

Supplementary Materials

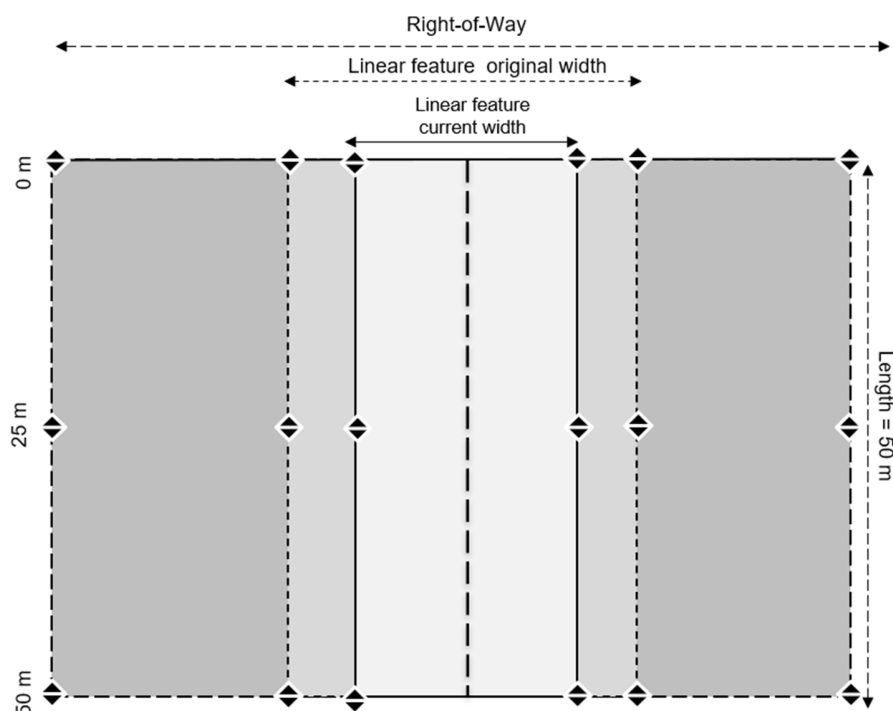


Figure S1: Field inventory plot design used to reconstruct the centerlines (Dimensions: 50m*clearing width).

Table S1: Hyperparameters (ranges and types) and their definitions

	Hyperparameter	Description	Type	Start	End	Default
<i>mars</i>	degree	Number of retained terms	Integer	1	3	1
	nprune	Degree of interactions	Integer	2	100	8
<i>km</i>	k	Number of neighbors	Integer	5	20	7
	distance	Metrics to measure the distance between observations	Integer	1	5	2
	kernel	types of kernel functions	Nominal	Rank, cos, inv, Gaussian, optimal.	-	-
<i>rf</i>	mtry	Number of variables to randomly sample	Integer	1	3	\sqrt{p}

		as candidates at each split					
gbm	ntree			Integer	250	3000	500
	shrinkage			Numeric	0.001	0.1	0.001
	interaction.depth	Maximal depth	tree	Integer	1	9	1
	n.minobsinnode	Minimal node size	terminal	Integer	1	10	20

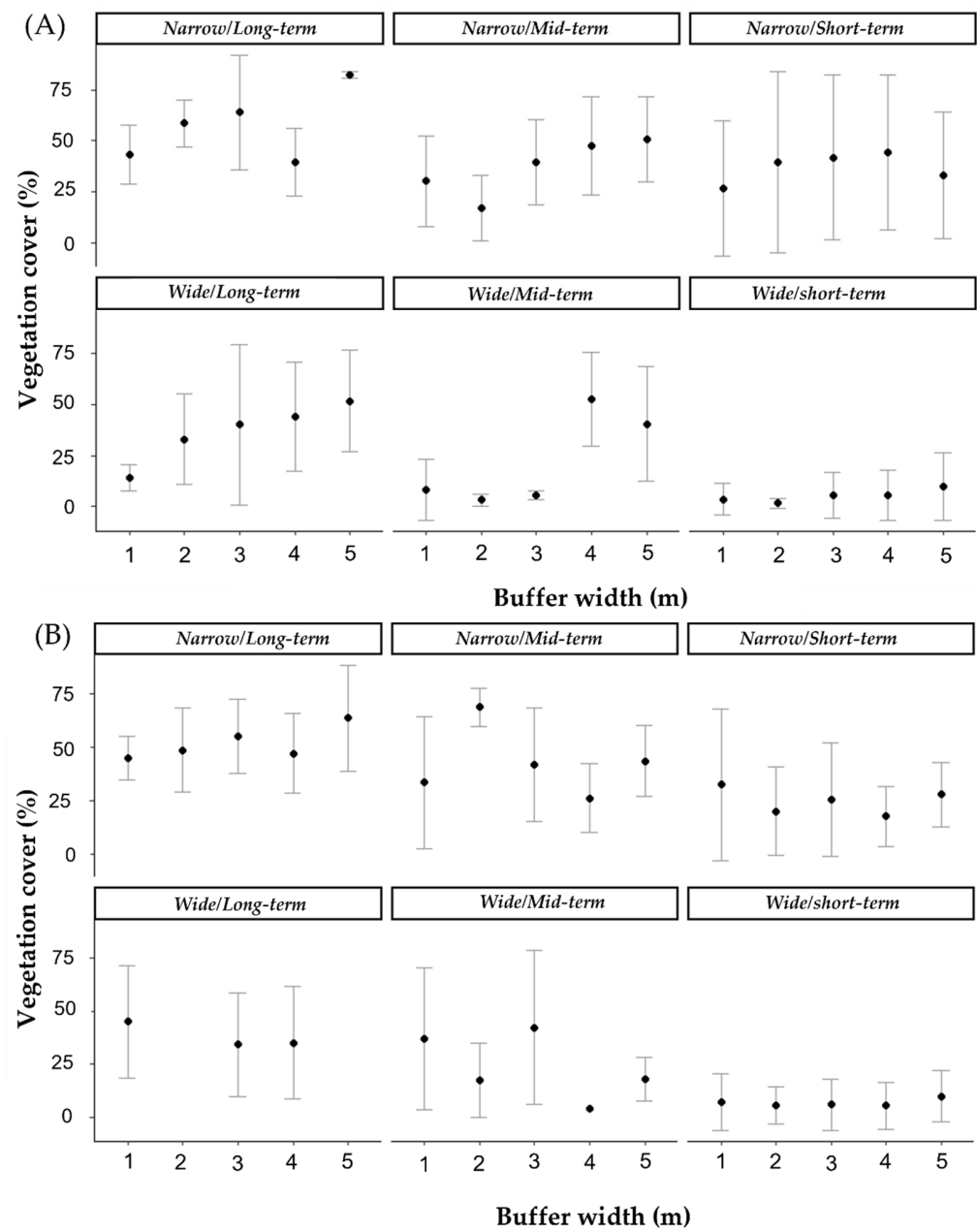


Figure S2: (A) Summary of vegetation cover predictions (means and means +/- standard deviation error bars) grouped by different forest road categories and timeframes, from cross-validated *rf* model ($R^2=0.69$, $RMSE=18.69\%$) recorded within the multi-buffers around the road centerlines, across forest road

types (wide roads and narrow forest roads) for the post-clearing timeframes: > 20 YPC (long-term, black boxes), [10–20] YPC (mid-term, dark grey boxes), and [0–10] YPC (short-term, light grey boxes). (B) Vegetation cover mean predictions using independently-validated *rf* model ($R^2=0.62$, $RMSE=20.29\%$) across forest road types and post-clearing timeframes.

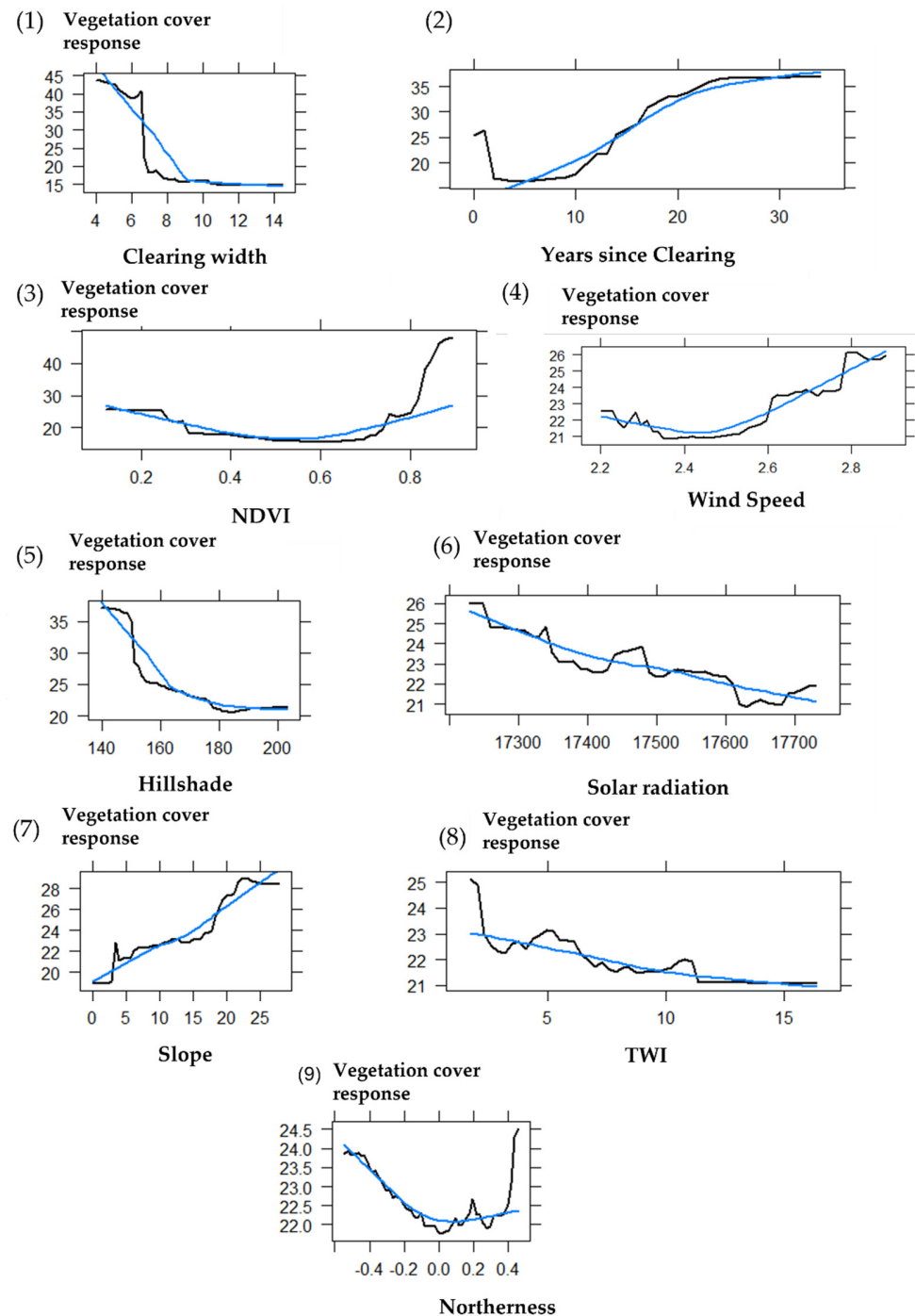


Figure S3: *rf*-based Partial dependence plots (black curves) showing impacts of single factor on vegetation cover when all remaining factors are constant. Smooth curves are shown in blue.