Effectiveness of Ecosystem Restoration Concessions and Protected Areas in Avoiding Forest Fires in Indonesia from 2017 to 2021

Anna Wenzel, Master Thesis

Abstract

Indonesia's diverse forests are threatened by frequent and extensive fires, primarily originating from commodity-driven clearance and land management. This thesis investigates forest fires across two area-based conservation interventions – protected areas and Ecosystem Restoration Concessions – in Sumatra and Kalimantan between 2017 and 2021. It evaluates their effectiveness in avoiding forest fires relative to unprotected areas through a quasi-experiment using matching prior to regression and assesses potential spill-over effects in adjacent buffers.

The findings revealed substantially lower forest fire rates in the interventions, particularly in protected areas. Both interventions had an effect of around three percent of avoided forest fires relative to unprotected land. Despite needed improvements, both can be seen as valuable tools to mitigate forest fires. The buffers showed extreme forest fire detections under El Niño conditions, but also an overall effect in avoiding forest fires. Investigating occurred and avoided fires, also in their surroundings, complements evaluations of conservation action.

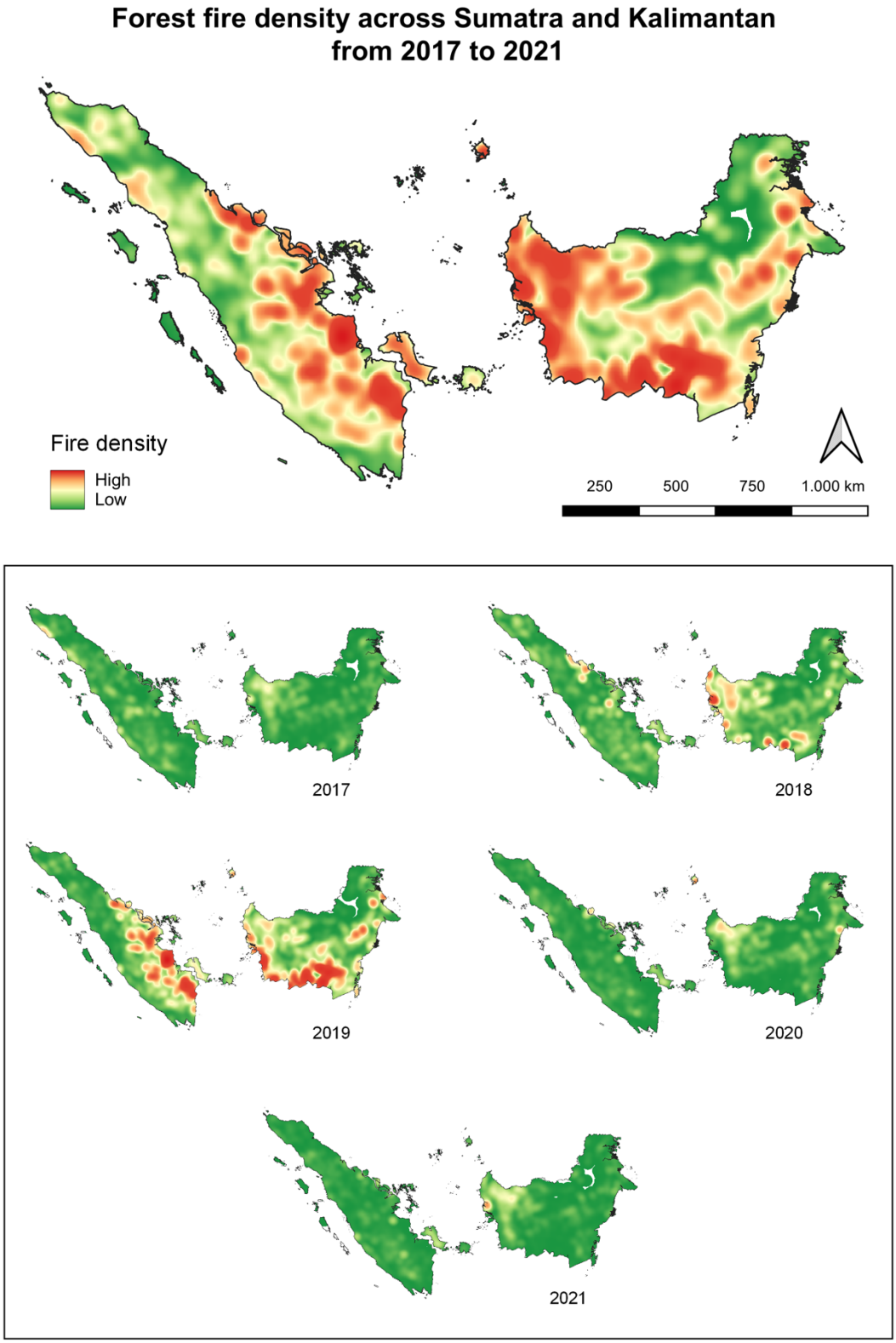

Fig. 1. Density map of forest fires across Sumatra and Kalimantan from 2017 to 2021, including yearly forest fire density maps. Source: Own representation based on VIIRS Active Fire data (NASA FIRMS, 2022; Schroeder et al., 2014) and GADM (2018).

Treatment	Treatment Effect	Confidence Intervals		Standard Error	P-values
		2.5%	97.5%		
ERC	**- 0.0303**	- 0.0391	- 0.0214	0.0045	2.47e-11 ***
ERC buffer	- 0.0280	- 0.0343	- 0.0217	0.0032	< 2e-16 ***
PA	**- 0.0290**	- 0.0311	- 0.0269	0.0011	< 2e-16 ***
PA buffer	- 0.0127	- 0.0148	- 0.0107	0.0010	< 2e-16 ***

Fig. 2. Estimated treatment effects of the treatment groups in avoiding forest fires relative to never protected areas. Source: Own representation