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# POTENTIALLY HARMFUL WORLDBANK PROJECTS ARE PROXIMATE TOAREAS OFBIODIVERSITY CONSERVATION IMPORTANCE

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Conflict of interest:

The authors declare no conflicts of interest.

Code and data availability:

Links to the data used in analysis and the code to create the data layers and conduct the statistical analysis can be found here https://github.com/joffy2/WB_paper_public.

# Abstract

For many countries in the global south the World Bank is a key funder of development. A subset of the activities it funds have the potential to cause harm to biodiversity. Currently, however, little is known about the spatial coincidence of Bank-funded projects and important areas for biodiversity. Using a dataset of World Bank projects funded between 1995-2014, we examine the relationship between potentially harmful project activities and the ranges of globally threatened birds, mammals, and amphibians, Key Biodiversity Areas, protected areas, and biodiversity hotspots. We find that 5 by 5 km cells containing a project activity are more likely to contain a Key Biodiversity Area, or a biodiversity hotspot, and have on average greater richness of globally threatened species, than those without. This relationship was statistically significant even after considering human population and country-level socio-economic effects except in the case of Key Biodiversity Areas. We also found limited evidence that activities are systematically placed within countries to avoid the ranges of threatened species or Key Biodiversity Areas. By contrast, we found a negative relationship between project activities and protected areas globally and within most countries, which may be evidence that potentially harmful activities are placed to avoid protected areas. Our findings raise questions about whether the Banks environmental safeguards have adequately translated into avoidance of highly diverse areas. Given the size of the World Bankõs lending portfolio and its role i concerning for conservation efforts.



Keywords: World Bank, Development, Aid, Biodiversity conservation, Spatial analysis

# 1. Introduction

Human activity is driving a global biodiversity crisis (Díaz et al., 2019). Land use change and associated pressures from development are contributing to reductions in the abundance and diversity of biological communities (Newbold et al., 2015). Agricultural expansion and intensification, resource extraction, and the construction of infrastructure (here all grouped together as "development"), are some of the biggest drivers of biodiversity loss (Maxwell et al., 2016). Simultaneously there is a crisis of global inequality and poverty which will require substantial development to be adequately addressed (UN, 2015). This has implications for biodiversity as increased demand for agriculture and forestry products (Marques et al., 2019), metals and minerals (Sonter et al., 2018), and rapid infrastructure expansion (zu Ermgassen et al., 2019), are all expected in the coming decades.

A key mechanism of global development is the flow of money from wealthier to poorer countries as loans and grants (Tierney et al., 2011). The World Bank (hereafter the single largest source of this development finance, distributing billions of dollars each year (US$ 49 billion in 2019) with the aim of ending extreme poverty and promoting shared prosperity (World Bank, 2019a). In practise this means funding development projects in low- and middle-income countries, many of which, particularly in the tropics, are also home to high levels of biodiversity (Reed et al., 2020; Sachs et al., 2009). Many of the development activities that the Bank finances have the potential to negatively impact biodiversity (Buchanan et al., 2018), for example, mining and resource extraction (Sonter et al., 2018), roads and linear infrastructure (Laurance et al., 2009), energy infrastructure (Gibson et al., 2017) and agricultural expansion and intensification (Henry et al., 2019). For example, roads and linear infrastructure can cause habitat loss and fragmentation creating barrier and edge effects (Benítez-López et al., 2010), increase mortality of wildlife from collisions with vehicles (Ahmed et al., 2014), and increase hunting pressure when remote areas are easier to access (Yackulic et al., 2011).

The Bank has historically faced criticism for the severe negative environmental impacts of certain projects it has funded (Wade, 1997) and campaigns driven by conservation organisations have previously secured reforms at the Bank (Park, 2010). Given the proven ability of

environmental non-governmental organisations to influence the Bank, the size of its lending portfolio, the highly biodiverse regions it operates in, and the potential negative impacts of the activities it funds, understanding the potential risk from Bank-funded projects is important for informing conservation (Morley et al., 2021).

The risk to biodiversity conservation from Bank funded development is currently unclear. If the Bankõs funding enabled projects to go ahead, that would not otherwise have gone ahead, it might accelerate or increase threats to biodiversity in the areas that it operates. However, the Bank has long positioned itself as a leader in sustainable development, with stringent environmental safeguards that aim to minimise as much as possible the negative environmental impacts of the activities it funds (Park, 2010). If these safeguards help to increase environmental protections relative to a counterfactual scenario in which the development went ahead anyway, funded from other sources, the net effect of Bank involvement could be positive for the environment. There is currently little empirical evidence about the true impact of World Bank funding on conservation outcomes (Buchanan et al., 2018; Runfola et al., 2017; Zhao et al., 2017). An important first step to understanding the risk presented by Bank-funded development is to assess the spatial congruence between Bank-funded projects and areas of importance for biodiversity conservation.

To address this, we examined the co-occurrence of potentially harmful Bank funded development activities and areas important for biodiversity conservation both globally and within countries. We examined all projects with a potential for environmental harm (including, for example, those involving building infrastructure but not those focused on education) funded between 1995-2014, and made a spatial statistical comparison to four conservation metrics: the presence of protected areas (PAs), Key Biodiversity Areas (KBAs), and biodiversity hotspots (hotspots), and the ranges of globally threatened birds, mammals, and amphibians (here after õspeciesõ).

We undertake the analysis at the global and national levels. At the global level we are interested in the relationship between projects and the conservation metrics as an indicator of the extent

of exposure and possible risk to important and sensitive biodiversity from potentially harmful Bank-funded activities. A positive relationship at the global scale could reflect the fact that countries that have a need for Bank funded interventions are also home to important and sensitive biodiversity. We are not suggesting that spatial associations correspond to a causal link between activities and the conservation metrics. Examining the within-country relationship allows for the fact that projects that take place within a country must (due to the necessity of development) be located somewhere. At the national level we are interested in whether there is any evidence of a negative relationship. This could be an indication that potentially harmful activities are systematically placed to avoid a countryõs imporequirement of the Bankõs environmental safeguard