

# Spatial predictions of bird species distribution as regional essential biodiversity variables (SD EBVs): a bird perspective in Swiss Alps

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## Abstract

This study aims at examining the applicability of a novel approach based on species distribution models (SDMs) to establish spatial predictions of EBVs for birds based on bird diversity metrics such as the distributions of properties of key bird habitats. A major objective of this study is to build bird SDMs which can be used to derive spatial EBVs for bird species at a regional scale. We used as predictors 16 environmental variables that are known to be ecologically meaningful for birds at 100 m spatial resolution, including two bioclimatic variables (Bio17 = precipitation of driest quarter and Bio7 = temperature annual range) for three periods of ‘current’, ‘future 2050’, and ‘future 2070’, eleven land-cover (land use) predictors, the normalized difference vegetation index (NDVI), and two topographic variables (slope and topography). We used multiple modeling techniques to build presence-only SDMs relating bird presence to environmental features of each species. Here, we show that the suitability estimated according to the SDMs can be used as a spatial ‘species distribution’ EBV (SD EBV) and reflect the habitat quality and trends in land use and climatic impacts on populations of bird species. These developments could facilitate monitoring of bird species across space and time, ultimately helping to identify priority conservation areas, estimate habitat suitability and provide early warning signs regarding bird distribution trends. In general, bioclimatic variables, topography and forest structure were identified to have important ties to the species probability maps generated on the basis of the SDMs, signifying a dominant role of bioclimatic variable Bio17 in the development of habitat suitability patterns. Keywords: Essential biodiversity variables, species distribution modelling, species distribution essential biodiversity variables (SDEBV), bird species, Swiss Alps

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