Water in the Amazon

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By Heather and Georgie

The Amazon is the world’s largest tropical rainforest.

The Amazon is so big that the U.K and Ireland would fit into it 17 times.

The Amazon River

- It's length is around 6,400km.
- It is the second largest river in the world.
- It contains about 20% of the world's fresh water.
- The drainage system of the Amazon Basin has approximately 1,100 tributaries.
- The Amazon River's highest elevation is 5,598 meters in the Peruvian Andes (Kricher,1997).

Flows through the northern part of the rainforest.

Amazon River's Sediment

River	Drainage area, 10^3 km^2	Mean Discharge $10^3 m^3 s^{-1}$	Mean suspended Sediment load 10^6 t y^{-1}	Mean dissolved load 10^6 t y^{-1}	Percentage of total load carried in solution
SOUTH AMERICA					
Amazon	6150	200	900	290	24
Magdalena	260	6.8	220	20	8
Orinoco	990	36	150	31	17
Parana	2800	15	80	38	32

Figure 4.1: Sediment loads of major world rivers (after Knighton, 1998: Figure 3.2). Sources: Degens et al (1991), Meybeck (1976) and Milliman and Meade (1983).

Amazon River Research

University of Washington research explained that years ago that the river exhales large amounts of carbon dioxide.

Substances like woody plant matter is almost completely digested by bacteria in the Amazon River.

The mouth of the Amazon River has three main channels.

The authors estimated that about 40 percent of the Amazon's lignin breaks down in soils, 55 percent breaks down in the river system, and 5 percent of carbon reaches the ocean.

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Meeting of the Waters

Amazon

It gets its “coffee” coloring from the rich sediment that runs down from the andes including sand, mud and silt. This part of the amazon is sometimes referred to as “the white water” river.

- Average 22°C
- Water is dense

Rio Negro

It gets its “black tea” coloring from the leaf and plant matter thats dissolved in the water. It has little to no sediment, and is considered one of the cleanest natural waters in the world.

- 6°C warmer
- Less dense

The Water Cycle in the Amazon

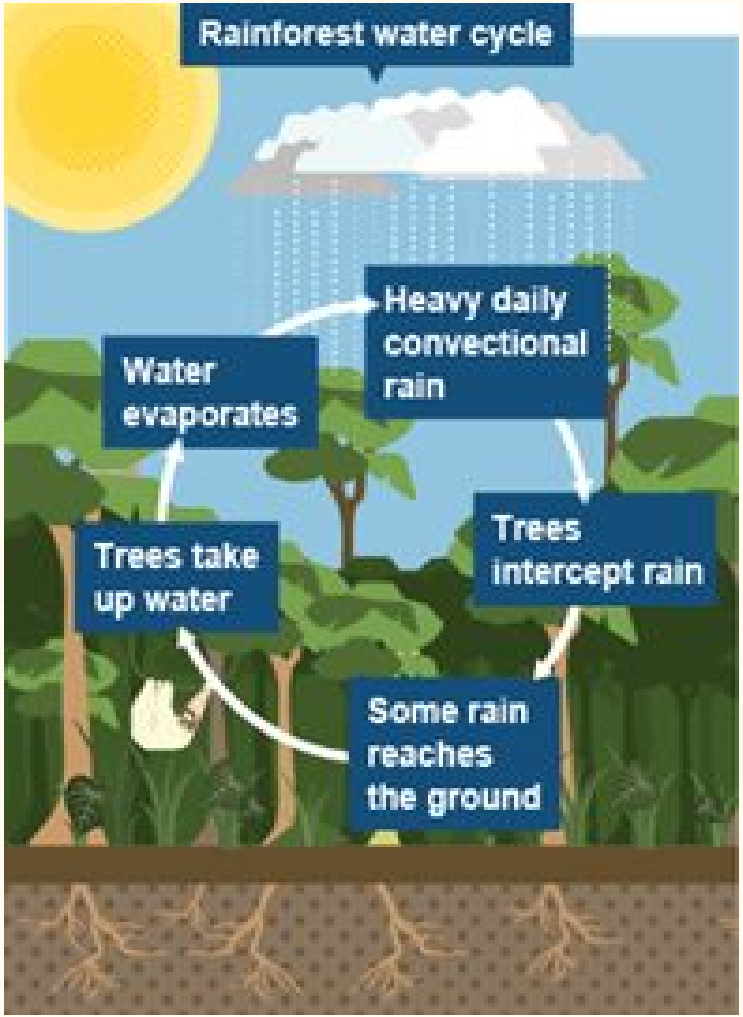
Water Cycle

1. Rainforest ecosystems are characterized by heavy convectional rainfall, high humidity, and luscious vegetation.

2. Convectional Rainfall: When air is hot it rises and cools then condenses to form rain.

3. Annual rainfall in the rainforest must be 75 inches at a minimum.

4. Only about 0.5-5% of sunlight reaches the rainforest floor, so it must be about the same for rainwater.



Why should I care?

The Amazonian water cycle is critical to Brazil's water supplies.

In what ways?

São Paulo Water Crisis

A two year drought was wreaking havoc in São Paulo up until this past el Niño. The city's population was growing but there was not enough water to support it. No rain means no water in their reservoirs and no water in reservoirs means some residents extremely limited water supply.

- While this issue is now “solved” due to the el Niño, experts warn São Paulo residents to be weary with water use because more drought could be lurking in the near future.

Could this be an effect of Deforestation?

- Convectional rainfall occurs when heat is reflected off a surface (treetops) and warms the air above which causes the formation of clouds.
- Transpiration is a key part of the water cycle which directly involves trees. It ensures that water enters the atmosphere and makes clouds and rain.
- Within the past 40 years, about 20% of the Amazon has been cut down.
- Less trees means less rain.

1. Ocean water evaporates and clouds are formed.
2. Winds blow these clouds to the Amazon Rainforest and cause rain.
3. Rain water reaches the forest and evaporates quickly, forming more clouds.
4. These clouds move west until they hit the Andes Mountains.
5. Clouds follow the contour of the Andes Mountains and produce rain for the Midwest, Southeast and South of Brazil.

The Nature Conservancy
Protecting nature. Preserving life.

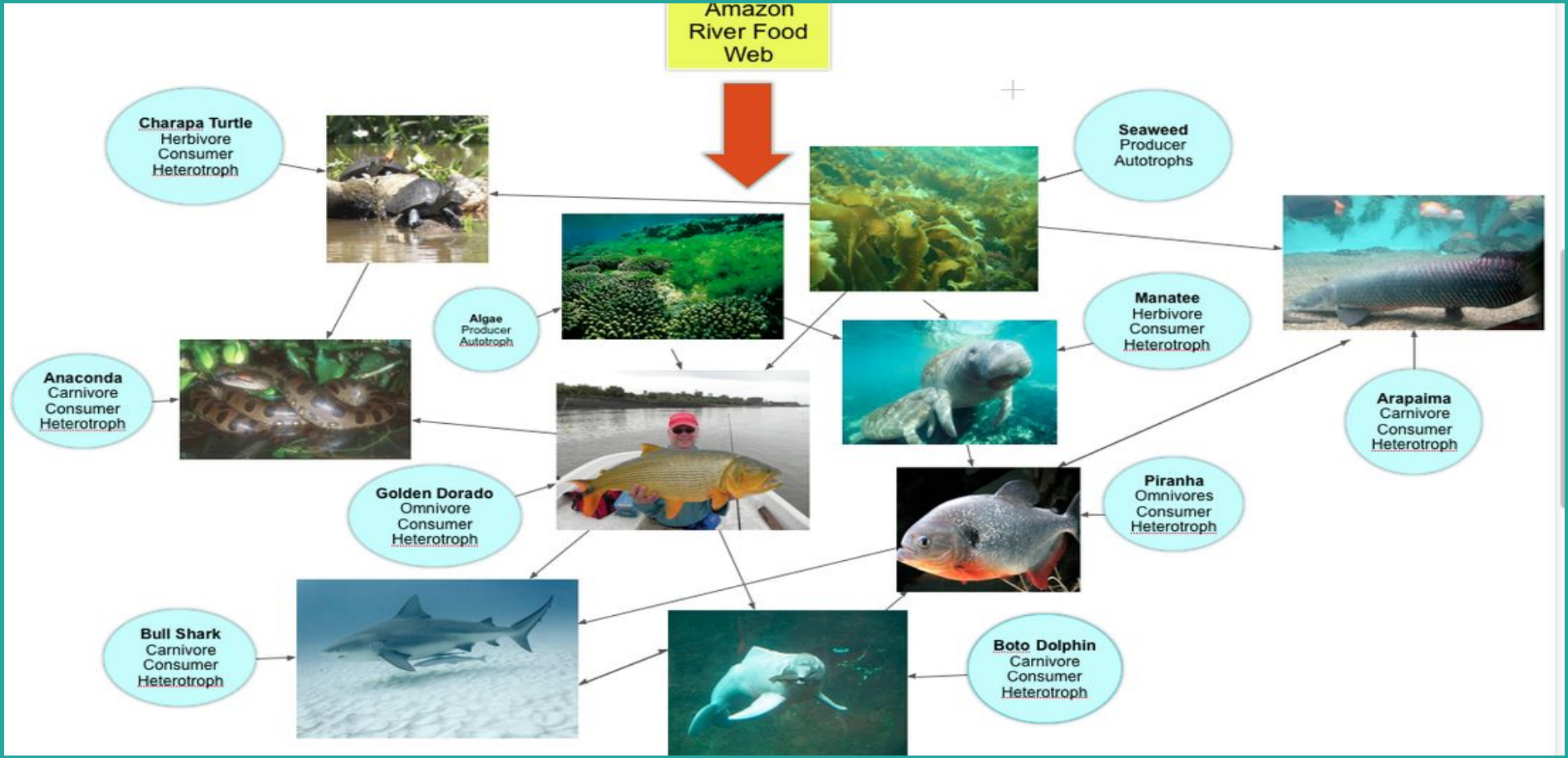
Importance of the River

Biodiversity

Many species depend on the Amazon River to sustain life.

- 427 Mammals
- 1,300 Birds
- 378 Reptiles
- Over 400 amphibians
- About 3,000 freshwater fishes

Food Web Example



Endangered Species in the Amazon River

- The pink river dolphin are rare to see and get their pink color due to blood capillaries near their skin. Their diet consists of freshwater fish, turtles, and crustaceans
- The giant river otter has only 2,000 to 5,000 remaining
- The Amazonian manatee which are hunted by the Natives who eat their meat and use their fat. Occasionally the manatees will get caught in fishing lines.
- The giant Amazon River turtle are known as a conservation dependent species due to their low survival rate.

Wet Season

Highest flow period occurs from January to May.

Dry Season

Lowest flow period is August to September.

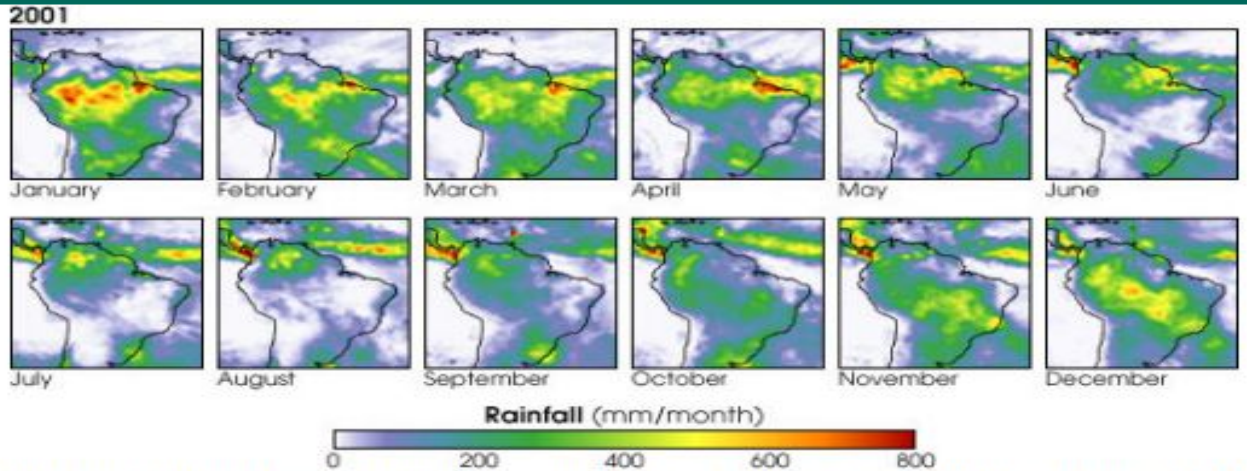


Figure 2 variation of the precipitation in South America for the 2001. (Source NASA)

Wet Season

Wet Season (December–May)

The flooded forest comes from seasonal precipitation and the input from the Andes snowmelt.

Dry Season

Dry Season (June–November)

Photographs courtesy Max-Planck-Institute for Limnology.

Humans Depend on the River

The indigenous Amazon people have developed lifestyles that are adapted for the benefits and restraints of life in the rainforest.

- These people hunt and eat from the river, typically they eat things such as fish, turtles, capybara and crocodiles.
- Homes, schools and stores are all along the riverbanks.
- Most people use boats to navigate the river and get from place to place.

What about floods?

- Every year over 250,000 km2 of Amazon floodplain forests are topped by water from the River.
- These flood areas are called the *Varzea*.
- Most populations are higher in these areas because of the seasonal abundance of fishes, birds, turtles and fertile soil.
- However, the people who live there have to be willing to deal with the flooding cycle and occasional shortages of food.

Environmental Issues

Deforestation causes erosion and soil loss, and an unbalance in the ecosystems.

Expansion of the urbanization near the river basin.

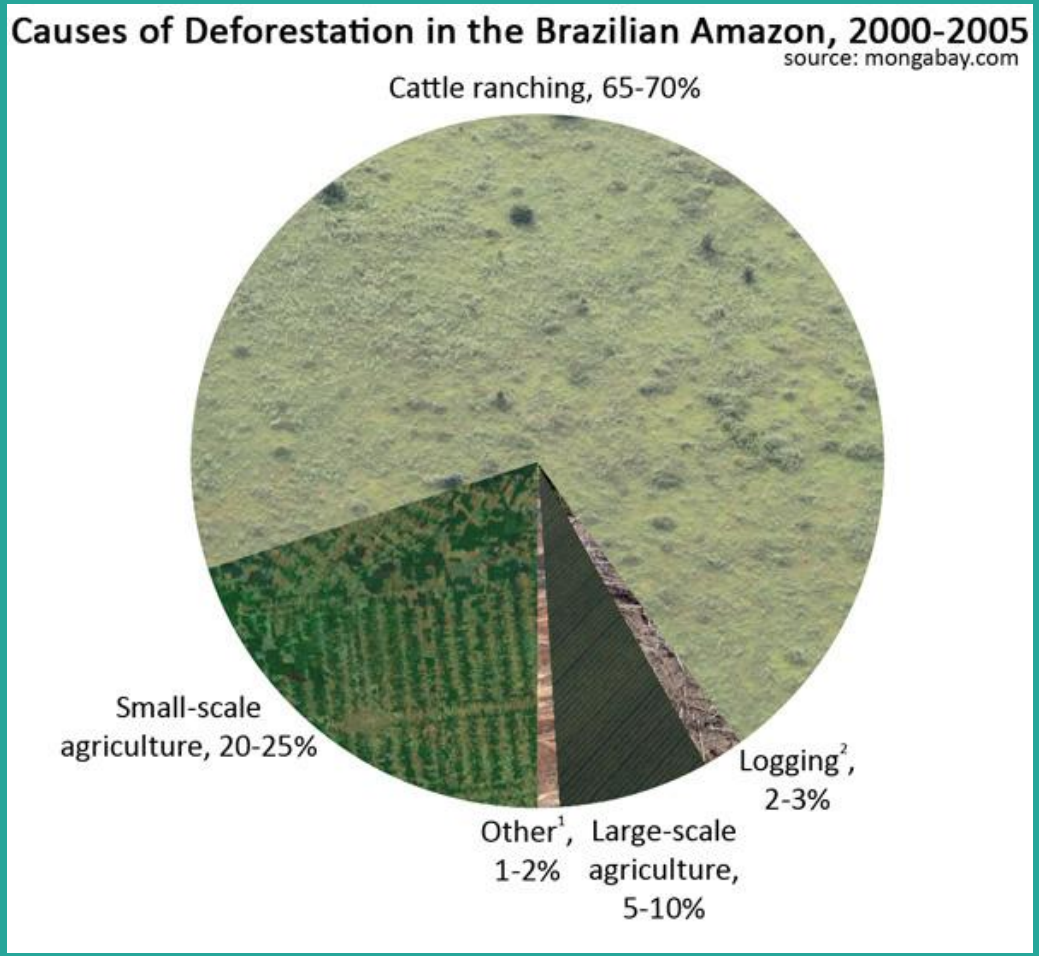
Water pollution which includes agriculture pesticides, inadequate wastewater treatment from populated areas, contamination of the rivers by mercury coming from the gold mines.

Change in the hydrologic cycle due to climate change.

In Brazil, over 60 percent of deforestation in the Amazon basin is due to the cattle ranches.

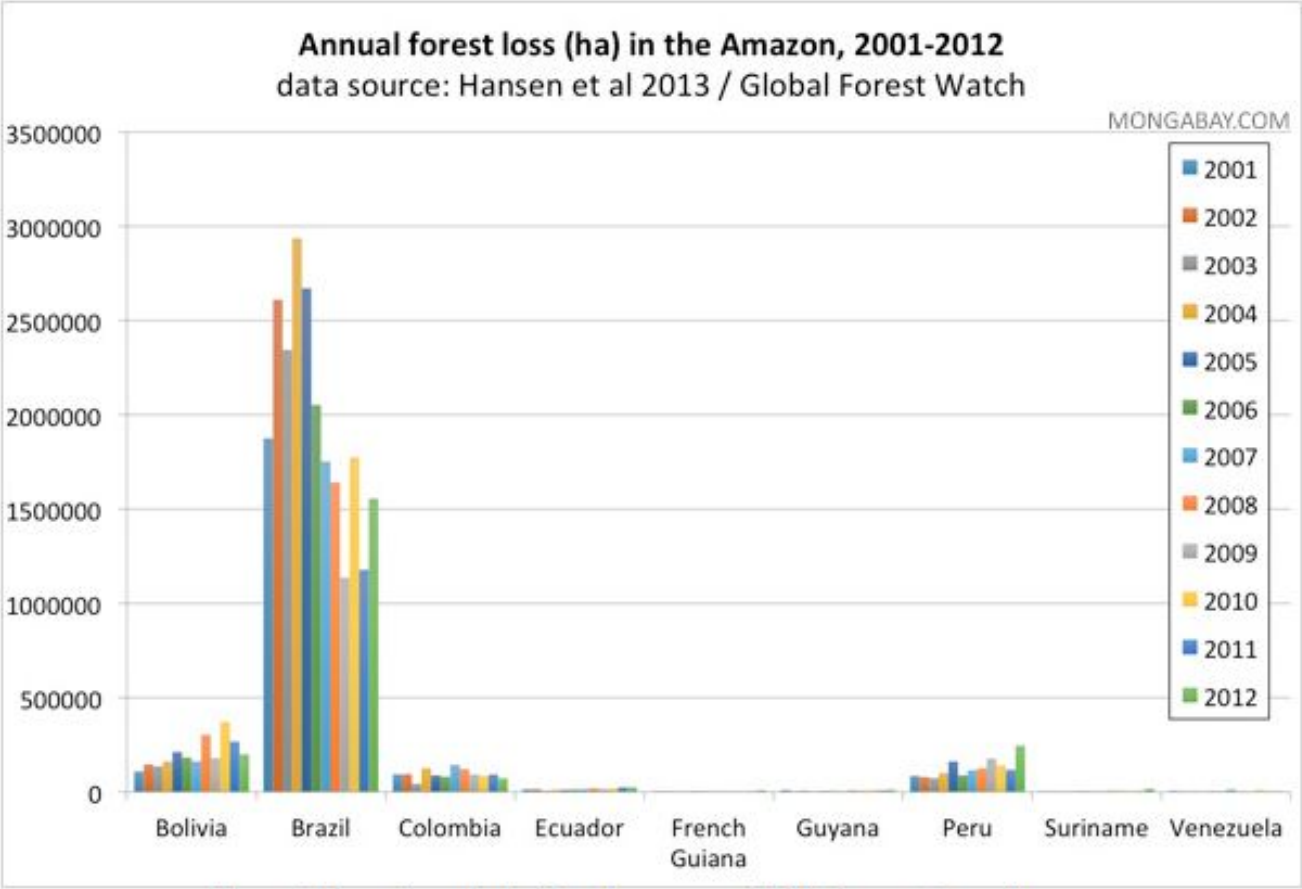
600 to 800 million tons of sediment per year are transported by the Amazon River.

Dams interfere with the hydrological cycle and the nutrient flows.



While everyone is under the assumption that the logging industry is the largest cause of deforestation in the Amazon, this graph clearly shows that the main culprit is the cattle ranchers.

Deforestation



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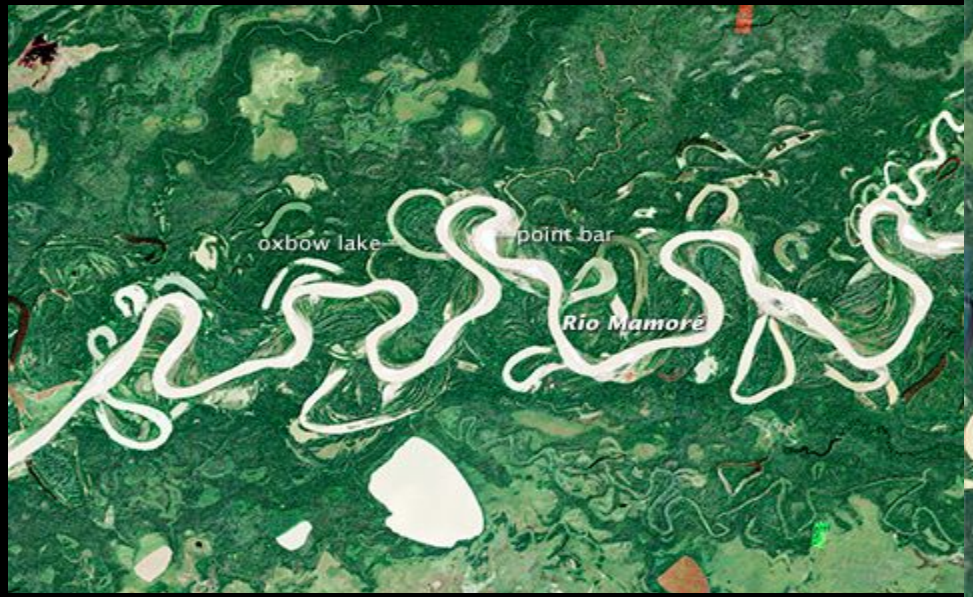

July 14 2014

Images by Jesse Allen, using Landsat data from the U.S. Geological Survey.

CAUSES: Erosion from an abundance of sediment going through the meandering stream during the past decades.

Conclusion

The Amazon River not only gives benefits to the wildlife that lives in the water but also the surrounding environment. Wildlife such as the river dolphin and the Arapaima, depend on the river to survive. Due to the Andes mountains the river receives and discharges sediment. The water levels depend on the precipitation in the wet and dry seasons. Seeing the river in person and how the surrounding natives live near the river will make all of what we researched come to perspective.

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