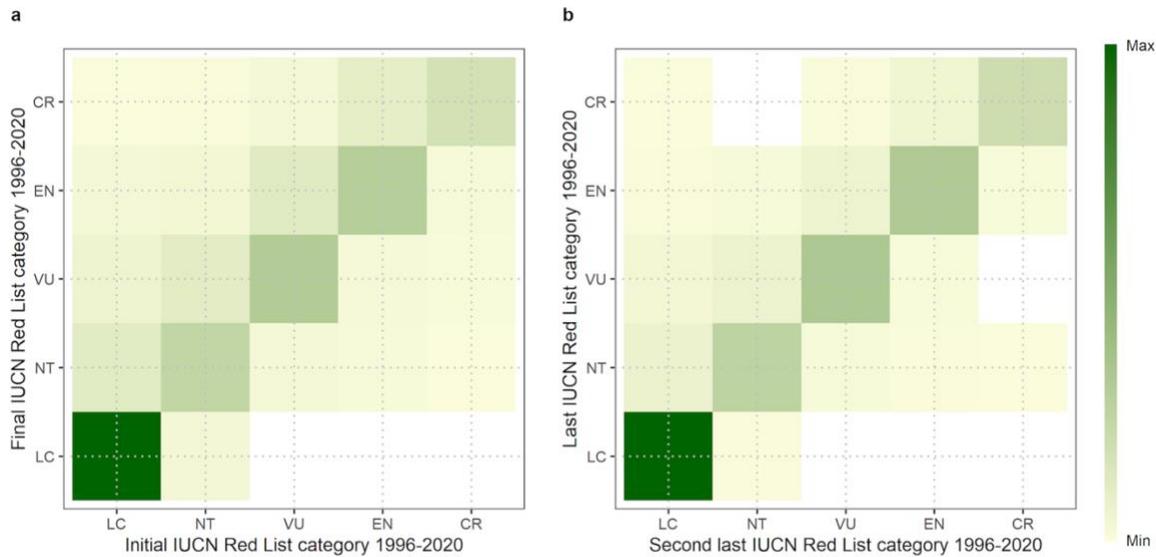


Supplementary information

Matrix condition mitigates the effects of habitat fragmentation on species extinction risk



Supplementary Fig. 1. Transition matrix of extinction risk categories for terrestrial

mammals between 1996 and 2020. a Shows the transition matrix of the initial and final Red

List category reported between 1996 and 2020. **b** Shows the transition matrix of the second last

and last Red List category reported between 1996 and 2020. The colour scheme represents the

relative frequency of individual species in each transition. Acronyms refer to the IUCN Red List

categories, including Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered

(EN), and Critically Endangered (CR). The relative frequency was arcsine square-root-

transformed for visual purposes and to avoid variance instability when handling proportions

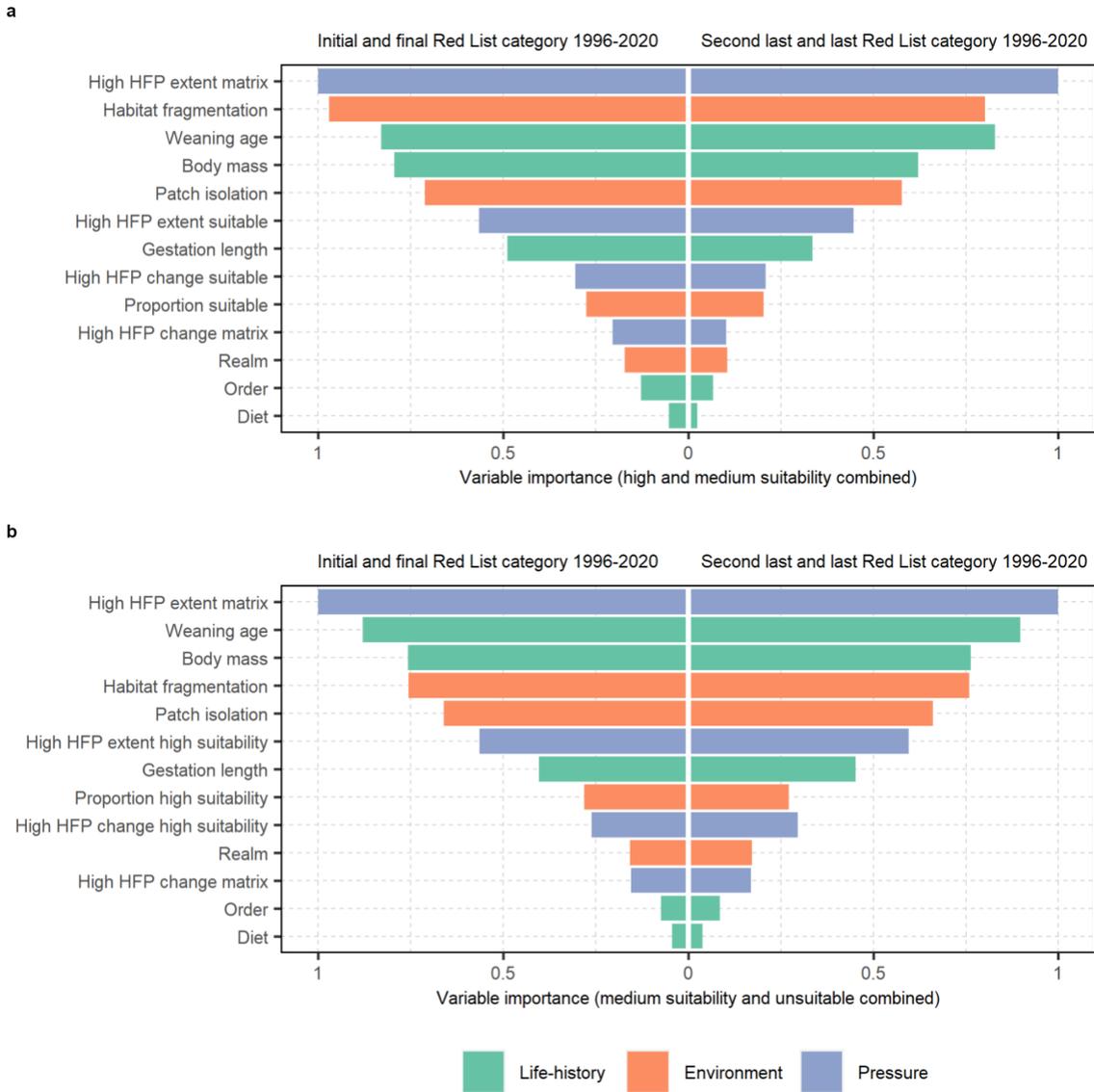
close to zero.

Supplementary Note 1. Changes in species threat status. To test the sensitivity of the

transitions in species extinction risk, we also classify species based on the last two Red List

assessments registered during the study period (i.e. the second last and last Red List categories

between 1996 and 2020). When classifying extinction risk transitions with the initial and final Red List categories, we found that 4,029 (93.1%) species retained the same Red List category and 298 (6.9%) changed through time. With this classification, we found that 2,907 (67.2%) species faced a low-risk transition and 1,420 (32.8%) a high-risk transition (see Fig. 1 of the main manuscript). When classifying extinction risk transitions with the last two Red List assessments registered during the study period (i.e. the second last and last Red List categories registered between 1996 and 2020), we found that even more species held the same Red List category (97.3%) and a minor part of them changed over time (2.7%). While 0.4% more species faced a low-risk transition, 0.8% less species faced a high-risk transition relative to the classification of the initial and final Red List categories.

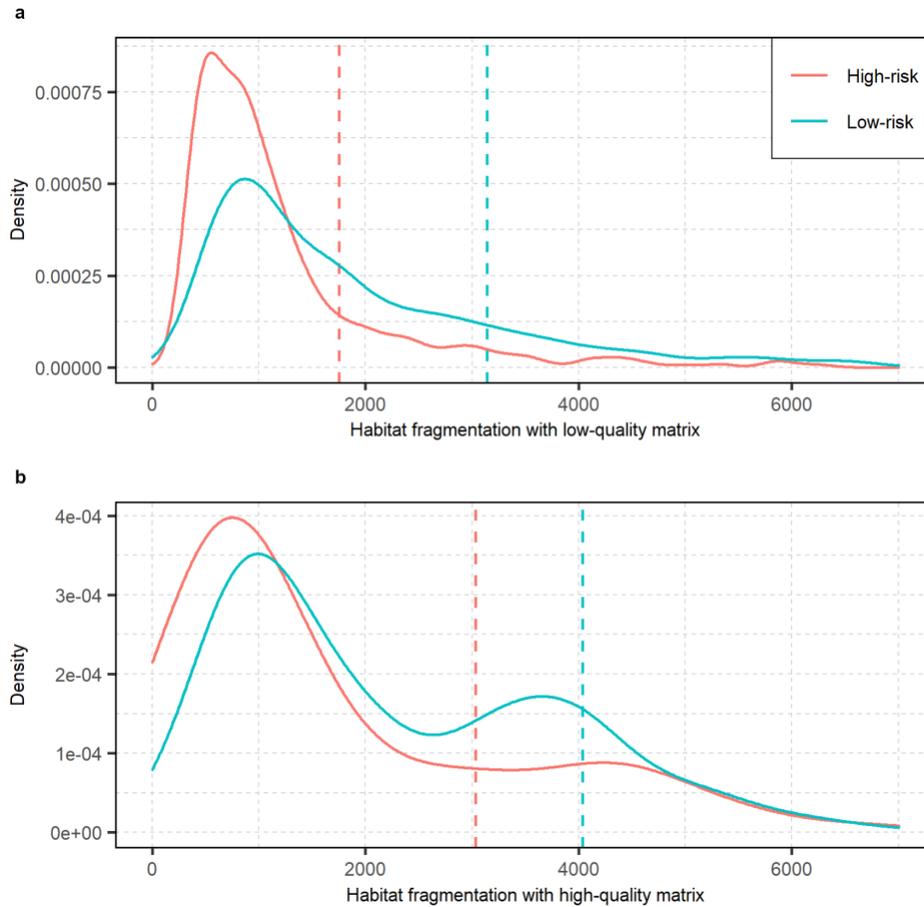


Supplementary Fig. 2. Sensitivity analysis of selected variables for the prediction of extinction risk transitions in terrestrial mammals. a Shows the relative importance of each predictor when the extent of suitable habitat was represented by high and medium habitat suitability combined and the extent of the matrix by ‘unsuitable’ habitat alone. **b** Shows the relative importance of each predictor when the extent of suitable habitat was represented by high habitat suitability and the extent of the matrix by ‘unsuitable’ habitat and medium habitat suitability combined. Top-left and bottom-left plots show the relative importance of each

predictor when transitions in species extinction risk were classified based on the initial and final Red List category between 1996 and 2020. Top-right and bottom-right plots show the relative importance of each predictor when transitions in species extinction risk were classified based on the second last and last Red List category between 1996 and 2020. Variables are colour-coded according to their broad class (life-history, environment, and human pressure). The description of each variable is given in the Table 2 of the main manuscript. High levels of the human footprint (HFP) included values of 3 or above.

Supplementary Table 1. Cross-validation results of the Random Forest models for the prediction of extinction risk transitions in terrestrial mammals. The cross-validation was performed in terms of proportion of correctly classified species (accuracy), proportion of correctly classified high-risk species (sensitivity), proportion of correctly classified low-risk species (specificity), and the true skill statistic (TSS = sensitivity + specificity – 1). *Indicates that the classification routine was built based on the initial and final Red List category between 1996 and 2020. †Indicates that the classification routine was built based on the two most recent Red List categories (second last and last Red List category) during the same time period.

Model	Accuracy (%)	Sensitivity (%)	Specificity (%)	TSS
Extinction risk transitions ~ High and medium suitability combined*	82.0	61.7	84.4	0.5
Extinction risk transitions ~ High and medium suitability combined†	82.0	59.6	83.8	0.4
Extinction risk transitions ~ Medium suitability and ‘unsuitable’ combined*	81.4	60.7	84.0	0.4
Extinction risk transitions ~ Medium suitability and ‘unsuitable’ combined†	80.7	56.6	82.7	0.4



Supplementary Fig. 3. Distribution of the degree of habitat fragmentation as a function of

the quality of the matrix within mammal species ranges. a Shows the distribution of habitat

fragmentation with low-quality matrix, which included species with proportions $\geq 50\%$ of the

extent of their matrix overlapping with high human footprint values ($n = 2,529$ low-risk species

and 1,250 high-risk species). **b** Shows the distribution of habitat fragmentation with high-quality

matrix, which included species with proportions $< 50\%$ of the extent of their matrix overlapping

with high human footprint values ($n = 341$ low-risk species and 111 high-risk species). Low

values of habitat fragmentation, as defined by the average Euclidean distance into suitable

habitat for each species, represent more highly fragmented habitat, whereas high values represent

less-fragmented habitat. Different lines refer to species in the low-risk group or high-risk group,

as reported in legend. Dashed lines denote mean of distributions. High human footprint included values of 3 or above.