

Macaw Tails

“Act for the Amazon”

Part I



By Roshan Tailor

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Amazon Rainforest: Why the world must not tolerate its destruction

“It has always been clear the struggle to save biodiversity will be won or lost in the forests”

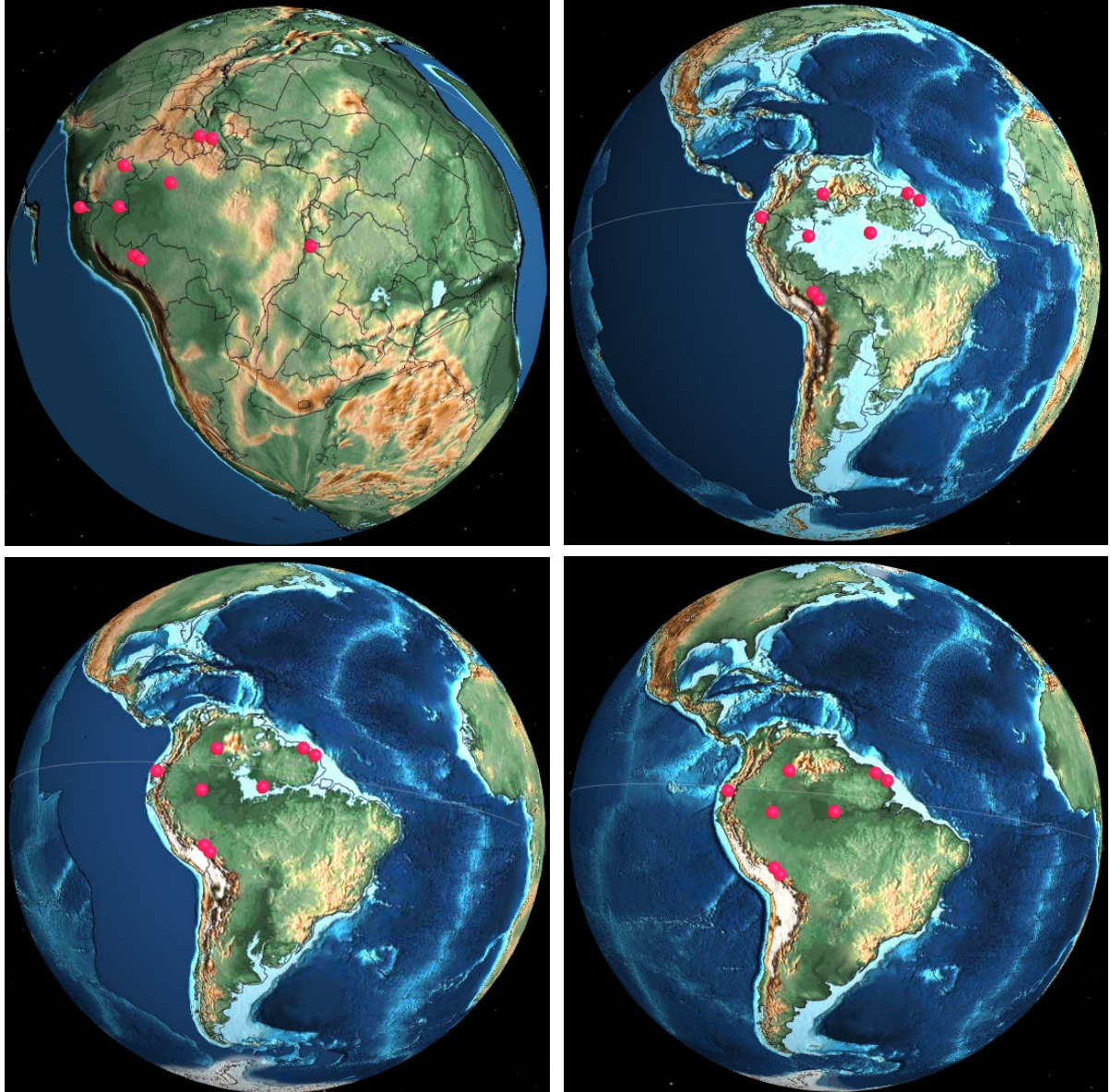
- E.O. Wilson

A natural ecosystem is a distinct environment where living organisms (like animals and plants) interact with the non-living environment (like weather). Think of it like your car, you interact with passengers in the car and you interact with non-living items such as the steering wheel, engine etc., your car is a system. If one of these is removed or stops working, the car will no longer work. Ecosystems around the world are in danger of being lost at alarming rates – with global rainforests predicted to be lost 80 years. Natural ecosystems play important roles in maintaining balance on Earth, on both a local scale and a global scale, including roles such as pest management, preventing disease outbreaks to roles such as producing oxygen - to the extent that the Amazon Rainforest is described as the ‘lungs’ of the planet.

From Sea to Rainforest – Amazon’s brief history

Over 200 million years ago (MYA), the world was a very different place, only two massive bodies of land existed¹. During this time, the region that is now the Amazon Rainforest, was connected to the region that is now Africa’s Congo Basin. Then 200 million years later, the Andes Mountain Range began forming, and peak elevation was reached in 10-15 million

years. The mountains became a natural barrier, and the Amazonian region became flooded by sea. With changing sea levels, the Amazon sea became the Amazon lake. In the period of 10-20 MYA, weather conditions were dry and savannah-like. Around 7-10 MYA, sea levels dropped, and Amazonian lake became Amazonian river, which flowed to the East. And with this, Earth saw the birth of the Amazon Rainforest. Transformations continued as sea levels



changed, and it is these changes that helped facilitate the Amazon Rainforest to boast the highest biological diversity in the world.

These images show what Earth looked like 240 MYA (top left), 90 MYA (top right), 20 MYA (bottom left) and Present Day (bottom right). The pins show Amazon regions in eight of the nine countries. The point of what is now the Congo Basin is also pinned in the first image to show the connection to what is now the Amazon region. *Source: Webster².*

So, to give the threat some timescale, the formation of the world's largest rainforest was destined from natural changes that began many millions of years ago, yet in a blink of an eye, that is less than a century, we could lose the Amazon Rainforest forever.

What is Biodiversity?

Biodiversity or biological diversity is a term used to describe the variety of living organisms (animals, plants and fungi). It encompasses diversity on three levels – the genetic level, species level and the ecosystem level. At the ecosystem level, the Amazon region is more than just a single habitat of tropical trees, it includes a mosaic of habitats: mangrove, moist, palm, montane and tropical deciduous forests, natural savannas, floodplains. As well as clay (salt) licks, creeks and rivers flowing through and around the forest. Of land-based ecosystems, the Amazon is home to 10% of living species, more than anywhere else³. And this variation in ecosystems promotes a huge diversity of species. There are an estimated over 7,000 plant species⁴ and over 15,000 tree species⁵ with Brazil holding the most species of trees in the world. One hectare of Amazon forest can contain more species of trees than in the USA and Canada combined⁶. Amongst animals, there are thought to be over 3 million species; where a hectare can contain more species of frogs and similar numbers of bird species than all found in the USA and Canada combined⁶.

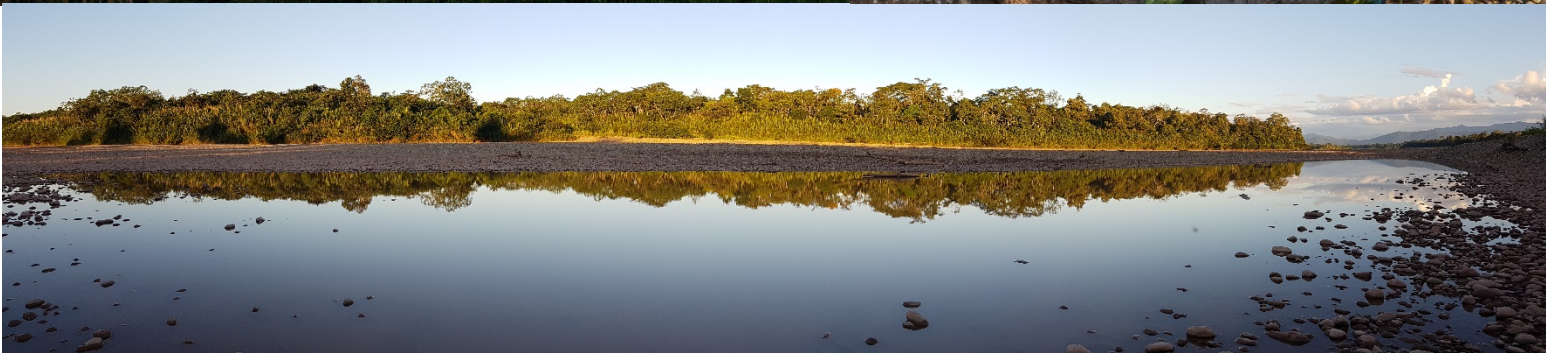
World's Largest Rainforest

Globally, forests cover around 31% of global land area, 50% of which is in the Amazon forest. And covers a colossal 6,290,000 km² (2,430,000 miles²)⁷, which is roughly equal to the UK + Mexico + India (or 25 UKs!). It spans nine nations:

Country	% of Amazon ⁸	Global biodiversity rank ⁸
Brazil	60	1
Peru	12	12
Colombia	8	2
Bolivia	7	13
Venezuela	5	7
Guyana	3	36
Suriname	3	47
Ecuador	2	10
French Guiana	1	45



Map showing the vastness of the Amazon region in each nation
Source: Scholastic News⁹.



Photos: Roshan Tailor

Why it is important we have a healthy and biodiverse Amazon?

The Amazon Rainforest performs the amazing and vital function of keeping the planet alive and has been a source for many of the medicines that we have today. And forests in general also help prevent the spread of diseases.

You might think, “Well why would any of these, concern me, I don’t live close enough to the Amazon to be worried about any negative impact on me”. But what if you want to visit the Amazon, and everyone should, it is one of the most incredible places on the planet. There is nothing quite like the experience of waking up to howler monkeys bellowing away in mark of their territories, and hearing these bellows from metres to kilometres away, and macaws screaming and squabbling as they emerge from their roosts and make their way to a claylick, where they produce one of nature’s most magnificent shows, and you can barely hear yourself think, or hear the person next to you, as the macaws greet and communicate with all the other noisy parrots and parakeets. To see some of the largest trees in the world, and experience some of the most powerful thunderstorms, and where new islands form and change the course of rivers and alter the ecology of the surrounding habitat. The spectacularism of the Amazon Rainforest is endless, and there is no better place to appreciate the splendour of nature where wildlife wanders unrestricted.

But even if nature is not really your thing, you should still be concerned. The Amazon has a strong influence on global weather patterns and events of flooding and droughts (precursors to fires); is a stronghold for carbon storage; and also has medicinal opportunities that have yet to be discovered, that could treat a variety of diseases and conditions.

Climate Benefits

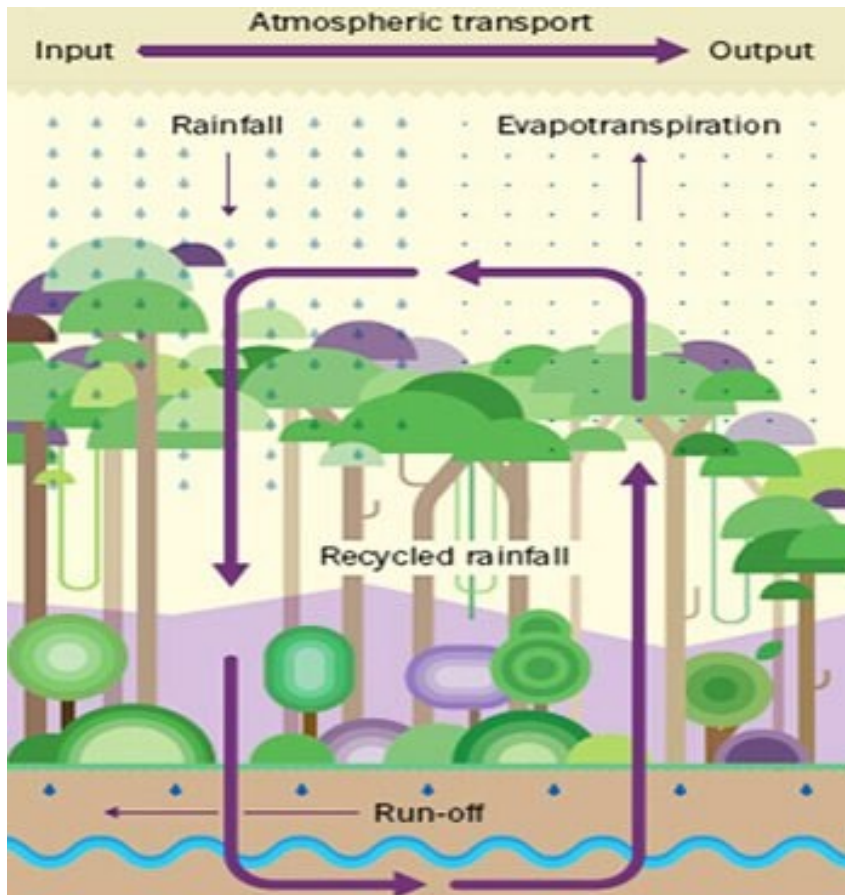
To survive, plants are able to carry out a process called photosynthesis whereby, they use water and carbon dioxide to produce sugar, their food, as well as oxygen, the gas that all animals need to breath. Carbon dioxide is type of greenhouse gas, a gas that traps heat from the sun, much like the glass roof of a greenhouse. The more carbon dioxide (and other greenhouse gases such as methane) in the air, means that less heat can escape the air, and temperatures can rise.

The Amazon region is thought to have over 300 billion trees¹⁰. On average one tree is able to take in around 22 kg (48 lbs) of carbon dioxide per year¹¹, so the Amazon can potentially take in over 8.5 billion tonnes of carbon dioxide per year.

All these trees function as a team to help regulate rainfall, to the extent that together, the trees produce 30-50% of rainfall over the Amazon¹². As rain falls, the water soaks into the soil, and some of that water will be soaked in by the roots of the trees. Water that soaks into the roots, is carried up the tree by plant cells. When water reaches the leaves, some gets used in photosynthesis, and the rest will leave the tree through tiny holes called stomata, a process called transpiration. For water that remains in the soil, some gets sucked back into the air by evaporation, and the rest will flow (runoff) into rivers. The process of water returning to the atmosphere through plants and the soil, is collectively known as evapotranspiration. And the hotter and drier (less humid) the air is, the more water that releases into the air. All water returns to the atmosphere as gaseous water vapour. The water vapour is then absorbed by the air above the forest, and essentially flows like a ‘river’ over the forest, before falling again

as rain, thus a loop is maintained where the water is constantly recycled. Hence, a healthy Amazon, with lots of trees, is an integral part of the whole ecosystem functioning. *But when you destroy the trees, the balance of the ecosystem goes horribly wrong.*

Below is an image showing how water naturally cycles in a healthy ecosystem.



Source: Aragão¹³.

Ecosystems can manage themselves. Each species will carry out a particular role in the ecosystem, from fruit-eating animals such as the agouti, tapir and hundreds of bat species, which all help to spread seeds across the Amazon, and ensure a future for food supply. To the predators such as wild cats, birds of prey and snakes which maintain herbivore and frugivore numbers. And the many giant trees that provide nesting areas for all the birds. Right down to all those biting insects, which are food sources for frogs, lizards and many species of bats. And do not forget all the microorganisms living in the soil, bacteria, fungi, worms and other critters, which help keep soils healthy, helps provide all plant life with nutrients, and crucially, allow carbon to be stored in the soils, and allow water to penetrate through the soils. Everything has a role to play, and when they are removed, can initiate a branched domino effect whereby all life that depends on something that has been lost, will slowly diminish.

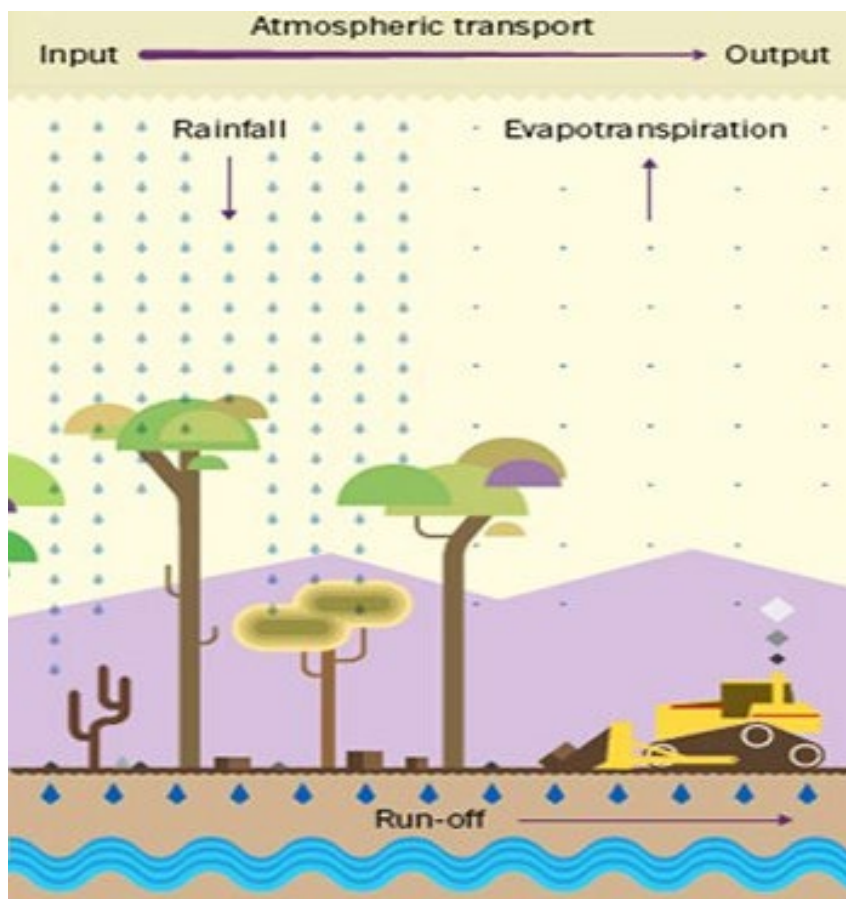
Toppling Nature

“What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another”

- Mahatma Gandhi

When forests are destroyed, there are fewer trees to uptake water, this means there are fewer roots to hold soils together, causing soils to become loose and unstable. As a result, more water remains in the soil, and less evaporates into the air. And most of it will flow into waterways. This, in urban ecosystems, leads to waterways overflowing and flooding, as well as leading to landslides. The biggest drivers of deforestation are mining, logging, agriculture (crops and livestock), forest fires, urbanisation and infrastructure development (such as building of bridges or highways)¹⁴.

The image below shows how deforestation impacts ecosystems, and disrupts the balance in the cycle, leading to a great loss of water.



Source: Aragão¹³.

Between 1950 and 2009, 2.27 million km² of global tropical forest was lost¹⁵, this is larger than the land area of the Democratic Republic of Congo (Africa's second largest country). Additionally, Food and Agriculture Organization (FAO) data show that there was an average loss of 47,400 km² of forest per year between 2010 and 2020, taking the total loss up to 2.74 million km², equivalent to a land area larger than Argentina (S. America's second largest country).

Global deforestation is fuelled by three major industries – agriculture (predominantly beef, soya and oil palm), mining (predominantly gold) and logging.

The Current Brazilian President, Jair Bolsonaro claims the Amazon belongs to Brazil¹⁶, however this is geographically, systematically and morally wrong. Whilst the largest portion is within Brazilian borders, the rest crosses the border of eight other nations. The rainforest is a connected (eco)system, destroy one part (in this case, the largest part) and the whole system will collapse; international boundaries are meaningless in nature. The species that inhabit the Amazon, have done so since before humans evolved, and so we have no right to claim, let alone destroy their home.

The Amazon Region has been at the forefront of many challenges over the last two, three decades, and particularly in these last two years. Conversion of primary rainforest for agricultural land use is placing catastrophic pressure on the world's largest rainforest. And as the Amazon has a global impact that extends outside of South America, and indeed outside of the Americas, the preservation of the Amazon is now more pertinent than it has ever been.

In Part 2, I go into the agricultural practices, of which, pose the greatest threat to the Amazon. Including cattle ranching and soya, and how we can make choices to reduce the pressure.

About the author

My career in conservation began when I started my Bachelor of Science degree in International Wildlife Biology at the University of South Wales, UK. On my BSc, I got my first experience of forests on a field trip to Honduras, where we spent a week in a cloud forest, and I fell in love with ecosystem. After I graduated, I went on a conservation field course to Guyana, spending a month in an ecosystem called the Guyana Shield. I then progressed on to my Master of Science degree at the University of Leeds, UK, where I took a year out and volunteered on a conservation project on blue-throated macaws in Bolivia, and then embarked on my first experience with The Macaw Society as a field volunteer assistant. This was my first time in true Amazon Rainforest, and it was a spell-binding experience for me. Here, I spent half a year and worked alongside amazing people, and learnt so much about macaw conservation in the Amazon. As such, I was very fortunate to be able to return as the field leader, to oversee all the field work for what was our 20th year of macaw research in Tambopata.

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