ha	IKONOS satellite imagery

As the world grapples with climate change, protecting and restoring mangroves is more critical than ever. The insights gained from advanced GIS and Remote Sensing technologies will help safeguard these invaluable forests, ensuring they continue to provide their myriad benefits for generations to come. The historical absence of GIS and remote sensing techniques in Sri Lanka's environmental conservation endeavors has given way to a burgeoning landscape of initiatives aimed at leveraging these innovative technologies such as Geospatial Technology, Data Analytics, Ecological Modeling, Sensor Technology, Drones, UAVs (Unmanned Aerial Vehicles) and other Biotechnology for ecological preservation and stewardship.

While GIS and remote sensing provide valuable tools for environmental conservation, relying solely on them for decision-making has limitations. These technologies often require ground truthing to ensure accuracy, and factors like resolution constraints, temporal gaps, and the complexity of ecological systems can hinder comprehensive analysis. Additionally, GIS data may overlook crucial socioeconomic and local knowledge, making it essential to integrate on-ground observations and community perspectives for more effective conservation outcomes. In this study, we utilized open-source medium-resolution satellite imagery, which may introduce some limitations regarding the accuracy of the results. However, we can emphasize the robustness of our analytical methods, which could yield more accurate and detailed outcomes if high-resolution satellite images become available in future analyses in Sri Lanka as open source. The Unawatuna mangroves are more than just a forest. They are a testament to the resilience and importance of nature, and a reminder of our responsibility to protect it.

References:

Satyanarayana, B., Mulder, S., Jayatissa, L. P., & Dahdouh-Guebas, F. (2013). Are the mangroves in the Galle-Unawatuna area (Sri Lanka) at risk? A social-ecological approach involving local stakeholders for a better conservation policy. *Ocean and Coastal Management*, 71, 225–237.

Dahdouh-Guebas, F., Verheyden, A., De Genst, W., Hettiarachchi, S., & Koedam, N. (2000). Four decade vegetation dynamics in Sri Lankan mangroves as detected from sequential Aerial photography: a case study in Galle. In *Bulletin of marine science*,67(2).

Department of Wildlife Conservation.2022. Available at: <https://www.dwc.gov.lk/> [Accessed: 07.03.2023]

Satyanarayana, B., Koedam, N., De Smet, K., Di Nitto, D., Bauwens, M., Jayatissa, L. P., Cannicci, S., & Dahdouh-Guebas, F. (2011). Long-term mangrove forest development in Sri Lanka: Early predictions evaluated against outcomes using VHR remote sensing and VHR ground-truth data. *Marine Ecology Progress Series*, 443, 51-63.

B R, Shivakumar & S V, Rajashekaradhy. (2018). An Investigation on Land Cover Mapping Capability of Classical and Fuzzy based Maximum Likelihood Classifiers. *International Journal of Engineering & Technology*. 7. 939-947. [10.14419/ijet.v7i2.10743](https://doi.org/10.14419/ijet.v7i2.10743)

Congedo, Luca. (2021). Semi-Automatic Classification Plugin: A Python tool for the download and processing of remote sensing images in QGIS. *Journal of Open Source Software*, 6(64), 3172, <https://doi.org/10.21105/joss>

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Wild Wisdom

Bridging Global Insights into Sri Lankan Conservation

Sri Lanka Leopard Day falling on 1st August is dedicated to raising awareness on conserving the island's unique leopard species, *Panthera pardus kotiya*. It aims to foster community involvement, promote conservation actions, advocate for stronger environmental policies, and encourage global collaboration. This date was declared based on a proposal made by the WNPS to the DWC. To commemorate Leopard Day 2024, WNPS brought down Dr. Jeannine McManus, affiliated with the Landmark Foundation in South Africa, a leading conservation organization dedicated to South Africa's wildlife, focusing on apex predators like the Leopard. Dr. McManus is a senior researcher and acting director who has contributed as a human-wildlife conflict mitigation expert in landscape-level conservation projects across three provinces in South Africa. During her two-week visit, Dr. McManus engaged with different stakeholders related to leopard conservation in Sri Lanka and joined multiple events in and outside Colombo.

Engaging in Discussions with a Global Expert

“Cat Chat” and the WNPS monthly lecture, “Leopards, People and Everything,” brought together cat specialists, conservationists, and the public to hear Dr. McManus



Session for senior planters in hill country



Discussion with the DWC officials in Kumana



Meet up at the ETH

discuss international perspectives on wildlife conservation, focusing on the human-leopard conflict in South Africa. She highlighted the challenges faced, and the science-driven approaches applied, including leopard collaring, ecological and genetic studies, and non-lethal strategies for protecting livestock. The interactions concluded with Q&A sessions and offered everyone the chance to gain insights, exchange ideas and explore global conservation strategies that could be adapted to protect Sri Lanka's leopards.

Fostering Dialogue and Partnership

The Wildcats subcommittee members and Dr. McManus met with officials from the Department of Wildlife Conservation, exchanging knowledge on human-leopard interactions in both Sri Lankan and South African contexts, and exploring potential collaborations and technological innovations in leopard conservation. Dr. McManus also met with Mr. Kithsiri Gunawardena, COO of LOLC Holdings PLC, to discuss the role of private sector involvement in conservation. The "WNPS LOLC Multi-Regional Leopard Research and Conservation Project," launched in 2022, focuses on leopard conservation in human-dominated landscapes, operating six research centers across Sri Lanka to monitor incidents and promote human-leopard coexistence. Dr. McManus conducted a workshop for the project's field staff. The advisory committee meeting reviewed the progress of the above project and was attended by experts including Prof. Enoka Kudavidanage, Dr. Sriyanie Miththapala, Dr. Rohan Pethiyagoda, Dr. McManus, Rukshan Jayawardena, Dr. Vidya Athreya (via Zoom), and Dr. Bools Smuts (via Zoom). During a visit to the Elephant Transit Home in Udawalawa, Dr. McManus discussed the current veterinary practices, facilities, and challenges, highlighting the need for more resources, personnel, and advanced medical care.



Field observation in Panama



Inquiring on leopard attacks on livestock

During a session held for senior planters representing 13 Regional Plantation Companies in the hill country, she emphasized the value of promoting human-leopard coexistence in tea estates and advocating for sustainable tea production where the leopards roaming in tea estates could be perceived as an asset rather than a threat. She highlighted how the plantation sector's active involvement could impact reducing human-induced negative interactions. Prof. Enoka Kudavidanage also shared insights on highland leopard conservation, urging planters to support the DWC and the WNPS in their initiatives. This session brought together a diverse group of planters, including upper management, estate managers, and assistant managers, for the first time, fostering a unified approach to conservation as engaging decision-makers at all levels is critical to ensuring

their commitment to sustainable practices and promoting effective, long-term conservation efforts across the plantation sector.

Nurturing Young Minds

Dr. McManus held sessions at St. Joseph's College in Colombo and Queensberry Tamil Vidyalayam in Kotagala, offering students insights into leopards and leopard conservation from a global expert's perspective. These programs aimed to inspire young future conservationists by broadening their understanding of the interconnectedness of conservation efforts worldwide. Such initiatives are vital in shaping young minds, fostering a sense of responsibility for wildlife, and building the next generation of conservation leaders. The sessions also provided these students an opportunity to actively engage and learn from a leading researcher and scientist.

A limited-edition leopard t-shirt collection in collaboration with the Moose Clothing Company was also launched in July-August to raise funds for the leopard conservation initiatives led by the WNPS. These received tremendous positive results.

Understanding Human-Leopard Interactions

While in Panama, in one of the LRCP regional centers, Dr. McManus and the WNPS team held discussions with other conservationists/stakeholders focused on challenges encountered in their work. During a meeting with the DWC officers in Kumana they touched on recent leopard incidents and strategies to reduce negative human-leopard interactions near residential areas. Conversations with local cattle farmers revealed the impact of livestock predation on their livelihoods, helping the team gather insights for potential pilot projects aimed at mitigating human-leopard conflicts through compensation and deterrents.

Dr. Jeannine's participation in the celebration of Sri Lanka Leopard Day 2024 was an impactful and multifaceted initiative, facilitating the exchange of global conservation strategies. Through diverse sessions, her insights offered valuable lessons for local leopard conservation efforts. These events encouraged mutual learning, strengthened stakeholder relationships, and emphasized the importance of technology-driven approaches. The workshops, lectures, and dialogues provided a platform for participants to engage with innovative conservation



initiatives that could be adapted to the Sri Lankan landscapes, inspiring a shared commitment to conserving the island's unique leopard subspecies.

Moreover, the focus on community involvement and youth engagement helped nurture future conservation leaders. By connecting with students and regional center coordinators, the sessions inspired young minds to take an active role in protecting wildlife, demonstrating how international conservation

efforts can inspire local actions. The partnerships formed during her visit, especially with plantation sector leaders and private stakeholders, laid the groundwork for sustainable, long-term conservation practices. Dr. McManus's contribution also raised awareness of international cooperation in addressing the complex challenges faced by Sri Lanka's leopard populations. Dr. McManus's visit to Sri Lanka was facilitated by Dilmah Conservation and Jetwing Hotels.

TALES OF CONSERVATION :

A Groundbreaking New Initiative From Our Youth Wing

The Tales of Conservation, organised by the Youth Wing of the Wildlife and Nature Protection Society and supported by USAID, was a powerful convergence of creativity and conservation, under the broader theme 'Action and Aspiration combined with Art'.

Held on the 29th-30th of August at the Royal MAS Arena, this exhibition created a powerful platform for exploring creative solutions in response to the pressing challenges of environmental sustainability. The event featured over 45 compelling creative expressions by passionate youth, each highlighting critical conservation issues. Large diverse crowds passed through this unique event, which was a first for WNPS in recent times, and set the tone for more such initiatives in the future.

The event also saw collaboration among key players in the conservation field, which is something we should ideally be seeing more of. There was representation from prominent organisations such as Biodiversity Sri Lanka, Centre for Environmental Justice, Climmacoms, Dilmah Conservation, Federation of Environmental Organizations, Urban Fishing Cat project, Young Zoologists Association and Zero Plastic Movement, who all showcased their groundbreaking conservation initiatives.

The exhibition featured a very diverse collection of art forms, from sculpture to photography, emphasizing the beauty and fragility of our natural world and inspiring a deeper appreciation for biodiversity. The artworks shone a spotlight on critical issues such as climate change's impact on endangered species and sustainable waste management, underscoring the urgent need for conservation. By raising awareness and fostering dialogue, this exhibition hoped to spark collective action toward a sustainable future. Due to the noteworthy effort of our Youth Wing, these next generation WNPS members and leaders have already begun engaging in high profile activities and initiatives.

The event was inaugurated by Gabriel Grau, the USAID Mission Director, alongside Kaitlyn Gallander, Country Representative of the Sri Lanka Engage Programme, past WNPS presidents Ashley De Vos and Dr. Malik Fernando, WNPS President Graham Marshall and the Youth Wing leadership which is spearheaded by Sajani Jayakody and Keshan Perera.

A competitive element was introduced to the submissions and the top winners in different categories were generously rewarded. Some of the winning submissions are featured on different pages of this Loris edition. The work done by WNPS in several key areas was also featured, coupled with mini video clips capturing the essence of these efforts. These are all uploaded on the Facebook pages of the society to enable wider audiences





A. P. Mahavithanage : Tides
(Drawings/ Paintings - 3rd place)



K. H. Chamanka: Plight (Fashion Design - 1st place)



W.A. Hishara Dhanuki : Melting Ice and Burning Bears (Fashion Designs-2nd place)



P.A.D.Nimesh Rukshan : Chains of Conscience (Sculptures-2nd place)



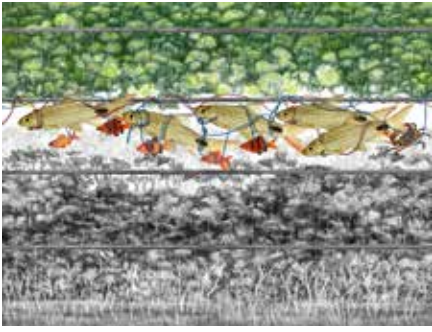
A.B.B.S. Silva : Forgotten Hihiri (Fashion Design-3rd place)

to benefit from them. Beyond the visual arts, the event featured engaging discussions with experts from various fields, as well as representatives from the WNPS, academia, civil society, legal experts and other environmental organisations. These conversations helped bridge theoretical knowledge with practical solutions, and empowered attendees to become agents of change. Simultaneously it provided a platform for patrons to voice their opinions and share their experiences.



M. D. Wickramasinghe : Metal Arachnid (Sculptures-3rd place)





K.K.Suwandahennadi : Extinction of Asoka (Digital Arts-2nd place)



D.P. Handunge : Unseen layers (Drawings Paintings-2nd place)

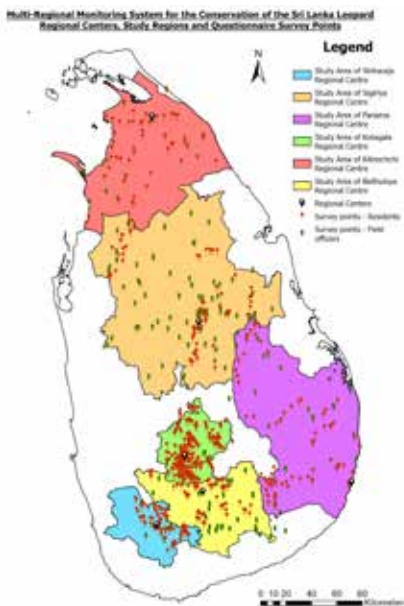


N.A. Gamage : The Aftermath (Digital Arts-3rd place)



WNPS LOLC Multi-Regional Leopard Research and Conservation Project

A Leap Forward: Scientific Progress of Our Journey



The Multi-Regional Leopard Research and Conservation Project (LRCP) was initiated by the WNPS Wild Cat Sub Committee in mid-2022 in partnership with LOLC Holdings PLC as the principal sponsor. The objectives were to study the leopard populations in human-dominated landscapes and facilitate human-leopard coexistence outside protected areas in Sri Lanka. Under this, six research centers were to be established island-wide in geographically important regions - Panama, Sigiriya, Kalawana, Kotagala, Belihuloya, and Kilinochchi.

Laying the Groundwork: Baseline Data Collection and Preliminary Activities

After the initial training of the center coordinators and scoping meetings to define the layout of the project, over 1000 questionnaires were completed to collect baseline data, across all centers between August 2022 and April 2024 in pre-defined study regions focusing on two specific groups. These were field officers employed in the Department of Wildlife Conservation (DWC) and the Department of Forest Conservation (DFC), the two government authorities responsible for managing wildlife habitats and forested lands of the country, and residents of the center localities in rural regions. Based on these citizen science data, the next step involved profiling leopard distribution and the status of human-leopard interactions in the surveyed regions. Under this, areas, where leopards and leopard-related incidents have been recorded, were identified and they were then categorized further under different risk levels to detect the high-risk zones. Alongside the fieldwork, a network of informants was established at each center location to facilitate working closely with the local communities, regional field

officers, estate communities, and the public sector. Simultaneously, awareness development, assisting communities to adjust, and providing assistance where needed in leopard-related incidents in close communication with the DWC continued as our priority activities. The educational programs conducted through the regional centers have reached over 13,000 participants up to date advocating for human-leopard coexistence.

ATBC 2024, Rwanda: Presenting Breakthroughs in LRCP

The findings of the project were communicated locally over different media. The first international scientific communication was made at the 60th Annual Meeting of the Association for Tropical Biology and Conservation (ATBC) held in Kigali, Rwanda from 14th-18th July. An oral presentation titled "Insight into Sri Lanka's Apex Predator: Threats, Public Perceptions and Conservation Initiatives" was presented showcasing analysis of citizen science data, community outreach events, and other project initiatives and was well received by the audience. The ATBC is a leading international scientific organization dedicated to promoting the scientific understanding and conservation of tropical ecosystems. A total of 400 participants from 52 countries attended this year's conference where Prof. Kudavidanage, the scientific advisor of the project, and Gihani Hettiarachchi, our project coordinator, represented the WNPS.

Partnering for Progress: Research Collaborations

LRCP also collaborated on a thesis project conducted by Mr. Kushal Neupane, following Erasmus Mundus's Joint Master's Degree in Tropical Biodiversity and Ecosystems. His research project was titled "Assessment of people's attitudes towards the Sri Lankan leopard *Panthera pardus kotiya* in Sri Lankan hill country" where



Conducting interviews with field officers



At ATBC 2024



Gathering data from residents



During Kushal's field activities

he worked with the two regional coordinators of the Kotagala center. His findings revealed more positive attitudes among male respondents compared to female respondents and more negative attitudes among those who frequently use forested lands for resource consumption. The study also suggests the establishment of “Eco clubs” in tea estates and conducting educational programs to address myths and provide accurate information to improve community attitudes towards Sri Lankan leopards.

Coming Up...

Another research collaboration with the Faculty of Computing, Sabaragamuwa University of Sri Lanka is underway where an app for data collection via regional centers is being designed as a community project by a group of 3rd year students. Based on the collected citizen science data, manuscripts for the research papers are currently being drafted for publication and one manuscript is under review. Further, research abstracts on the findings of regional centers have been submitted for publication in the upcoming Wildlanka symposium in Sri Lanka. The project team is also exploring the possibilities of collaborating with state universities for potential research initiatives by involving interested undergraduates. We are eagerly awaiting the launch of the field sampling session this year using brand new camera traps to collect robust scientific evidence on leopard ecology and behavior in the study sites.

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