

TransPurus: Amazonia’s biogeochemical cycles depend on the fate of the region’s largest block of intact forest

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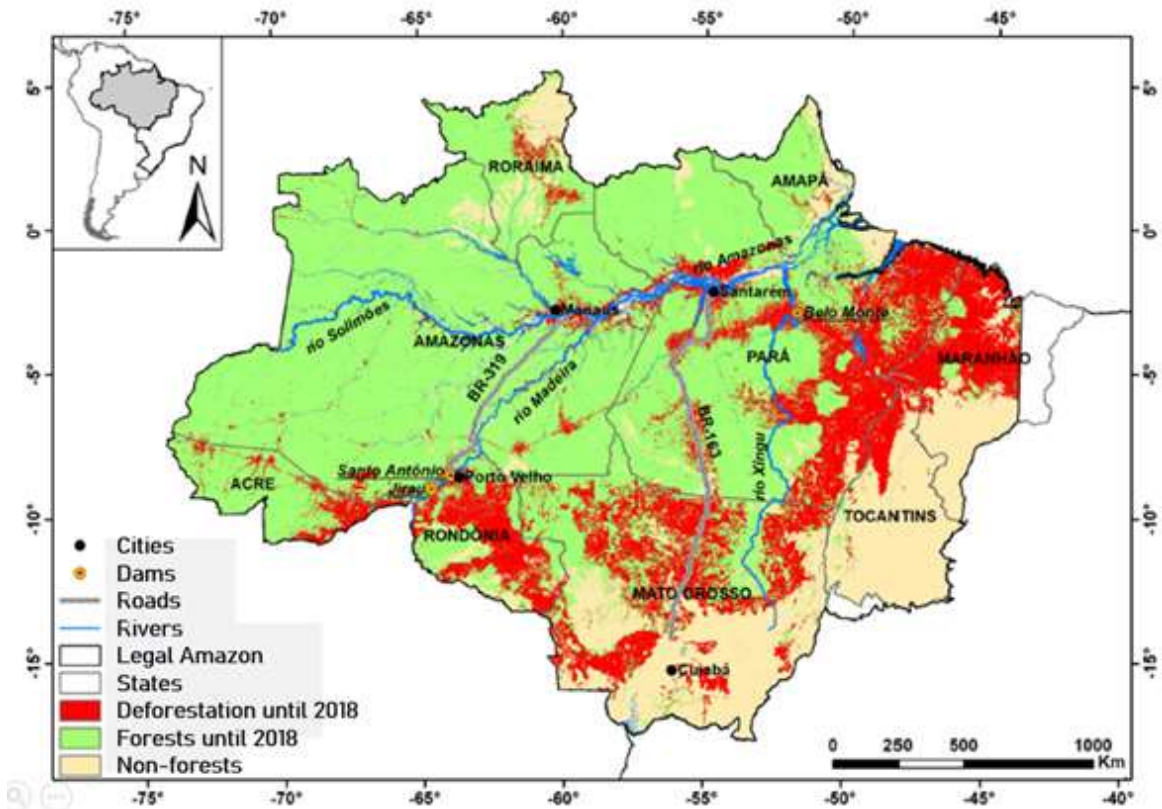
Abstract

Brazil’s Amazon deforestation is one of the world’s great environmental problems, and the fate of the “TransPurus” region – the vast block of intact forest to the west of the Purus River in Brazil’s state of Amazonas – will be the deciding factor in maintaining Amazonia’s biogeochemical cycles and associated ecosystem services, including carbon storage and water cycling and biodiversity. The Purus River effectively divides Brazilian Amazonia between its eastern side (where the forest has been heavily affected by deforestation, fragmentation and degradation), and the western side (where the forest is largely intact due to lack of accessibility by road). This situation in western Amazonia is likely to change radically if the proposed AM-366 and associated roads are built, opening this block of forest with a connection to Highway BR-319 (Manaus-Porto Velho). The AM-366 would cross the Purus River at Tapauá and link BR-319 to Tefé, Coarí and Juruá. BR-319 is a highway that was abandoned in 1988 but that has been “maintained” since 2015 while awaiting approval of a federal environmental impact assessment (EIA) before being “reconstructed.” Another threat comes from the “Solimões Sedimentary Basin” project that would open a substantial part of the TranPurus area to oil and gas drilling, potentially totaling thousands of wells. This would greatly increase the probability of roads being built to reduce the costs of servicing these wells. Roads are the primary drivers of deforestation in Brazil. The TransPurus area would be subject to invasion by actors ranging from landless farmers to large “land grabbers” (grileiros), and would be likely to attract oil palm and logging interests. Logging can potentially provoke large-scale forest degradation in conjunction with its increasing the vulnerability of forest to fire. Should the huge area of intact forest in this region be lost, potential release of greenhouse gases would be of a scale that could be a key factor in pushing global temperatures beyond a “tipping point” leading to global warming escaping from human control to begin a “runaway greenhouse” ending in a “hothouse Earth.” It would also threaten the source of water vapor for the “flying rivers” – winds that carry water vapor recycled through Amazonian trees to São Paulo and other parts of Brazil and neighboring countries.

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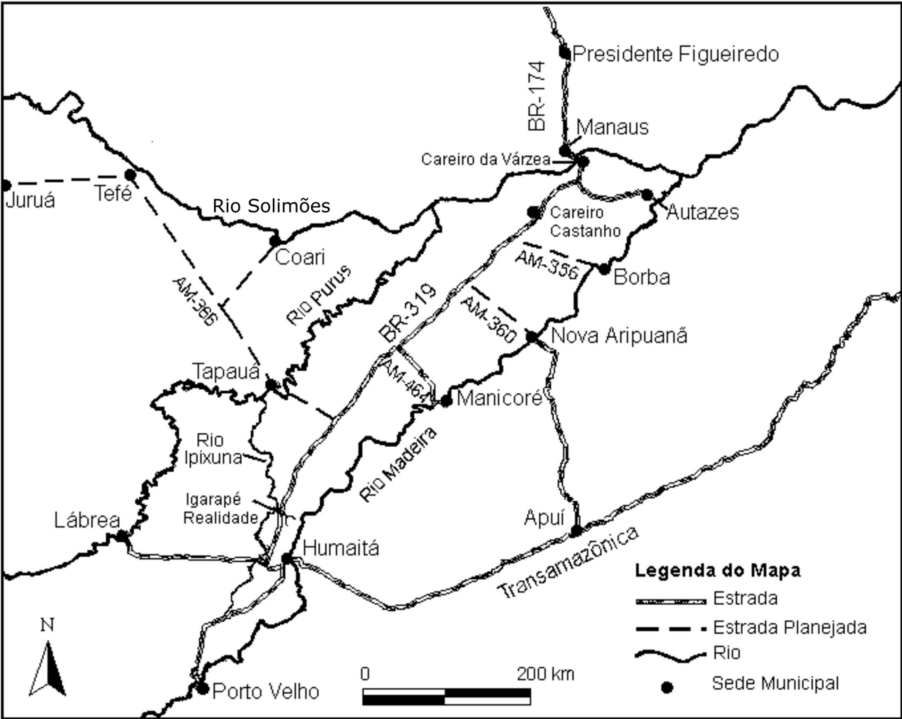
HIGHWAY BR-319



Brazil's Legal Amazon region. The "arc of deforestation" is the red area along the southern and eastern edges of the forest. The BR-319 cuts the remaining Amazon basin forest in half, providing access to vast areas of standing forest by those who have deforested the eastern and southern portions of the region. Deforestation data courtesy of Brazil's National Institute for Space Research (INPE).

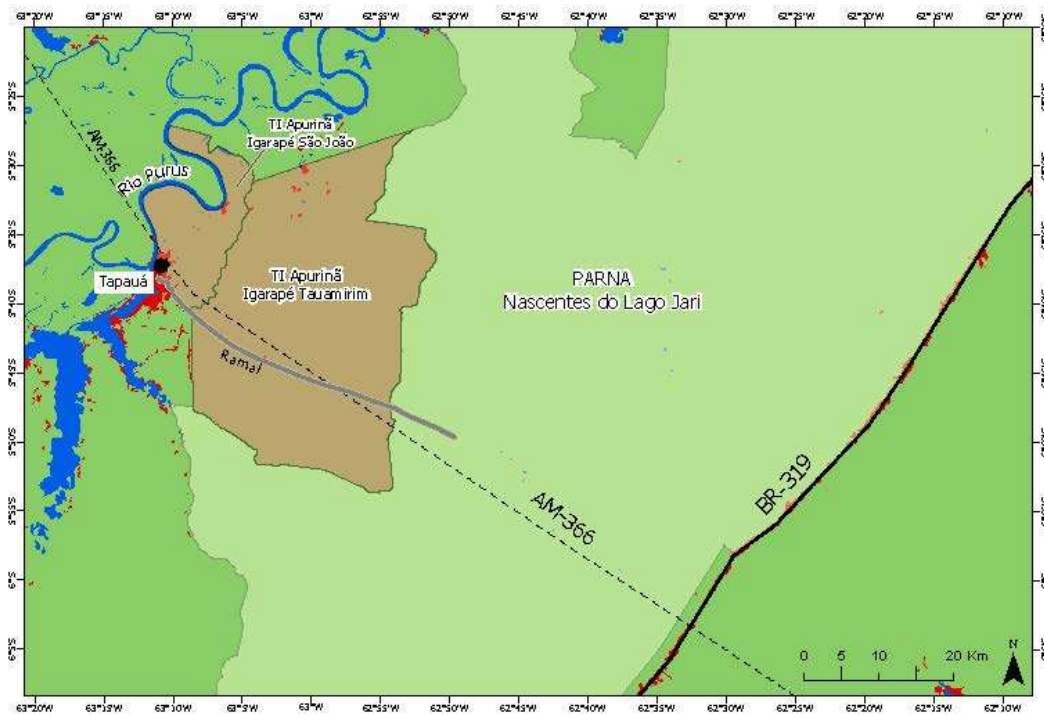


The BR-319 (Manaus-Porto Velho) Highway passes through large areas of intact rainforest, seen here in 2018 with road "maintenance" underway. Source: Folha de São Paulo.



Side roads planned from the BR-319 highway, including AM-366, which would open the Trans-Purus region to deforestation.
Source: Fearnside & Graça, 2006

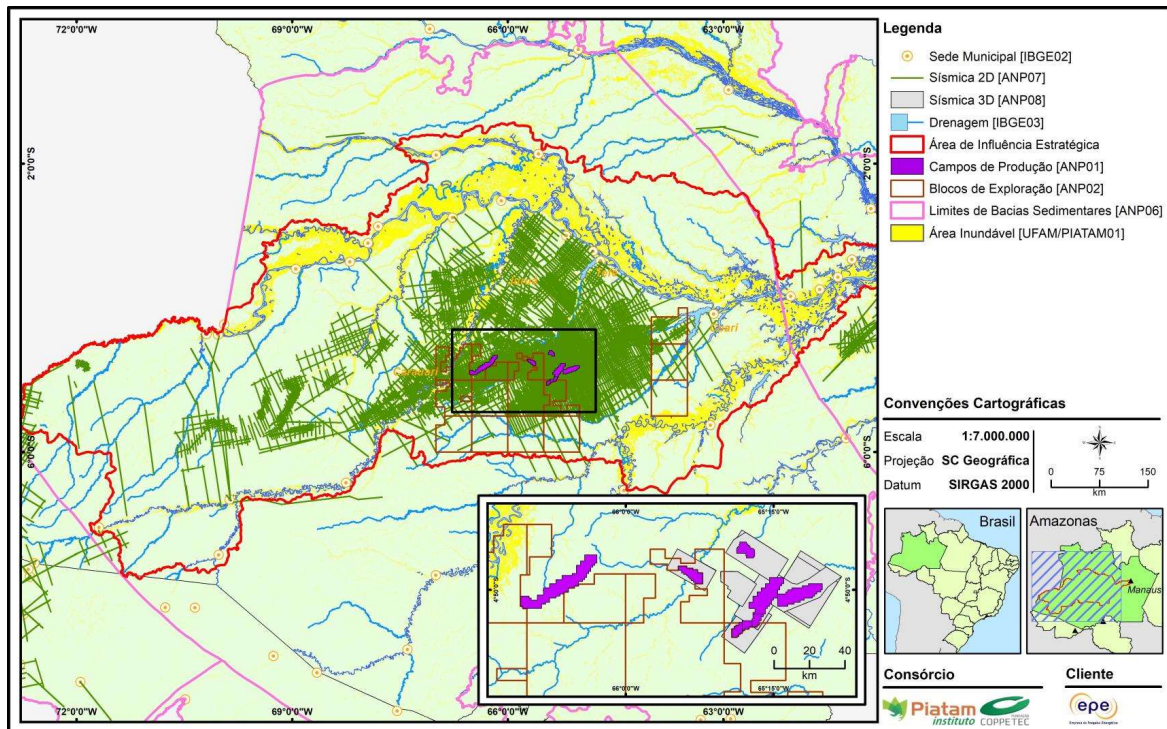
TRANS_PURUS REGION



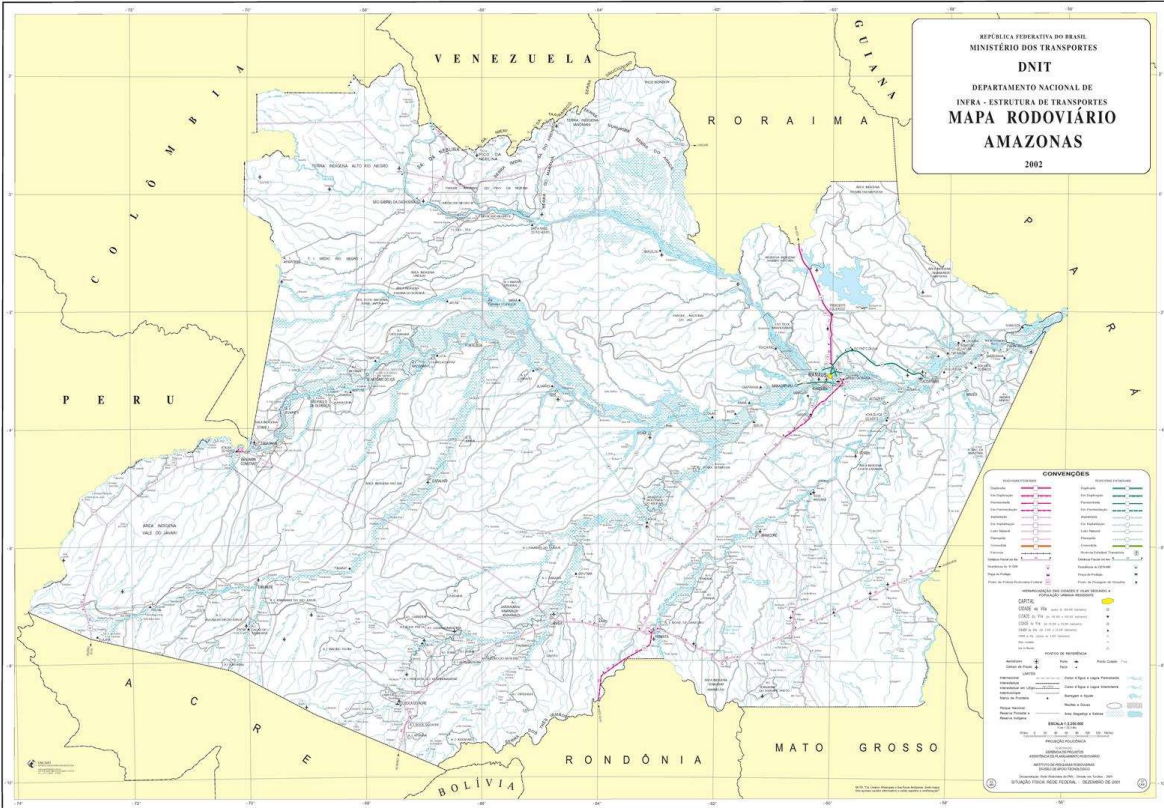
Location of the access road in relation to the route (as planned by DNIT) of AM-366. The Nascentes do Lago Jari National Park and the Apurinã do Igarapé São João and Apurinã do Igarapé Tauamirim Indigenous Lands are shown with deforestation (in red) up to 2019 according to the PRODES satellite monitoring project of INPE, Brazil's space agency. Image: INPE.



Illegal access road bordering the Apurinã do Igarapé São João Indigenous Land. The road is being built to link BR-319 to Tapauá, on the Purus River, giving access to the Trans-Purus Region following the route of the planned AM-366 road. Image: Chief Waldemiro Apurinã, October 2020



Map of gas and oil blocks (EPE, p. 65). The purple areas have wells currently in production. The thin green lines represent the locations for future drilling where seismic surveys have already been carried out. The project's "Strategic Influence Area," delimited by the red line, covers 47 million hectares (larger than the US state of California). Image: EPE.

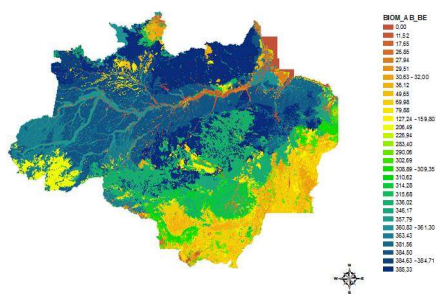


Highway department (DNIT) map showing the extension of BR-230 across the Trans-Purus region. (Source: DNIT (2002))

LOST ECOSYSTEM SERVICES



The Amazon forest holds a huge carbon stock both in the trees and in the soil. This carbon can be released to the atmosphere as greenhouse gases either intentionally through deforestation or by tree mortality from droughts and fires that are expected to increase as a result of climate change. If this were to occur over a short period of years, the emission would be a critical factor in driving the climate system past tipping points leading to a runaway greenhouse.



Pre-1970 biomass in Amazonia. The blue area in the Trans-Purus region has high biomass and is still intact (Nogueira et al., 2015).



In 2014 the city of São Paulo was only a few days away from running completely out of water. The variation in rainfall that caused this (not a direct effect of Amazonian deforestation), when added to a loss of water vapor transported from Amazonia, and especially from the Trans-Purus region, would be catastrophic for Brazil. The Amazon forest also recycles water, supplying water vapor to the air that maintains rainfall, and consequently tropical rainforest, in the Amazon region. This water vapor is also transported to the São Paulo area by winds known as the “flying rivers.” Image: <http://g1.globo.com/sao-paulo/noticia/2014/05/entenda-o-que-e-o-volume-morto-do-sistema-cantareira.html>

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