

Abstract for the general public

Wildlife monitoring is critical for comprehending, reacting to and halting the current biodiversity crisis. Recent advances in biodiversity sensing, such as camera trapping, image classification technologies, citizen-science platforms and machine learning, provide cost-effective wildlife monitoring; however, there are still some bottlenecks, such as the high costs of manual image reviews and the lack of automated workflows. These constraints have hampered our ability to innovate and harmonise methods and tools for collecting and managing biodiversity monitoring data and take timely conservation and management actions.

We will develop a scalable monitoring framework that includes harmonised and reproducible procedures across the data cycle, from capturing images to big-data processing, annotation, sharing, and downstream estimation of Essential Biodiversity Variables. We will test this system in four study areas representative of different ecosystems and European biogeographical regions: Tatra National Park (S Poland), Doñana National Park (SW Spain), Hardangervidda National Park and nearby areas (S Norway) and the Oder river delta (German-Polish border). We will combine camera trapping, citizen science, artificial intelligence and hierarchical modelling to obtain unbiased estimates of species populations and community dynamics that will enable the development of spatially comprehensive Essential Biodiversity Variables data products and indicators of biodiversity changes in an automatized manner. Our project will generate products that any stakeholder can reuse. These products include, among other things, the IT infrastructure required to process the images and translate them to Essential Biodiversity Variables and other biodiversity-related statistics, as well as four artificial intelligence systems tailored to the four study areas easy to use and that can be re-trained for new sets of species or systems. We will disseminate our results in real-time through a project-dedicated website and application and will mobilise the data through the Global Biodiversity Information Facility. We will provide supporting tools and capacity building to facilitate the application of the monitoring system to other areas and upscaling, helping mobilise and optimise existing data and nurture camera trap projects.

Our experienced Consortium of five research groups includes experts from ecology and conservation biology, mathematics, computational sciences, and big data management, from across Europe and beyond. This will ensure a highly interdisciplinary and advanced scientific environment to achieve the project goals. We combine the Consortium's skills with a solid collaboration network with stakeholders and policymakers, which is critical for implementing and scaling up the developed monitoring framework. This project will contribute to European scientific excellence and capacity building by providing scientists, managers, and policy makers with a biodiversity research and monitoring tool to generate critical knowledge, support accurate assessments and predictions, and implement evidence-based and timely management strategies.