

Restoration Priorities in Huila, Colombia

Kellee Koenig, David Hunt, Kristen O'Shea, Kevin Ocampo, and Margot Wood

Conservation International



Study area



Sierra Nevada de Santa Marta, Colombia

Introduction

Coffee is a globally-traded commodity with worldwide demand estimated to double or triple by 2050 (Bariyo & Dunn, 2016). Land cover changes in coffee growing regions due to expansion pressure from increasing demand are further exacerbated by climate change, as coffee-suitable areas are shifting, often to higher elevations which may be currently forested (Bunn et al., 2015). With the recent attention towards nature and sustainable land management strategies as a critical component of climate change mitigation, restoration is becoming an increasingly important strategy to maximize carbon sequestration and other key ecosystem services (Strassburg et al., 2020). Forest restoration areas and priorities can vary within a landscape depending on whether active or assisted natural regeneration is planned, and which benefits are most desired (e.g. only maximizing carbon sequestration vs additional benefits like improving downstream water quality).

Conservation International is partnering with the Walmart Foundation to develop methods and tools to identify and map reforestation priority areas in coffee landscapes, with pilots in Colombia and Indonesia. These countries are two of the top five coffee producing countries and hold approximately 30% of global production (FAO, 2021). While each country has a unique coffee growing context, coffee in both countries

presents both a deforestation risk, and opportunity for reforestation and climate adaptation in already converted areas. These countries are also of interest to major coffee traders, roasters, and retailers with sustainable sourcing commitments. Colombia is a data-rich, highly organized coffee producing country with a goal of mitigating the risks of coffee-driven deforestation in post-conflict regions. Indonesia is a highly complex, decentralized context with a diversity of coffee production systems across multiple islands. Testing the coffee landscape restoration approach in these different contexts will help ensure it is applicable across multiple regions. The goal of this analysis is to facilitate stakeholder engagement to develop Forest Restoration Action Plans, with a tailored restoration priority map depending on stakeholder interests and opportunities.

The department of Huila, Colombia is a major coffee producer and one of two priority jurisdictions for this pilot. Led by in-country specialists, a workshop was held in June, 2022 to identify active restoration opportunities in Huila such as agroforestry. Expert and stakeholder engagement identified both which variables to include, and how to prioritize them for the analysis. The resulting map will be used to develop an action plan.

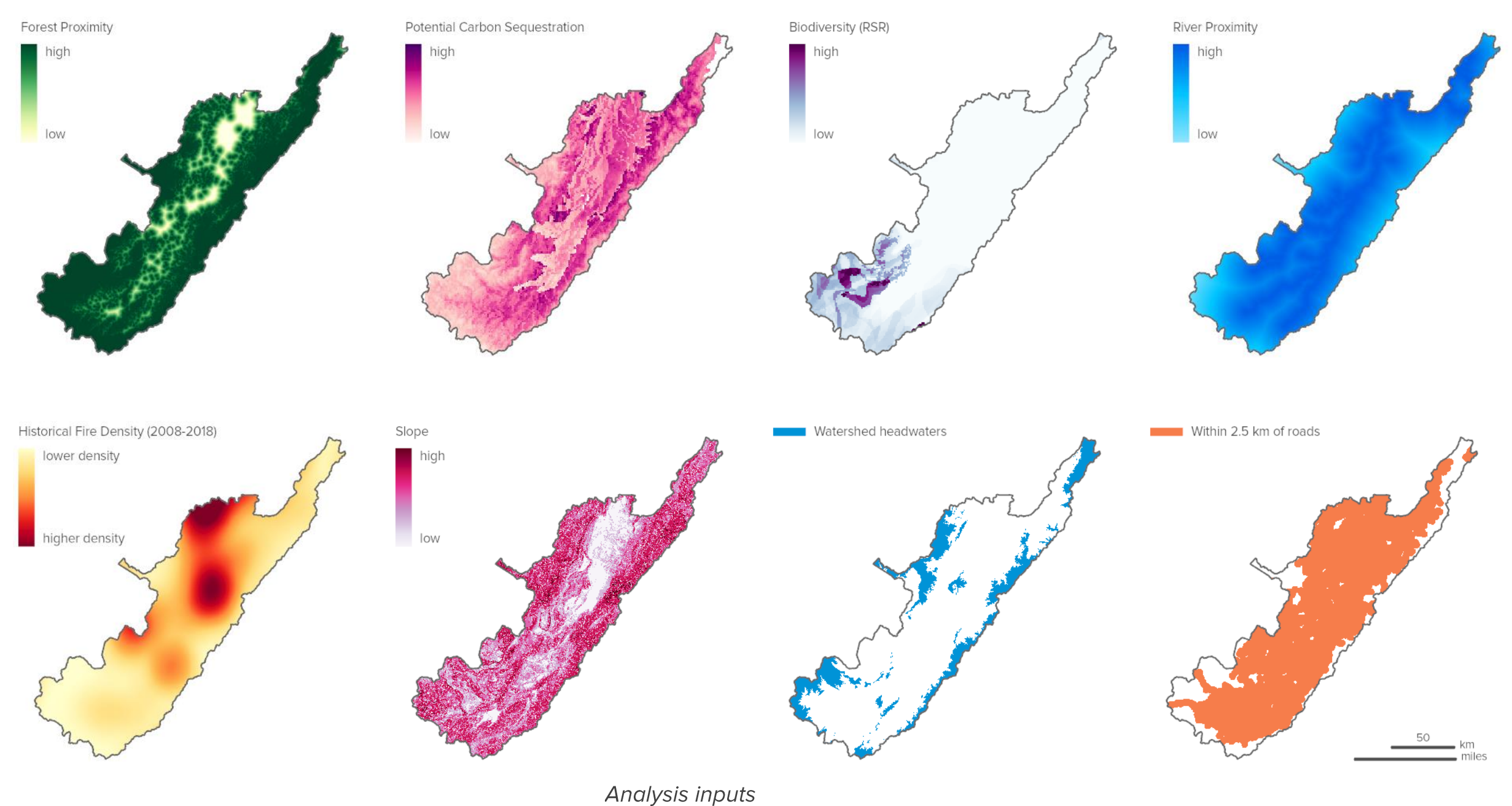
Methods

Working with local colleagues, we compiled and organized the most authoritative and relevant geospatial data around both biophysical (e.g. forest, biodiversity, water bodies) and socio-economic (e.g. protected areas, IPLC lands) variables. During the workshop, participants chose which variables to include, opting to remove most filtering layers (e.g. protected areas) to be as inclusive as possible at this phase.

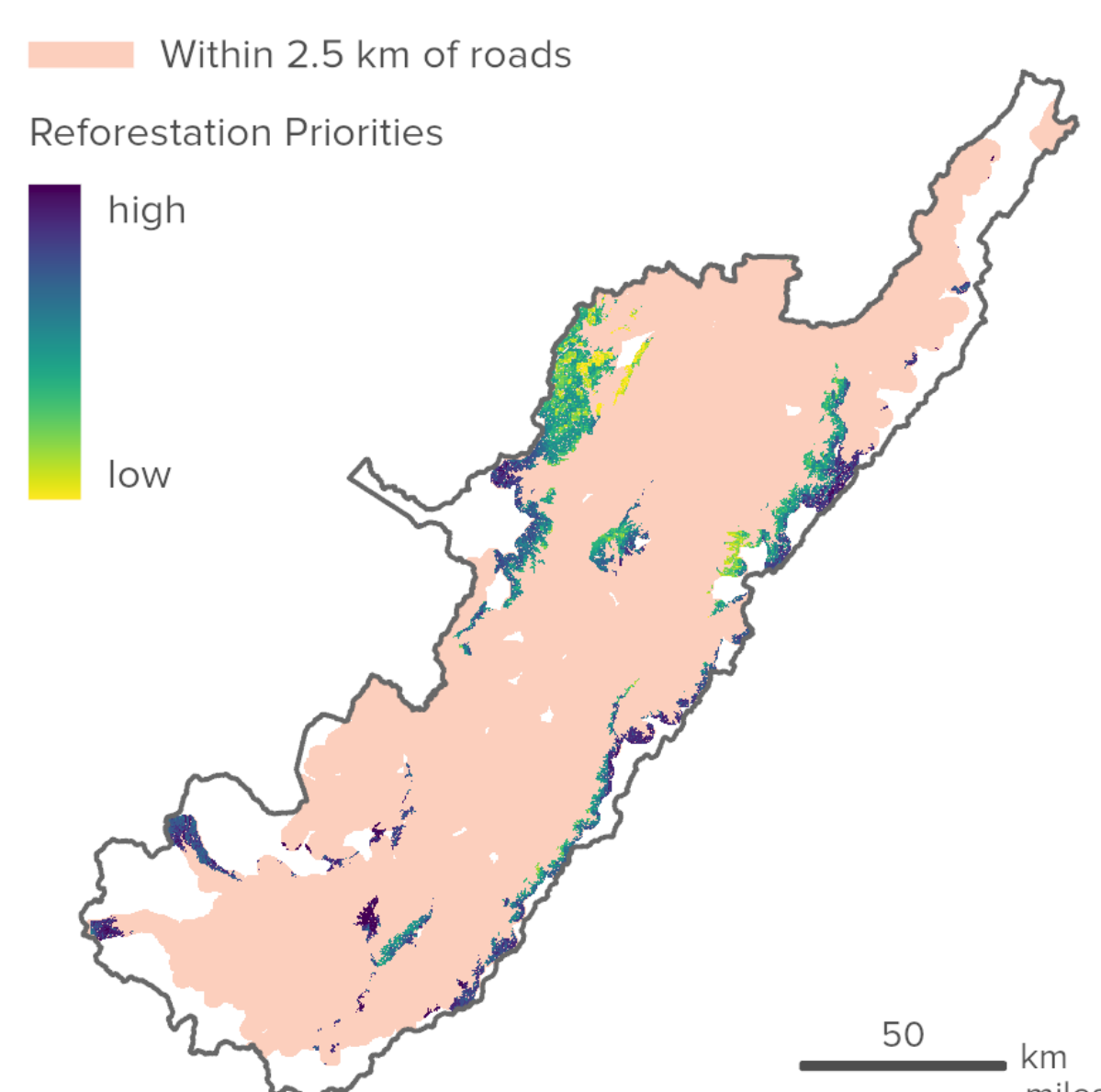
A distance from roads mask was applied since active restoration was determined to only be feasible within a certain distance (2.5 km) from roads. Each variable was clipped to the mask, and slopes in the region were reclassified into categories with $>30^\circ$ as highest priority. Watershed headwaters were identified as the top 20% by elevation of a given watershed and were included as an additional presence/absence mask.

All layers in this filtered extent were rescaled from 1–100 using the Rescale by Function tool. The layers were then combined using the Weighted Sum tool, with the criteria and weights chosen by the workshop participants shown below.

Criteria (1=low, 5=high)	Huila
Proximity to existing forest	5
Carbon sequestration potential	5
Species Range Rarity	4
Proximity to Riparian Areas	5
Fire frequency	4
Slope	4
Watershed headwaters	5



Analysis inputs



Restoration priorities in Huila, Colombia

Next steps

Due to the scale of the input data, the map serves as an initial screening stage to identify where localized engagement will provide more precise guidance for optimized restoration as part of the Restoration Action Plan. The map has use beyond the coffee sector, and the analysis can be modified for different actors based on their priorities.

Acknowledgements

This work was generously funded by the Walmart Foundation.

Citations

Bariyo & Dunn, (2016) U.S. Demand for Coffee is Expected to Grow, Wall Street Journal. <https://www.wsj.com/articles/u-s-demand-for-coffee-is-expected-to-grow-1477331665>

Bunn, C., Läderach, P., Ovalle Rivera, O. et al. (2015) A bitter cup: climate change profile of global production of Arabica and Robusta coffee. *Climatic Change* 129, 89–101. <https://doi.org/10.1007/s10584-014-1306-x>

Strassburg, B.B.N., Iribarrem, A., Beyer, H.L. et al. Global priority areas for ecosystem restoration. *Nature* 586, 724–729 (2020). <https://doi.org/10.1038/s41586-020-2784-9>