Deforestation is threatening Amazon biodiversity and its carbon sponge

By Amanda Paulson, Christian Science Monitor, adapted by Newsela staff on 09.06.19
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Image 1. This photo shows the Amazon rain forest in Brazil. The Amazon covers an area of almost three million square miles. Photo by: FG Trade/Getty Images

Recently, I visited the Amazon rain forest. While visiting, I stayed at Camp 41. The camp consists of a handful of tin-roofed huts located deep within the rain forest. For about 40 years, it has been a home base for hundreds of scientists studying the Amazon. The camp is 50 miles north of Manaus, Brazil, and just a half-mile hike into the forest.

I'm here to visit Thomas Lovejoy, a famous ecologist and the "godfather of biodiversity." Biodiversity refers to the variety of living things in an environment.

Lovejoy has been studying the Amazon for more than 50 years. His goal is to gather long-term data on the effects of breaking up the Amazon's habitat. As an environmental journalist, I'm tagging along with him. I'm hoping to learn how the rain forest affects climate change. I also want learn about the role that the Amazon plays in the loss of biodiversity.

A Unique Environment For Organisms

The Amazon rain forest covers an area of about 3 million square miles. Most of the Amazon lies in Brazil, but parts of it lie in seven other South American countries.

The rain forest is a uniquely diverse environment. A section of rain forest about the size of two football fields might have 250 species of birds. It might also have 320 different species of trees. The Amazon rain forest is also a stable environment. It allows organisms to thrive in very complex relationships. Each organism plays a specific role in the environment.

Take army ants, for example. Swarms of them cover the forest floor, eating whatever they find. Several bird species have evolved to follow the ants. They do not eat the army ants; instead, they eat all the creatures that are forced to escape the ant swarm. Certain butterflies, meanwhile, follow the birds and suck nitrogen from the birds' droppings.

This type of complicated interaction among species is associated with rain forests, says Mario Cohn-Haft. He is a bird expert who also conducts research in the Amazon. Cohn-Haft said that these complex interactions reach a peak point in the Amazon.

A Carbon Sponge

The Amazon's forests are not just important for the species that live in them. They're also important for storing carbon dioxide. The Amazon is one of Earth's most important environmental filters. It sucks carbon dioxide out of the atmosphere to use in photosynthesis. This is the process by which plants make their own food.

Carbon dioxide is a greenhouse gas. These gases are produced when humans burn fossil fuels, like oil and coal. Greenhouse gases trap heat in the atmosphere, which ultimately leads to global warming. The Amazon rain forest helps control the buildup of greenhouse gases by taking in carbon dioxide.

The Amazon can absorb more carbon dioxide than it releases, making it a carbon sponge. However, the rain forest is losing its ability to act like a sponge. This is due to deforestation, or cutting down forests. Lovejoy predicts that the Amazon ecosystem could break down if just 20 or 25 percent of it is destroyed. In Brazil, 17 percent of the Amazon is already gone.

Today, the Amazon stores between 90 and 120 billion tons of carbon. That's equivalent to 10 years of carbon emissions from cars, power plants and other industrial sources. If deforestation continues, this carbon dioxide could end up in the atmosphere. This could endanger the entire planet.

Deforestation Made Worse By Fires

Scientists are concerned that the Amazon might reach a tipping point. This is because climate change and

fires are destroying the ecosystem. Since 2000, the region has been hit by three major droughts. These have led to massive fires.

Daniel Nepstad is the executive director of the Earth Innovation Institute. He says that the Amazon's carbon pool is leaking out slowly with deforestation. "It's actually happening; it's not a hypothetical thing." There is a potential for more with forest fires.

This is a major problem because the Amazon provides important benefits to the planet's climate. The moisture created in the Amazon produces rainfall in South America's Andes Mountains. This is one of the world's largest mountain ranges. The Amazon also sends rainfall to parts of Brazil, Paraguay and Argentina. It even sends rainfall all the way up to the Midwestern United States.

The Amazon provides important benefits to people, too. Thousands of different tree species grow in the rain forest. Humans rely on these trees. Some produce cashews, pineapples and cacao. People also rely on products from animals that live in the Amazon. For example, the venom from the bushmaster snake was the basis for many high blood pressure drugs.

Nearly 20 percent of the world's river water flows in the Amazon basin. There are several major rivers in the basin, including the Amazon River and the Rio Negro River. Both rivers are surrounded by miles of forests that flood regularly. The waters rise and fall by as much as 50 feet a year. These forests support specific tree and animal species.

Smaller rivers flow into the Rio Negro. These rivers are also surrounded by forests; however, these regions support completely different species. The forests are home to shorter trees and shrubs, which thrive in white, sandy soil. These regions are particularly vulnerable to the threat of deforestation.

The diversity of these smaller worlds contributes to the region's vulnerability. Most deforestation happens in specific areas in the Amazon. This can be a problem for the unique species that live there. Some species might become extinct.

Bigger Is Better

Lovejoy invented the term "biological diversity." It is also known as biodiversity. In the late 1970s, Lovejoy ran an experiment. He wanted to look at the effects of breaking up large forested areas into smaller areas. These small sections are usually separated by roads or buildings.

Lovejoy found that breaking up forested areas leads to a loss of species. He also found that the rain forest is only stable in large sections. These sections have to be at least 400 square miles in size to prevent the ecosystem from collapsing. This finding has influenced Brazil and other countries in their conservation efforts.

Brazil has already reduced its deforestation rate nearly 80 percent since its peak in 2004. But the country is now facing political and economic problems. Conservation is often a low priority for this government.

But there are still reasons for hope. The Amazon ecosystem has remained largely unchanged. Lovejoy notes that in 1965, one park in Venezuela and another in Brazil were the only protected areas in the Amazon. Now, about half the Amazon Basin is protected.

"There are hopeful possibilities," says Lovejoy. The key, he says, is that it has to be managed as a whole, "so that all that great repository of biodiversity remains intact. Because it does operate as a system."