

Carbon corridors between key biodiversity areas in the Dry Chaco

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Abstract

Climate Change and the Global Biodiversity crises are the two biggest environmental threats for societies, with deforestation at the core of these processes. The Chaco, a tropical dry forest in South America, is a global deforestation hotspot with high rates of CO₂ emissions and an urgent need for protection. As means for conservation are limited, conservation approaches must be designed in a way that they will contribute to the mitigation of both pressing challenges at the greatest extent possible. Two possible approaches are the protection of areas that are important for biodiversity and rich in carbon, or the implementation of corridors with high carbon densities that interlink these areas.

In my thesis, I compared key biodiversity areas of the Chaco with their interlinking corridors regarding their carbon stocks and importance for landscape connectivity. To do so, I predicted aboveground carbon based on multi-annual remote-sensing data and biomass samples, followed by the computation of connectivity and the identification of corridors through a least-cost path analysis.

The comparison of carbon stocks between key biodiversity areas and corridors at the ecoregion scale showed a general suitability for maximizing conservation benefits through the protection of identified key areas for biodiversity when the interlinking corridor network was narrow. Carbon corridors outcompeted key biodiversity areas regarding their potential to maximize conservation benefits at wider widths. A comparison per biodiversity area, however, showed differences in this relationship and highlights the importance of a conservation design that considers areas individually. The inclusion of landscape connectivity highlighted the importance of biodiversity areas at the landscape scale and provided important knowledge for decision makers. My thesis highlights the Chaco's potential for its contribution towards global efforts in the mitigation of Climate Change and the Global Biodiversity Crisis.