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Conference Abstract

Bridging ecological concepts, policy needs, data science and digital innovation with Essential Biodiversity Variables (EBVs)

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Abstract

The concept of Essential Biodiversity Variables (EBVs) for monitoring changes in biodiversity and tracking policy goals has substantially advanced in the last decade. I synthesize crucial information for developing an integrated European-wide biodiversity monitoring framework using EBVs to better inform environmental policies. This includes an overview of which EBVs have been prioritized for a modern and efficient European biodiversity observation network (Junker et al. 2023) and how these EBVs link to the EU policy framework and to different types of monitoring methods (Kissling et al. 2024). Generating EBVs requires designing and developing workflows for integrating primary observations from multiple data streams into aggregated and harmonized datasets that can then be modelled to derive spatially explicit EBV products with a specific spatial and temporal resolution (Kissling et al. 2018, Fernández et al. 2020). This requires information on

1. data collection and sampling,
2. data integration, and
3. modelling for each EBV (Fig. 1).

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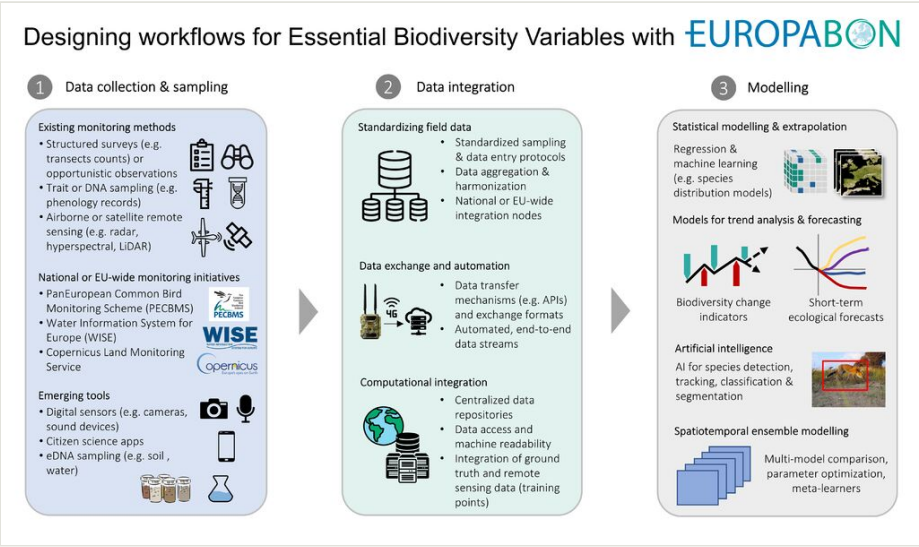

Figure 1. doi

Example of important workflow components for generating Essential Biodiversity Variables (EBVs) in the context of an EU-wide biodiversity observation network (from Kissling and Lumbierres (2023)) .

To achieve this at a European scale, an improved data coverage, enhanced transnational coordination, adoption of advanced monitoring technologies, and a digital infrastructure with open data and interoperable standards is needed (Kissling et al. 2024, Moersberger et al. 2024, Morán-Ordóñez et al. 2023, Santana et al. 2023). To develop an effective EU-wide spatial sampling design, existing monitoring sites need to be incorporated, and spatial gaps need to be filled to achieve a broad representation of European biodiversity. This can be accomplished by combining a stratified random selection of sites (e.g. grid cells) across Europe with local sampling designs that consider randomisation, replication and stratification and co-location of monitoring activities using various field survey methods (Kissling et al. 2024). This can ensure a representative sampling across different environments, human impacts and policy or management interventions. Close collaborations between ecologists, data scientists, monitoring practitioners, and national and EU bodies, and the adoption of open science practices and FAIR guiding principles will be crucial to advance EBV implementation at a continental scale. This will support the establishment of a European Biodiversity Observation Coordination Centre (EBOCC) that is proposed for the coordination of monitoring activities and data management across Europe (Liquete et al. 2024).

Keywords

biodiversity monitoring, co-location, data cubes, data interoperability, ecosystems, environmental policy, indicators, informatics, metadata, research infrastructures, sampling design, workflows

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Conflicts of interest

The authors have declared that no competing interests exist.

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