



MODERN APPROACHES
TO THE MONITORING
OF BIODIVERSITY

MAMBO Newsletter 2024

As MAMBO celebrates its second anniversary, this newsletter provides insights into our recent achievements, including participation in conferences and events, new publications, and important updates!

MAMBO's Second Anniversary



From 17 to 19 September, all MAMBO partners gathered for the second annual project meeting in Leipzig for three days of updates, workshops and celebration of all the hard work in the past year. **This September, MAMBO celebrated its second birthday!**

[Read more](#)

MAMBO Policy Brief

MAMBO's contribution to the development of the European Biodiversity Observation Coordination Centre (EBOCC)

[Read the full brief](#)

MAMBO Modern approaches to the monitoring of biodiversity [mambo-project.eu](#) [@MAMBO_EU](#) [Mambo project](#) [@mamboproject](#)

POLICY BRIEF

MAMBO's contribution to the development of the European Biodiversity Observation Coordination Centre (EBOCC)

Toke T. Heye, Pavel Stoev, Pierre Bonnet, W. Daniel Kissling



INTRODUCTION

The biodiversity monitoring data in Europe, which is currently available, is insufficient to generate knowledge that enables development and deployment of well-targeted actions to tackle the drivers of biodiversity loss, in a cost-effective manner and at different spatial scales. This stems from the insufficient spatial and temporal resolution of current monitoring programmes, but also from limitations in access to such data. Together this challenges efforts to quantify the state and trends of species and habitats and their dependence on the pressures exerted upon them. As such, current biodiversity assessments are based on information, which has substantial taxonomic, geographical, and temporal biases and gaps.



Novel methods and monitoring technologies can vastly expand the extent and resolution of biodiversity data. It is now possible to identify organisms from digital data such as images or sound recorded through citizen science projects or via in-situ sensors. Digital recorders (e.g. microphones, cameras, radars and other mobile and stationary sensors) together with artificial intelligence (AI) approaches have great potential for scaling up and automating the monitoring of ecological communities and wildlife species with less-invasive methods. Furthermore, new tools in the realm of high spatial resolution remote sensing have the potential to greatly enrich traditional approaches of ecological monitoring. Finally, the remarkable development of participatory approaches has led to the wider dissemination and use of automated identification tools based on multimedia content. MAMBO aims to increase knowledge and advance tools for monitoring species and their habitats more comprehensively.

Funded by the European Union

MAMBO receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101006039. This policy brief reflects only the author's view and the European Commission/REA is not responsible for any use that may be made of the information it contains.

MAMBO has released its first policy brief, showcasing its role in enhancing biodiversity monitoring and observation efforts across Europe. To disseminate it further, a press release about the essence of the policy brief has been distributed on two media channels:

[EurekaAlert!](#)

[AlphaGalileo](#)

MAMBO Publications Corner

- [Development of a cost-efficient automated wildlife camera network in a European Natura 2000 site. Basic and Applied Ecology](#)
- [AI Species Identification Using Image and Sound Recognition for Citizen Science, Collection Management and Biomonitoring: From Training Pipeline to Large-Scale Models](#)
- [A deep-learning framework for enhancing habitat identification based on species composition](#)
- [Can we harmonize the monitoring of plants and pollinators?](#)
- [Towards a standardized framework for AI-assisted, image-based monitoring of nocturnal insects](#)
- [Efficient Speech Detection in Environmental Audio Using Acoustic Recognition and Knowledge Distillation](#)

Visit MAMBO's website to access the complete list of project publications and deliverables.

MAMBO Outcomes

MAMBO Collection in RIO



This collection presents significant findings and outcomes from the project.

As the MAMBO project progresses, the RIO Collection will continue to expand, providing a valuable resource for researchers, policymakers, and practitioners.

[View here](#)

MAMBO at Events

International Congress of Entomology



MAMBO's coordinator, Tøke T. Høye, participated in the International Congress of Entomology (ICE 2024), held from 25 to 30 August in Kyoto, Japan. He delivered a presentation, titled “*Globally Standardised Species Monitoring with Insect Camera Traps and Deep Learning Models*”, and it highlighted the latest advancements in insect population tracking and the use of AI to enhance monitoring accuracy.

On behalf of MAMBO’s communication and dissemination partner, Pensoft Publishers, the project was represented at several key events across Europe, where MAMBO's policy brief was showcased.

International conference ‘Global warming's imprints on the elements of the climatic system’ – a side event of the 61st session of the IPCC



24 - 28 September 2024
Hisarya, Germany



53rd Annual Conference of the German Ecological Society



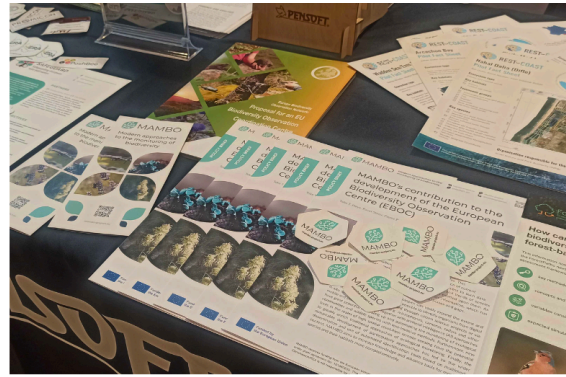
9 - 13 September 2024
Freising, Bavaria, Germany



World Biodiversity Forum



16 - 21 June 2024
Davos, Switzerland



World Biodiversity Forum

From 16 to 21 June in Davos, Switzerland, MAMBO took part in the 3rd World Biodiversity Forum (WBF), which brought together researchers, practitioners, and stakeholders to address critical issues in biodiversity conservation and sustainable transformation. A few MAMBO partners also participated in the event, contributing to discussions on advancing biodiversity preservation efforts globally.



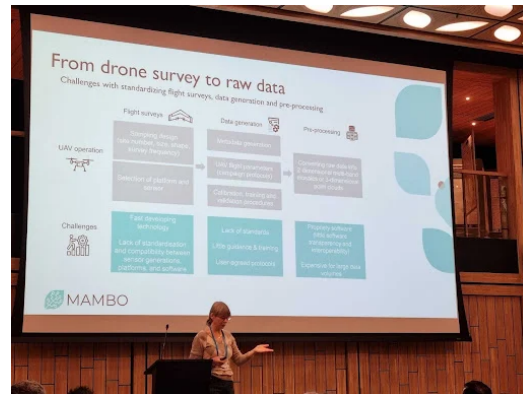
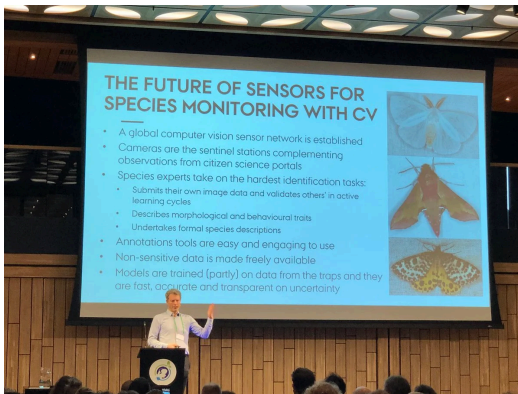
[Read more](#)

Solutions to Monitor Plants, Pollinators and Their Interactions in a Changing World

MAMBO partners Pierre Bonnet (CIRAD) and Alexis Joly (INRIA) participated in a conference on plant-pollinator interactions held on 23 May at the Collège de

France in Paris. They presented their research on how artificial intelligence can revolutionise plant biodiversity monitoring. Their talk highlighted the technological advancements of PI@ntNet, focusing on its application in conservation, particularly for analysing plant community images and developing new biogeographic models to predict species and habitat distribution on a large scale. The findings from their work have been published in the journal *New Phytologist*, allowing widespread dissemination of the methodologies proposed.

Empowering Biodiversity Research



In late March, the Naturalis Biodiversity Center in Leiden hosted the third Empowering Biodiversity Research (EBR III) conference, focusing on leveraging biodiversity data to inform policy decisions. MAMBO project representatives participated, showcasing the project's objectives and recent advancements.

[Read more](#)



Netherlands Annual Ecology Meeting

MAMBO member Rita Pucci from the Naturalis Biodiversity Center presented at this year's NAEM. The meeting was organised by the NERN Network and took place from 13 to 14 February in Wageningen. Her presentation focused on the development of AI models for species

recognition, showcasing innovative approaches to biodiversity research.

MAMBO Open Positions

Geospatial Data Engineer

The Geospatial Data Engineer will contribute to ongoing scientific work at Ecostack Innovations and participate in R&D activities based on their expertise and interests. They will also support innovation and policy efforts for national and EU biodiversity and climate risk projects, working alongside team members and collaborators.

[Read more](#)

MAMBO Updates

D2.1 Report on optimal positioning and linkage of MAMBO tools to KCBD and RI landscape

As part of the EU Biodiversity Strategy and Kunming-Montreal Global Biodiversity Framework, MAMBO is developing six innovative tools for species and habitat monitoring across Europe. These tools aim to enhance biodiversity monitoring by 2030 and ensure interoperability with existing Research Infrastructures (RIs).

Between May and October 2023, expert interviews with representatives from 66 RIs highlighted the importance of image and sound recognition tools, and the need for consistent data standards, API integration, and accurate GIS data to optimise the use of MAMBO's tools.

[Learn more](#)

D2.3 Deliver framework and its technical implementation of MAMBO tools and technology supporting EU Pollinator Initiative

The EU Pollinators Initiative (EU PI) addresses the critical decline in pollinator populations, setting ambitious goals for their protection and conservation by 2030. In support of this, MAMBO is developing innovative tools designed to monitor and enhance pollinator habitats. These tools offer advanced capabilities for real-time data collection and analysis, enabling more effective conservation efforts.

By aligning with the EU PI, MAMBO contributes to improving knowledge on pollinator health, tackling the causes of their decline, and fostering collaboration across Europe.

[Learn more](#)

D4.2 Assessment of interoperability and maturity for upscaling habitat condition metrics

The deliverable highlights key challenges in upscaling habitat condition metrics for Natura 2000 sites, focusing on data from airborne laser scanning (LiDAR) and unmanned aerial vehicle (UAV) remote sensing. Major issues include a lack of standardization in UAV surveys, inconsistent LiDAR dataset characteristics across the EU, and complexities in integrating deep learning with UAV and LiDAR data.

To overcome these obstacles, the report proposes creating a cloud-based virtual research environment (VRE) to enhance data discovery, access, and workflow execution. By leveraging existing EU infrastructures, this VRE aims to develop standards and best practices for data collection and processing, ultimately improving habitat monitoring and promoting sustainable resource use in the EU.

[Learn more](#)

D4.7 Open-source deep learning framework for habitat extent mapping

MAMBO has launched MALPOLON, the first version of an open-source framework developed by the project partner Inria for habitat extent monitoring. This framework focuses on mapping plant species composition using deep-learning based species distribution models (DeepSDMs), which can model the distribution of numerous species simultaneously by analysing high-resolution remote-sensing data.

MALPOLON is designed to be user-friendly, requiring only general Python skills for training and sharing DeepSDMs, making it accessible for a broader audience, including modeling ecologists. The framework is freely available on GitHub, complete with comprehensive documentation and usage examples.

[Learn more](#)

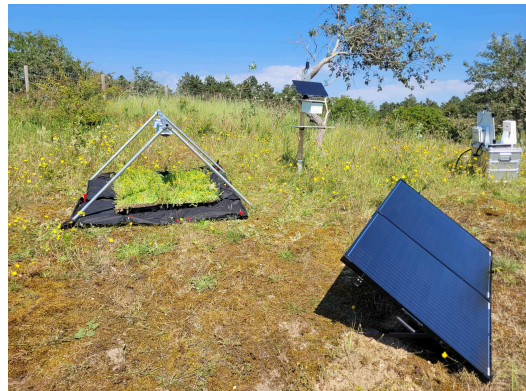
Field trip to Friedeburg at the AGM

During this year's annual general meeting in Leipzig, MAMBO members went on a field trip and visited the German demonstration site, Friedeburg. The field trip provided insights into the ongoing monitoring activities and offered a close-up look at local species and ecosystems.



Testing of tools at the Oostvaardersplassen Nature Reserve

MAMBO partners are actively testing the deployment of various digital sensors for biodiversity monitoring across several monitoring several demonstration sites across Europe. The photos highlight the deployment of insect cameras and drones at the Dutch demonstration site.



Field visit to the Strawberry Hill



MAMBO partners Dr. France Gerard and Richard Broughton from the UK Centre for Ecology & Hydrology presented new research at the UK demonstration site, Strawberry Hill. Their presentation introduced innovative methods for measuring habitat metrics, with a particular focus on assessing woody cover and shrub biomass in rewilding areas.

[Read more](#)



MAMBO partners from CIRAD and Inria take part in the XPRIZE Rainforest challenge

A joint team from two MAMBO partner organisations, CIRAD and Inria, collaborated with the Brazilian team, one of the six finalists in the XPRIZE Rainforest Challenge held in July in Manaus, Brazil. The event provided an

opportunity to test new capabilities of the PI@ntNet platform, which can now identify plant species from drone-captured visual data. This field experiment also facilitated the sharing of research results and methodologies with Brazilian partners, fostering collaboration for enhanced biodiversity monitoring in rainforest ecosystems.

Relevant News

EuropaBon's proposal for EBOCC

The final deliverable of the EuropaBON project, the proposal for the European Biodiversity Observation Coordination Centre (EBOCC), was officially released in May. This proposal is a step towards establishing a coordinated EU-wide biodiversity monitoring system that will deliver up-to-date data on Essential Biodiversity Variables (EBVs) to guide biodiversity protection and support policy decisions.

The EBOCC is meant to take a central role in coordinating existing biodiversity monitoring efforts, addressing data gaps, and promoting collaboration across various monitoring actors, while integrating and harmonising biodiversity data. It will serve as a key interface between national and international biodiversity monitoring hubs and EU institutions.

For full details on EBOCC's goals, structure, and implementation plan, access the proposal.



The Regulation on Nature Restoration has entered into force

The Nature Restoration Law, officially took effect on August 18. This significant legislation is targeting to reverse biodiversity loss in the EU, reaching climate neutrality by 2050, and ensuring food security for citizens across the region. The law aligns with the EU's goals under the Kunming-Montreal Global Biodiversity Framework and tasks Member States with implementing restoration measures on a minimum of 20% of both land and sea areas by 2030, with plans to extend this to all ecosystems requiring restoration by 2050.





Additionally, the legislation aims to reverse the decline of pollinator populations, bolster biodiversity in agricultural and forest ecosystems, and commits to planting three billion additional trees by 2030.

This law sets forth a comprehensive strategy for the sustained recovery of nature throughout the EU while also encouraging sustainable development and agricultural practices that complement the transition to renewable energy.

[Learn more about the Nature Restoration Law's requirements and its broader impact](#)

IPBES opened a call for nominations for experts for the methodological assessment of integrated biodiversity-

inclusive spatial planning and ecological connectivity



The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

Call: Nominations for experts for the methodological assessment of integrated biodiversity-inclusive spatial planning and ecological connectivity

Application deadline: January 24, 2025

Apply Now

The IPBES Plenary has approved a new assessment on biodiversity-inclusive spatial planning and ecological connectivity. This effort aims to tackle land, water, and sea use changes, offering strategies for improving conservation and sustainable use of nature across various scales. IPBES is inviting nominations of experts from academia, government, and civil society to contribute to the assessment.

Key Areas of Expertise Sought:

- Biodiversity, ecology, and conservation science
- Spatial planning and related methodologies
- Participatory approaches and governance frameworks

[Read more](#)



Online dialogue on the nomination of experts and fellows for the IPBES spatial planning assessment

To facilitate nominations, an online dialogue meeting will be held on 5 November 2024, from 1 p.m. to 3 p.m. CET. This meeting will cover the nomination process, required expertise, and provide a platform for previous IPBES experts and fellows to share their insights.

Representatives from Governments and observers, as well as any interested stakeholders, are invited to register.

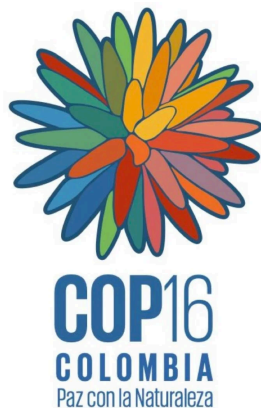
[Registration link](#)

United Nations Conferences

The UN Biodiversity Conference (COP 16) is taking place in Cali, Colombia from 21 October 21 to 1 November, followed by the UN Climate Change Conference (COP29) in Baku, Azerbaijan, from 11 to 22 November.

At both events, the EU Pavilion will serve as a key hub for discussions, networking, and sharing initiatives aimed at advancing the Kunming-Montreal Global Biodiversity Framework and driving climate action.

The MAMBO policy brief will be available at both events, providing insights into how the project is enhancing biodiversity monitoring and observation efforts across Europe. Additionally, MAMBO representatives will be attending to share their expertise on effective biodiversity monitoring and engage with stakeholders in discussions about best practices and innovative approaches.



**United Nations
Biodiversity
Conference COP16**



**United Nations
Climate Change
Conference COP29**

[Learn more](#)

[Learn more](#)

MAMBO on Social Media

MAMBO Faces



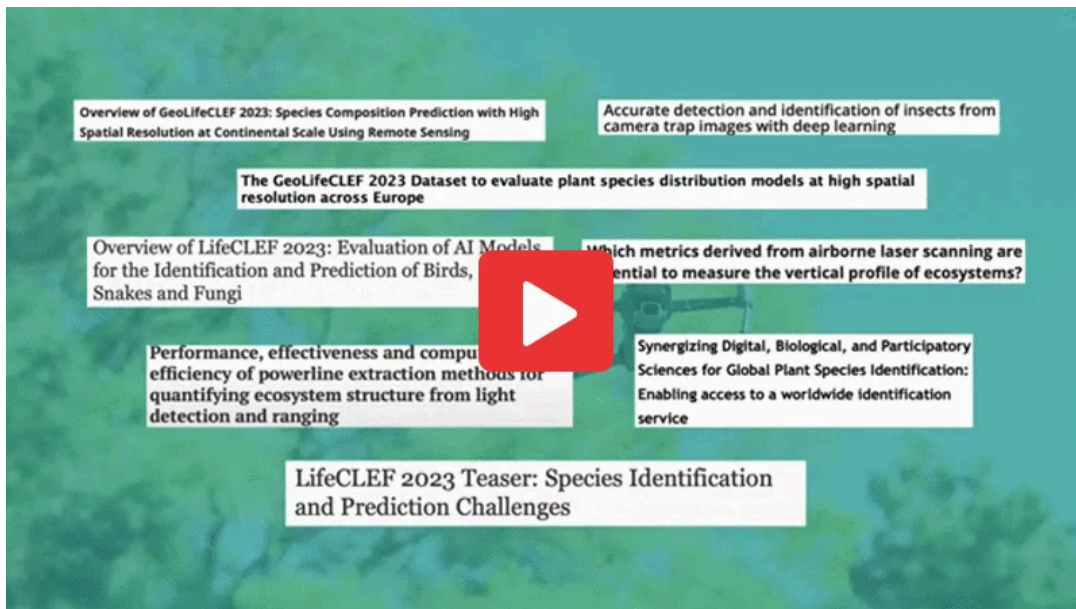
The graphic features the MAMBO logo in the top left corner. It is divided into four circular images: a bee on a lavender flower, a drone in flight, a pine branch, and a close-up of blue flowers. To the right, the text reads: "MAMBO PROJECT LAUNCHES A NEW SOCIAL MEDIA CAMPAIGN #MAMBOFaces". Below this, there is a grid of logos for project partners: Aarhus University, Pensoft, Aarhus University (with a stylized 'x' logo), UK Centre for Ecology & Hydrology, Inria, Naturalis Biodiversity Center, University of Reading, cirad, and EcoStack University. At the bottom, there are social media links: a home icon for mambo-project.eu, a Twitter icon for @mambo_eu, and a LinkedIn icon for MAMBO Project.

To spotlight the contributions of each team member, we held a social media campaign - #MAMBOFaces. Check it out to see our project partners, who shared their stories and roles within MAMBO

[View all #MAMBOFaces posts](#)

Highlights 2023

We ended 2023 with a video appreciating all the accomplishments MAMBO partners achieved during the past year. You can watch the video below to discover all project achievements from 2023.



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MAMBO receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. [101060639](#).

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