

CALL DOCUMENTS **BIODIVERSA+ CALL**

"IMPROVED TRANSNATIONAL MONITORING OF **BIODIVERSITY AND ECOSYSTEM CHANGE FOR SCIENCE** AND SOCIETY - BIODIVMON"

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Document 1: Announcement of Opportunity

The Funding Organisations in Biodiversa+ Partnership have joined efforts to organise and fund an international call for transnational research proposals on

"Improved transnational monitoring of biodiversity and ecosystem change for science and society (BiodivMon)"

Introduction

This call is launched by the European Biodiversity Partnership, Biodiversa+, co-funded by the European Commission. The Biodiversa+ Partnership is one of the actions included in the EU Biodiversity Strategy for 2030 to 'make the bridge between science, policy and practice, and make nature-based solutions a reality on the ground'. The Partnership's activities will include co-funded joint calls for research and innovation projects, biodiversity monitoring, and science-based policy advising activities.

33 countries are contributing to the funding of the present Biodiversa+ joint call for research projects, to be co-funded by the European Commission as part of the Biodiversa+ European partnership (see the updated list of countries and participating Funding Organisations on Biodiversa+).

Pre-amble

One of the main objectives of Biodiversa+ is to promote and support transnational biodiversity monitoring, by building a transnational (pan-European) network of harmonised monitoring schemes on common priorities for Biodiversa+ members. Biodiversa+ will contribute to improving the coverage, representativeness, and harmonisation of monitoring schemes, on collecting new data, on reinforcing national/regional monitoring schemes and on capacity building.

This Research & Innovation call aims at contributing to the general objective of improved monitoring of biodiversity and ecosystem services across all land and sea habitats in Europe. This should allow us to better characterize, understand and report on the state and trends of biodiversity. In conjunction with other Biodiversa+ activities on biodiversity monitoring, this call will focus on complementary aspects in the spectrum of knowledge, testing, and demonstration needs. It includes, for example, the development for application of new and existing monitoring tools, methodologies, and approaches, as well as the identification of how these can help to overcome key monitoring gaps in terms of e.g., less studied taxonomic groups, habitats, and ecosystems, or in sampling frequency. It also includes improved use of the outputs of monitoring schemes, to better understand biodiversity state, trends, pressures, and drivers. This, in turn, is expected to lead to the reinforcement of modelling and scenarios based on monitoring outputs, as well as to the evaluation of the successes of conservation policies and action. Societal relevance of biodiversity monitoring and research is an important part of this call, aiming to support management and policy for protection, conservation, and sustainable use of biodiversity.



(1) Context

Ecosystems are being degraded and biodiversity is lost at alarming rates around the world (IPBES 2018, 2019). Recently, it has been estimated that as much as 75% of the terrestrial environment, 40% of the marine environment and 50% of rivers and streams are severely altered due to human activity. In Europe, 96-98% of forests are disturbed by human activities, and 85% of grasslands, heaths, and scrubs are in non-favourable conservation status, as are 90% of wetlands and more than 70% of marine habitats (JRC 2020). This environmental impact is also one of the major drivers of the high and still accelerating rate of species extinctions. Intensification of agricultural use, natural resource exploitation, pollution, the invasion of alien species and climate change, as well as their multiple synergistic effects, drive considerable declines in the diversity of life on Earth. These losses matter. They impact human health and well-being, and in economic terms, the world loses trillions of USD each year in ecosystem services owing to land-cover change and land degradation (OECD 2019). The continuous attrition of biodiversity erodes the capacity of ecosystems to provide clean drinking water, purify our air, regulate our climate, or secure our food supplies, as well as their capacity to sustain services essential for continued functioning of the ecosystems in themselves.

In response to this biodiversity and environmental crisis, Heads of States around the world have made significant commitments for nature. Most notable are the Leaders' Pledge for Nature launched at the United Nations General Assembly in 2020, the 30 by 30 commitment to protect 30% of our land and seas by 2030, and the fostering of the restoration of at least 20% of habitats and related ecosystem processes (CBD 2021, LPN 2021). In Europe, the EU Biodiversity Strategy for 2030 commits Member States to ensure no deterioration in conservation trends and status of all protected habitats and species by 2030, and that at least 30% of species and habitats not currently in favourable status are in that category or show a strong positive trend (European Commission 2020). With its key funding programme for research and innovation Horizon Europe, the EU aims for recovering biodiversity, sustainably preserving, and restoring ecosystems and their services through improved knowledge and innovation. Activities under Horizon Europe's Cluster 6 will support the objectives of the EU Biodiversity Strategy for 2030, which is further complemented by other important strategies and initiatives such as the EU Forest Strategy for 2030, the EU Soil Strategy for 2030, and the EU Pollinators Initiative, all of which require improved transnational monitoring of biodiversity and ecosystem change.

In the context of biodiversity monitoring, substantial contributions are expected from the research community to enhance our understanding of biodiversity status, dynamics and trends. Appropriate, rigorous, and up-to-date data to improve knowledge about the state and trends of biodiversity constitute a basic requirement for the transition of all human activities and economies to a positive path for nature. Indeed, to develop effective conservation and management strategies, the ability to assess the status and changes of biodiversity comprehensively and reliably, and aligning it with an understanding of the effects of multiple stressors on ecological systems, is fundamental.

Biodiversity is dynamic in space and time. It responds continually and over the longer-term to abiotic and biotic environmental drivers, such as biological invasions, human pressures, and climate



change. It is thus necessary to efficiently monitor the status and changes of biodiversity at regular intervals in space and time, to investigate underlying mechanisms and to develop relevant management scenarios. Similarly, standardised and accurate data are needed to (i) deepen our understanding and ability to predict the short- and long-term effects on biodiversity of various conservation and management interventions, as well as drivers including climate change, and to evaluate the effect of these interventions and support evidence-based adjustments when necessary, and (ii) enable the inclusion of biodiversity into public and private accounting and reporting systems.

Literature reviews on biodiversity changes and recent assessments have revealed that information on biodiversity trends is biased towards some taxonomic groups and environments, and that important dimensions of biodiversity, e.g., genetic and functional diversity, remain to be properly studied (IPBES 2018, FAO 2020). Furthermore, a recent European Environment Agency (EEA) report identifies a series of knowledge gaps that include the need for a better characterization of the distribution and status of many habitats and species, and more generally the assessment of ecosystem condition and health (EEA 2020). There is also a need to help strengthen national bodies reporting to the EEA about progress on indicators of biodiversity change, and work supported by this call should, where appropriate, build upon and feed into reports on conservation status and trends such as EEA reports towards the EU Habitats Directive.

Particularly urgent are better harmonisation of monitoring schemes and thorough analysis of their outcomes, improved data collection through reinforcement of existing schemes and development, and implementation of new tools and technologies. Similarly, there is a need to produce more robust biodiversity trend estimates, and gain a better understanding of the drivers of biodiversity dynamics and their coupled effects, complemented by improved modelling of biodiversity scenarios. Research is further needed to develop and assess tools and approaches to monitor and quantify biodiversity, to compare data collected with novel versus established tools, and to develop innovative uses of existing monitoring schemes. Moreover, there is a need for better harmonisation of variables, data formats, and development of FAIR¹ databases (Findable, Accessible, Interoperable and Reusable), as well as rapid technological advances with respect to data collection, management and analysis. Research on these topics is needed to reinforce and supplement efforts by for example the biodiversity observation networks of the Group on Earth Observation Biodiversity Observatory Network (GEO BON) and EuropaBON², eLTER/LTER, GBIF, European Marine Observation and Data Network (EMODnet), European Bird Census Council (EBCC), Pan-European Common Bird Monitoring Scheme (PECBMS) and other biodiversity research and data infrastructures in Europe and globally. Merging classical biodiversity field observations with e.g., automated tools, emerging sensor technologies, eDNA techniques, remote and mobile sensing, artificial intelligence, as well as citizen science, could help to identify the best strategies to reverse biodiversity loss. Approaches could also entail research to help moving from individual prototypes to widespread use, in order to develop effective conservation strategies and measures by enhancing cost-efficiency and real-time information on species abundance. This could also increase the data on less studied taxa, interactions, and habitats. Participatory citizen science,

¹ https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf

² https://europabon.org



strengthened by education (and vice versa), can in collaboration with the relevant agencies be effective to increase public understanding of biodiversity and the importance of sustainability (EC 2020).

There are other important efforts to build upon, such as the Global Biodiversity Information Facility (GBIF), with data and protocols for standardised collections of scientific and citizen science data on biodiversity status, trends, and dynamics. Yet, measuring and analysing biodiversity changes across Europe to inform policy makers remains highly challenging. This is due in part to the limited spatial, temporal and species coverage of existing biodiversity monitoring schemes, the lack of standard approaches of biodiversity monitoring for many species and regions, and the limited FAIRness of existing datasets. The GEO BON group is however developing an international concept framework named Essential Biodiversity Variables (EBV) to help harmonising monitoring schemes and protocols, which is going to be a key element at the interface between science and policy and between monitoring and research. For these reasons, it will be important to assess how the use and uptake of existing data from GBIF and other facilities can be improved, and how the use of Earth Observation and harmonised protocols for standardised collection of data can be increased across Europe and globally.

To address these challenges, developing common methodologies and shared frameworks through collaborative work across countries that face similar challenges, policy targets and ecosystems is essential. This is addressed by several global legal and policy frameworks, including the Convention on Biological Diversity (CBD), the United Nations Convention on the Law of the Sea (UNCLOS), the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In Europe, several environmental directives encourage a transnational approach to optimize resource use and achieve adequate coverage for environmental management and protection, such as the EU Directives on Habitats, Birds, Water Framework, and Maritime spatial planning respectively, as well as the Marine Strategy Framework Directive and the Regulation on alien invasive species (European Commission 1992, 2000, 2008, 2009, 2014a, 2014b).

(2) Expected impacts and transnational added value

Projects are encouraged to consider interdisciplinary issues, cutting across the themes identified in the call and adopting or studying a broad range of methodological approaches. This call aims at funding transdisciplinary research projects demonstrating academic excellence, as well as potential societal impact and policy impact (see: Biodiversas Guide on Policy Relevance; https://www.biodiversa.org/1543). Proposed projects should provide relevant information and practical tools to promote the use of biodiversity monitoring data to provide science-based support for policy makers, authorities, and practitioners concerned with decision making, planning, designing, and managing a broad range of environments. Outreach to society is key for successful implementation of research into practice, which means that communication aspects should be carefully designed and fully integrated in the proposed project, and visualisation and analysis tools should be participatory. More generally, applicants should consider how the knowledge can be coproduced with stakeholders and disseminated in outreach actions to maximize societal impact (see:



BiodivERsA Guide on Stakeholder Engagement; https://www.biodiversa.org/702). Participation of public and private stakeholders in research proposals is strongly encouraged.

This call will support research projects in which the approaches and skills of natural sciences, technical sciences (including computer sciences and engineering), social sciences (e.g., economy, innovation sciences, psychology, sociology), and humanities (e.g., history, law, human geography), are integrated to address the specific objectives of each proposal. Strong transnational cooperation is expected, especially regarding the use, design and maintenance of long-term monitoring schemes allowing common approaches across countries to be derived from existing and future data and methodologies. Possibilities should be explored on how to maintain successful, robust monitoring approaches developed under this call also after the end of the projects, with support from involved stakeholders, programmes, and research infrastructures. Approaches linking transnational cooperation and their outputs that can be expanded to countries beyond the funders to this call are encouraged.

Applicants should make the novelty of their research explicit and detail how it adds to the existing knowledge base, both in the government and private sectors, including previously funded or ongoing projects and programmes. Complementarity with, and building upon, ongoing efforts within Horizon Europe and internationally on this theme is strongly encouraged, while unwarranted overlap or duplication is to be avoided. The added value of complementing existing research and monitoring programmes must be clearly explained, and proposals should demonstrate awareness and clear linkages towards relevant programmes. Proposals should also clearly outline the potential for their project outputs to feed into and support European and global monitoring, reporting, data and policy frameworks and programmes (EU Biodiversity Strategy for 2030, European Environment Agency, GBIF, Joint Research Centre (JCR), Knowledge Centre for Biodiversity (KCBD), as well as relevant projects such as EuropaBON, Marine Biodiversity Monitoring in Europe (MarBioME)³, etc.

Applicants are encouraged to use existing resources and infrastructures for their project, including the involvement of data and information from Earth Observation Programmes, transnational networks, EMODNET for marine data, and biodiversity research infrastructures (see: BiodivERsA Mapping of Biodiversity Research Infrastructures; https://www.biodiversa.org/1911). Links with other programmes and projects funded by the EU are also encouraged, for example under the LIFE Programme, Interreg and others. If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

Priorities of the Call (3)

This call is an opportunity to advance knowledge on biodiversity through monitoring, building on previous and existing efforts across Europe and beyond. It aims to support transdisciplinary and transnational research projects with a 3-years duration. Projects should have an overall focus on improving knowledge on species distribution and abundance. Moreover, projects should contribute

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³ https://www.aircentre.org/projects/marbiome/



to refining and enhancing and upscaling existing methods, and/or developing, testing, applying and evaluating new methods to characterize, understand, and model biodiversity status, dynamics, and trends at relevant spatial and temporal scales; developing tools for better implementation and harmonisation of monitoring schemes across countries and regions; and showing the power of (new and existing) monitoring information to inform transformative policies and management.

The call covers research on biodiversity conservation in all terrestrial, freshwater, and marine environments in Europe, the Outermost Regions (ORs) and Overseas Countries and Territories (OCTs), and globally across all continents and oceans. Transdisciplinary research projects are expected to integrate research across relevant scientific disciplines, from natural sciences, technical sciences, social sciences and humanities, and include relevant public and private stakeholders.

Applicants are invited to submit proposals addressing one or more of the three themes outlined in this call. Particularly welcome are development and application of new, and/or evaluation and advancement and upscaling of existing methods, technologies, and approaches for biodiversity monitoring, including its data collection, management, and analysis. Proposals should fill gaps in terms of coverage of taxa, ecosystem types, regions, and sampling frequency and, where relevant, consider concrete linkages to operational monitoring networks, research infrastructures, and other existing efforts at national, European, and global level. Funded projects will also be invited to collaborate with different actions on biodiversity monitoring within the Biodiversa+ partnership through the coming years. Projects focusing on poorly known organism groups, under-researched species of high functional significance and under-studied ecosystems and their functioning are particularly encouraged.

Biodiversa+ strongly supports open science, including open sharing of research data and digital outputs to stimulate novel approaches to the collection, reuse, analysis, validation, and management of data and information, thus increasing the transparency of the research process and robustness of the results. Therefore, submitted projects are expected to make produced data, digital outputs, and supporting material (including metadata) publicly available, possibly after a short period of exclusivity, unless there are legitimate reasons to constrain access. In particular, raw data should be made accessible to allow for integrated data analysis across different datasets. Data and digital outputs must be discoverable through machine readable catalogues, information systems and search engines. Projects should generate FAIR4 data and knowledge products, particularly in the context of real-time data feeds, exploring workflows that can provide "FAIR-bydesign" data, i.e., data that is FAIR from its generation, and building on and widening data availability in European Research Infrastructures federated under the European Open Science Cloud (EOSC). To this end, project proposals will need to develop and implement a Data and Digital Outputs Management Plan, which will also ensure ethical approaches and compliance with the Data Policy of this call (Document 5 in the call documents). Note that BiodivERsA and the Belmont Forum have developed a guidance document on data management, open data, and the production of Data Management Plans (DMPs), which may help applicants when developing their data

⁴ FAIR data principles: Findable, Accessible, Interoperable and Reusable https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf



management plan (http://www.biodiversa.org/1677/download). Training events to exemplify the added value and variety of tools at hand for the researchers to make their data freely accessible will be organised by Biodiversa+.

RESEARCH THEME 1

Innovation and harmonisation of methods and tools for collection and management of biodiversity monitoring data

The European countries will only be able to measure progress towards the targets laid out in the EU Biodiversity Strategy for 2030 if urgent action is taken over the next decade to improve acquisition, management, and dissemination of data. This involves a critical evaluation of the value of novel technologies to complement, enrich, or even in some instances replace, traditional biodiversity monitoring methods. Harmonisation and improvement of monitoring schemes and integration of data into international open access platforms is critically needed for scientists to cross-validate information, but also to support cross-sector collaboration and cross-fertilization in research. Existing national monitoring schemes should be considered as a way to feed into European and Global initiatives. This includes to identify important data gaps, to ensure that the right information is available to scientists and end-users of biodiversity data, and to allow for evidence-based, data-driven policy and management decisions on the sustainable use of living, mineral, and energetic resources, and of preparation for future scenarios. Projects can cover all aspects, from data collection in the field to quality control, management, integration, standardisation, or analysis, of data in line with the FAIR data principles, including management of uncertainty within functional data workflows.

Important challenges under this theme include:

- Development and implementation of new or improved approaches and technologies for monitoring biodiversity. Such advances should focus on development for practical application and evaluation, with the aim to quickly implement these in biodiversity monitoring schemes from local to large spatial scales. Proposals should complement and feed into ongoing efforts on novel technology within e.g., EuropaBON, and should also take into consideration and build on efforts and output from other calls within Horizon Europe⁵.
- Examples of technologies with potential to complement existing activities and help overcome key monitoring gaps are: collection and analysis of field data through artificial intelligence (AI) on both the symbolic (e.g., knowledge graphs) and sub-symbolic (e.g., deep neural networks) level; eDNA and other molecular biology-based approaches; functional ecology (biological traits, ecosystem function rates); satellite remote sensing; airborne surveys and/or drones; bio-acoustics; camera traps; automated and standardised

Data and technologies: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2021-biodiv-01-02;

Networking natural history museums: https://ec.europa.ew/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2022-biodiv-01-02;

Marine biodiversity observation: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2022-biodiv-01-01

⁵ For example:



biodiversity sensor networks; mobile applications for recording and identifying biodiversity; as well as new algorithms such as machine learning to e.g. reduce ambient noise or facilitate data processing for species identification. Proposed technologies should be assessed to ensure their relevance and applicability in the particular context (complementarity, legal aspects, privacy, ethics etc.).

- Improving current monitoring approaches and technologies from demonstration to largescale application across spatial scales, domains, and taxa, and evaluating the ability to collect pressure variables along with state variables.
- Harmonising existing operationalized protocols, methods and approaches for field data collection, Essential Biodiversity Variables (EBV), and indicators for monitoring the state of biodiversity and ecosystems, and for making them open and available to complement and feed into existing European and global initiatives.
- Optimizing the coverage and representativeness of biodiversity monitoring schemes, to support and complement existing efforts, addressing possible bias of taxonomic groups and habitats, analysis of cost-benefit ratios for different monitoring schemes, and pros and cons of upscaling and automation. This can include enhanced use of citizen science and increased public awareness including the role of (social) media and communication. Where relevant, reference should be made to existing and developing monitoring schemes at the national or transnational level⁶.
- Analysis and evaluation of impacts from current biodiversity monitoring methods, and possible proposal of alternatives, with a view to sustainability of practice in sampling and data collection.
- Addressing possible bias regarding taxonomic groups and habitats, analysis of cost-benefit ratios for different monitoring schemes (also beyond monetary terms), and pros and cons of upscaling and automation.
- Improving and standardising data collection in citizen science and local/indigenous knowledge for biodiversity monitoring with regards to methodology, data quality, complementarity with scientific data and adherence to the FAIR principles, aiming to enhance their combined usability for research, management, and policy. This includes:

EU Pollinator Monitoring Scheme:
 https://wikis.ec.europa.eu/pages/viewpage.action?pageId=23462107

 European Monitoring of Biodiversity in Agricultural Landscapes (EMBAL): https://wikis.ec.europa.eu/pages/viewpage.action?pageId=25560696

 LUCAS grassland and soil modules: https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2022

- European Butterfly Monitoring Scheme: https://butterfly-monitoring.net/
- Pan-European Common Bird Monitoring Scheme: https://pecbms.info/
- European Marine Observation and Data Network (EMODNet): https://emodnet.ec.europa.eu/en
- The new EU Forest Strategy: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13396-EU-forests-new-EU-framework-for-Forest-Monitoring-and-Strategic-Plans_en
- Baltic Data Flows: https://maritime-spatial-planning.ec.europa.eu/projects/baltic-data-flows

⁶ For example:



- (i) reinforcement of existing transnational networks and further development of feedback to stakeholders with user-friendly and digital tools and approaches; (ii) securing and/or development of data sets and digital infrastructure to leverage and enable large-scale citizen science efforts (this can include the creation of guidelines to encourage continuity, training, and involvement of people of diverse profiles and ages in citizen science activities); (iii) employing a mixture of technical, traditional, and contemporary knowledge practices for studying biodiversity trends and monitoring through a local and long-term perspective.
- Proposals should take into consideration and build on the outputs produced by the Horizon 2020 project EuropaBON where relevant, in particular on: i) the report on EU user and policy needs for biodiversity monitoring⁷; ii) the proposed list of candidate Essential Biodiversity Variables (EBV) and Essential Ecosystem Services Variables (EESV) for European biodiversity monitoring8; iii) the work produced on the identification of monitoring gaps and on the analysis of monitoring workflow bottlenecks9; iv) the report on potential of novel technologies for biodiversity monitoring¹⁰, and v) the EuropaBON inventory of monitoring initiatives¹¹.

RESEARCH THEME 2

Addressing knowledge gaps on biodiversity status, dynamics, and trends to safeguard biodiversity and to reverse biodiversity loss

Biodiversity monitoring is crucial for understanding dynamics, status, and trends through all levels of biodiversity - from genetic to ecosystem variation. Moreover, monitoring data is necessary in evaluating and assessing the efficacy and cost-benefit aspects of different approaches to bend the curve of biodiversity loss, such as ecosystem restoration, rewilding, improved protected area coverage or refined management. Evidence regarding benefits of such interventions for biodiversity can also be limited due to uncertainties and difficulties associated with the implementation of such approaches, and lack of comparable and relevant data collected in a standardised manner over the long term and with sufficient temporal and spatial resolution. Research based on obtaining and analysing data within the framework of biodiversity monitoring programmes is particularly needed to (i) obtain a comprehensive overview of the conservation status of a broad range of taxa across all regions at a high temporal and spatial resolution, (ii) assess if the potential of approaches for reversing present trajectories of biodiversity change is being realized, (iii) gain a deeper understanding of how the short-term and long-term benefits but also any disadvantages for biodiversity associated with the deployment of such approaches can best be monitored, and (iv) explore gaps and needs for monitoring data to support, e.g., models to calculate effects and costbenefit of interventions / predictive ecology.

Important knowledge needs under this theme include:

⁷ https://doi.org/10.3897/arphapreprints.e84517

⁸ https://riojournal.com/topical_collection/145/ (available end 2022)

⁹ https://riojournal.com/topical_collection/145/ (available early 2023)

¹⁰ https://riojournal.com/topical_collection/145/ (available end 2022)

¹¹ https://monitoring.europabon.org/monitoring/



- Filling gaps in knowledge on the status of a broad range of taxa, with a particular emphasis of indicator species and groups (for example pollinators or marine invertebrates). This should include analyses identifying a monitoring resolution suitable to inform policies that address drivers of biodiversity decline, as well as assessing the effectiveness of restoration efforts, taking into consideration also related efforts and programmes¹². Developing, implementing, and assessing tools for analysis of monitoring data to support prioritization of sites for restoration and conservation to meet EU targets, to feed the agreed indicators of the EU Biodiversity Strategy for 2030 and the proposed draft indicators of the global post-2020 global biodiversity framework. Such work should also recognize the importance of connectivity of migration and dispersal routes, temporal dynamics of distribution patterns, and climate refugia.
- Enhancing methodology and data integration to provide comparable indicators of policy and management relevance, and help integrate various geographical scales into policy and management decisions, in line with the EuropaBON approach to provide a response to EU's policy needs and its proposal on EBV and EESV.
- Testing and evaluating the practical usability (taking into account human behaviour, legal frameworks, governance arrangements, etc.) for managers in public and private sectors of tools and models to monitor the distribution and condition of habitats, species, and ecosystems of conservation importance, and identification of early-warning indicators of changes. This can also include challenges regarding standards, accessibility, analysis and integration of data and meta-data. Such tools should promote and make use of the most cost-effective approaches (both monetary as well as e.g., ease of use and responsible innovation), existing research infrastructures and networks, and emerging methodologies and technologies.
- Research to enable the explicit representation and consideration of uncertainty, along the entire process from data collection to analysis, modelling, simulation and in policy and management decisions.
- Research on the use and validity of predictive modelling/digital twins to enable incorporating understanding of biodiversity in practical settings. Modelling and predictions of outcomes from proposed interventions to promote science-based practical management and policy decisions.
- Analysing monitoring schemes in terms of conservation and restoration benefits for ecosystem functions and services accounting for Blue-Green Carbon, biodiversity support, and other crucial services provided to EU citizens, as well as in terms of preservation or enhancement of Natural Capital. This can integrate analyses of socio-economic factors with direct relevance for biodiversity monitoring, including the role of human behaviour, both individually and collectively.

¹² Including relevant calls in other programmes, e.g. https://www.faccejpi.net/en/FACCEJPI/The-2022-Joint-FACCE- JPI-SusCrop-Call-on-Agrobiodiversity-is-now-open.htm.



RESEARCH THEME 3

Making use of available biodiversity monitoring data

This theme supports research that makes use of existing knowledge, theoretical tools, data, etc., by integrating them to gain new insights on biodiversity monitoring. It encompasses various scientific approaches including for example meta-analyses and research conducted at synthesis centres¹³. By providing new understanding from biodiversity monitoring data, research under this theme should help to identify and address knowledge gaps to support management and policy for conservation, restoration, and sustainable use of biodiversity. Doing so can also include studies on human initiatives regarding biodiversity monitoring, as well as on the mechanisms behind policy and decision making in Europe and beyond.

On-going biodiversity research and monitoring have promoted a basic understanding of the potential consequences of the concurrent climate, land use and societal changes for biodiversity and ecosystem services. However, severe uncertainties persist, especially at geographical and time scales relevant to biological and societal adaptation processes. For example, the identification of important thresholds for change under the effects of stressors acting alone and in concert is key to guide decisions regarding limits to extractive activities, yet access to such knowledge remains challenging. Novel approaches to biodiversity monitoring can help close these knowledge gaps, and effective integration of monitoring data may provide answers by harnessing the strengths of different existing data sources.

Important knowledge needs under this theme include:

- Development and testing (e.g., evaluation of biases and uncertainties around biodiversity indices) of analytical tools and methods that improve the capacity of existing data to expand our knowledge of biodiversity status, dynamics, and trends across Europe, and be in line with the FAIR data principles. Such tools should promote and make use of the most costeffective approaches (both monetary as well as e.g., ease of use and responsible innovation), existing research infrastructures and networks, as well as new/emerging methodologies and technologies.
- Large scale data analysis to improve transnational monitoring schemes and databases used to understand biodiversity dimensions, their dynamics and trends. This will allow to support and complement concurrent monitoring initiatives within EU and globally. Such efforts should account for different organization levels (genetic and phenotypic traits, species, communities, and ecosystems) in various environments (e.g., below and aboveground, land and water), integrating different geographical scales (up- or downscaling), and identifying elements of biodiversity showing correlated variations. This includes for example evaluation of the relevance of data extrapolation across spatiotemporal and taxonomical scales to inform (inter-)national management strategies and policies.
- Research to integrate the output from monitoring schemes and promoting cross-cutting approaches to use of available data, in order to analyse the effects of combined threats,

¹³ https://synthesis-consortium.org



multiple stressors, and extreme events on different levels of biodiversity. This includes effects on population distribution, connectivity, and underlying dispersal and migration patterns, as well as the complex dynamics of ecosystem functioning and ecosystem services.

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(4) Procedures, eligibility and selection criteria

List of abbreviations:

CSC: Call Steering Committee (all participating Funding Organisations)

EPSS: Electronic Proposal Submission System (EPSS) – submission platform

EvC: Evaluation Committee

FCP: Funding Organisation Contact Point

Submission, deadlines and time schedule

Submission

A two-Step process will apply, with a mandatory submission of pre-proposals at Step 1 and submission of full proposals at Step two. Pre-proposals and full proposals (in English) must be submitted electronically with the Electronic Proposal Submission System (EPSS). Instructions for electronic submission will be available on the Biodiversa+ website at https://www.biodiversa.org/2017 in September 2022.

Please note that:

- The online platform will stay open 5 minutes after the official deadline. Any proposals not correctly submitted at this moment will be declared ineligible.
- All completed proposals will be submitted automatically when the platform closes, to avoid a situation where an applicant does not have time to click on the submit button. In this situation, the proposal will be evaluated as it stands.

At Step 1: Applicants have to submit pre-proposals: information (in English) on the project consortia, a 5-page description of the project and the required budget for each Partner must be submitted on the EPSS. **Submission of pre-proposals is mandatory**; it is not possible to enter the procedure at a later stage.

Only eligible pre-proposals can be invited to submit full proposals.

At Step 2: Invited applicants only have to submit full proposals: information (in English) on the project consortia, a 16-page description of the project and the required budget for each Partner must be submitted on the EPSS.

The information submitted at Step 1 and Step 2 will be used to complete an eligibility check, to find appropriate evaluators, and to evaluate the pre- (step 1) and full (Step 2) proposals.



Deadlines and time schedule

The evaluation procedure will consist in an eligibility check and an evaluation of pre-proposals at a first Step and an eligibility check and an evaluation of full proposals at a second Step.

The call will go through the following processes and applicants must pay attention to the deadlines outlined below in the time schedule:

16 June 2022:	Pre-announcement of the call
8 September 2022:	Official launch of the call
20 September 2022	General webinar of the Call
9 November 2022, 15:00 CET (local time in Brussels):	Deadline for submitting pre-proposal
December 2022:	First eligibility check completed by the Call Secretariat and Funding organisation Contact Points (FCPs)
Mid-February 2023	Results of the first Evaluation Committee (EvC) meeting > Selected applicants are invited to submit full proposals
5 April 2023, 15:00 CEST (local time in Brussels):	Deadline for submitting full proposals
May 2023:	Second quick eligibility check completed by the Call Secretariat and FCPs
June or July 2023:	Second EvC meeting > Ranked list of proposals established by the EvC
Late September 2023:	Recommendation for funding projects by the Call Steering Committee (CSC) Results communicated to applicants
1 December 2023:	Earliest possible start of funded projects
1 April 2024:	Latest possible start of funded projects

During the entire procedure, strict confidentiality will be maintained with respect to the identities of applicants and the contents of the proposals.

Eligibility of projects and Partners (call criteria):

The call is open to proposals and research consortia that meet the following criteria:

- The international, scientific research projects are performed by eligible Organisations. Funding Organisations eligibility criteria (see Funding Organisations' rules) apply to research entities and for participation by private sector (profit and non-profit) organisations;
- The project coordinator is eligible and employed by an eligible Organisation according to the terms and conditions of the participating Funding Organisation from which he/she applies for support;
- The project coordinator (person in charge) can only participate as coordinator in one proposal of this call. Apart from the position of project coordinator, applicants can participate in several proposals (as long as this is in line with their Funding Organisation's eligibility rules);



- The project must be a transnational project involving eligible research Partners from at least three different countries participating in the call and requesting support from at least three different Funding Organisations; including eligible research Partners from at least two different EU Member States or Associated Countries¹⁴ participating in the call.
- Proposals must be written in English;
- The submission of a pre-proposal is compulsory. Applicants cannot submit a proposal at a later stage otherwise;
- Pre-proposals and full proposals must be received before the deadlines set for the submission;
- Proposals must meet all the formal criteria: submitted electronically, respect page limits and number/type of attachments allowed;
- The scope or scale of the proposed research should exceed a single country;
- The information given in the pre-proposals is binding. No change regarding the proposals' content will be allowed by the Call Steering Committee (CSC) between the pre-proposals and full proposals. However, it is still possible to make minor changes to improve your proposal if the objectives remain unchanged (you will have to declare these changes in your full proposal). Regarding the administrative details, a limited number of changes may be allowed by the Funding Organisation Contact Point (FCP) and/or CSC, provided they are in line with the general rules of the call and the rules of the Funding Organisations:
 - Change of budget can be allowed by the relevant Funding Organisation. The FCP can decide according to its own rules whether it needs a justification for it. There is no need to inform the Call Secretariat.
 - Changes in the consortium composition:
 - No change of project coordinator (person in charge) will be allowed, except in case of force majeure. A request of change of project coordinator must be submitted to the Call Secretariat, at least one week before the deadline for submitting full proposals and it will be discussed on a case-by-case basis by the CSC.
 - Changes in the consortium composition are allowed (maximum two changes of Partners), provided approval by the concerned Funding Organisations. Please note that the following actions are considered as changes: addition, removal or replacement of a Partner (incl. subcontracted and self-financed partners). Please note that the maximum number of changes applies to "Partner"; it does not apply to "team member".
 - o In case of a removal of a Partner, consortia have to make sure that their consortium still includes the minimum number of requested Partners. If this is not the case, the project will be declared ineligible and won't be evaluated. All new Partners have to comply with their respective Funding Organisation's rules. If a new Partner is declared ineligible at Step 2, the whole consortium will be declared ineligible and won't be evaluated.

In terms of procedure: The eligibility of new research Partners must be confirmed at least one week before the full proposal submission deadline. Changes must be asked to the FCP, with the Call Secretariat in copy, who needs to check the eligibility of the new Partner and agree with the change, before being implemented into the EPSS.

¹⁴ https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-countryparticipation_horizon-euratom_en.pdf



Please note that the following cases are not considered as one of the maximum two changes but the procedure mentioned above remains the same:

- If the change is explicitly requested by a Funding Organisation after the eligibility decision at Step 1
- o If a researcher in charge (person) remains the same but changes the institutions (within the same country), provided the institution fulfils eligibility criteria of the same funding organisation.
- o Similarly, if the institution remains the same but the researcher in charge (person) changes, provided the researcher in charge fulfils eligibility criteria of the same funding organisation.
- The change(s) should not change the substance of the proposal. Applicants will have to indicate in their full proposal the changes made as compared to the pre-proposals (for information for the EvC and the Call Secretariat).

Please indicate the acronym of your project when your contact the Call Seretariat and/or your Funding Organisation.

• Compliance with Funding Organisation eligibility criteria and rules (e.g. eligible budget items) is mandatory; it is thus strongly recommended that applicants approach their respective Funding Organisation Contact Point to make sure they respect all the eligibility criteria and rules (contact list and main Funding Organisations' rules are available in the call documents published on the Biodiversa+ website).

If one Partner is not eligible, the whole proposal will be considered ineligible and will not be evaluated, unless the eligibility issue(s) can be fixed without changing the substance of the proposal.

Project duration

The project duration is 3 years. Projects are expected to act as transnational project and not as a mosaic of national projects; to this end, as far as possible Partners should participate in the project for its entire duration. However, as needed, position of some team members can be requested for only part of the project's duration, as long as at least one member of each Partner remains involved for the whole project duration.

Evaluation and selection

General information:

Potential applicants are advised to take careful note of the aims and scope of the call as described above in the Announcement of Opportunity. Applicants are strongly advised to assess the relevance of their proposed research against the thematic priorities set forth in the scientific text of the call. Any project that does not fit within the thematic priorities identified will not be recommended for funding, regardless of its quality.

Biodiversa+ aims at funding excellent scientific research projects that can demonstrate societal and/or policy relevance and engage with stakeholders. Proposals will thus be judged on both scientific excellence and their expected impact on society and policy, in addition to project implementation. Proposals should therefore focus on clear research questions with tractable and



testable hypotheses and clearly explain expected societal and policy impact as well as their stakeholder engagement approach. Research projects should generate new knowledge and solutions based on the production of new primary data and/or by making use of available data.

Proposals from the natural sciences, technical sciences, and social sciences and humanities are welcome.

Evaluation process:

A two-Step evaluation process will be organised.

1) First Step:

An eligibility check will be performed by the Call Secretariat and Funding Organisation Contact Points (FCPs) as well as a first Step evaluation of eligible pre-proposals by an independent Evaluation Committee (EvC) against the following criteria:

- (i) Fit to the scope of the call,
- (ii) Novelty of the research
- (iii) Impact

Only successful pre-proposals will be invited to submit full proposals.

2) Second Step:

An eligibility check of full proposals will be performed by the Call Secretariat and Funding Organisation Contact Points (FCPs).

Eligible full proposals will be evaluated by an independent Evaluation Committee (EvC) as well as by external reviewers (as far as possible 3 external reviewers per proposal, 2 scientific and 1 policy/management) against the following criteria:

- (i) Excellence,
- (ii) Quality and efficiency of the implementation,
- (iii) Impact.

The Call Steering Committee (CSC) will establish an EvC, comprising both scientific experts from natural sciences, technical sciences, social sciences and humanities, and policy/management experts relevant to the Call. The EvC composition should allow to cover, as far as possible, the range of topics within the scope of the call.

Members take part in the EvC as independent experts and do not represent any organisation nor can they send any replacements. This means that their work on this Committee does not represent any organisation or nation.

The EvC will assess the proposals according to the criteria defined (see "Assessment criteria" document in the call documents). At Step 2, the EvC will also moderate the assessments provided by the external reviewers.

The EvC will discuss about the proposals and establish the final ranking of pre- and full proposals based on the set of criteria defined.

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After Step 1: The Call Steering Committee (CSC) will decide on which projects to invite to Step 2, following the eligibility check and the evaluation made by the EvC.

After Step 2: The CSC will decide on which projects to recommend for funding, strictly adhering to the order of the ranking list established by the EvC.

Upon the final decision by the CSC, a list of funded projects will be published on the Biodiversa+ website.

Please note that no appeal can be brought at the EvC and CSC levels to challenge the results of the selection procedure. However, the decisions taken by the CSC do not take precedence over possible mandatory national or organisational requirements for eligibility and appeal processes.

(5) Funding

For this call a total amount of over 30 M€ has been provisionally reserved by the participating Funding Organisations (see the list in the table below).

The European Commission (EC) will also provide funding for the funded projects depending on the final total funding amount for research proposals committed by the participating Funding Organisations eligible for EC-funding.

The indicative total budget for this call is thus of over 40 M€, including the EC contribution. The full up-to-date list of participating Funding Organisations joining this Call as well as their reserved budgets is available on the Biodiversa+ website. Please note that Funding Organisation may have defined maximum requested budget per project. Each participant in a funded project will be preferentially funded by his or her Funding Organisation(s) participating in the call. The additional funding provided by the EC for the funded project will be distributed through the ECeligible Funding Organisations.

The aim of the call is to fund medium size projects (with a total budget of typically 1.2-1.5M€ on average; but note that this constitutes an indication rather than a formal limit). The requested funding should be justified and relevant with regards to the work planned within the project.



Please note that all Funding Organisations have defined specific rules – including restrictions with regards to the themes/environments they support. Read carefully the Funding Organisations' rules and contact your Funding Organisation Contact Point in case of any questions or doubts regarding these rules.

(6) Programme structure and management

Programme activities

The funded projects are considered to form part of an international research programme for which joint activities will be organised, in particular:

- a kick-off meeting at the beginning of the funding period
- a **mid-term meeting** to present and discuss the mid-term reports,
- a final conference to present and disseminate the project results at the end of the funding period.

These events will be possibly organised back-to-back with other workshops (such as clustering workshops, data management workshops, synthesis workshops, etc.)

At least the project coordinator of each funded consortium should participate in these joint activities. The costs for attendance to two physical meetings should be included in the budgets of their proposals (at least one event will be done remotely).

Project management and reporting

Funded projects will be required to submit via the project coordinator a mid-term report and a final report on research and activity progress. Some Funding Organisations may request additional specific reports.

(7) Eligible budget items

Eligible costs and the maximum allowed requested budget per project and/or per research Partner are governed by Funding Organisations' specific rules. Specific questions should be addressed to the Funding Organisation Contact Points (updated list available on the Biodiversa+ website).

In case of a significant financial pressure on a Funding Organisation due to the high number of teams requesting budget from this Funding Organisation in the submitted applications, the applicants may be asked to adjust downward their budget.

(8) Further information

The Call Secretariat is responsible for organising the call implementation procedure and for all communication with applicants related to joint aspects of the call and procedure.



However, for Funding Organisation eligibility criteria, the Funding Organisations' documented rules must be consulted and Funding Organisation Contact Points should be approached (the information are published and updated on the Biodiversa+ website), in particular with regard to eligibility of research Partner, eligible costs and other country-specific aspects of the call. The compliance with Funding Organisations' rules is mandatory, and relevant Funding Organisation Contact Points should be contacted to obtain further information if needed.

According to their respective rules, the Funding Organisations may require that the project members selected for funding establish a project consortium agreement to release the funds. The requirement will thus apply to all the project members, even if their respective Funding Organisation does not require a project consortium agreement.

Applicants attention must be drawnto the fact that they will be requested to produce data management plans and regularly update them in the course of your project (data manangement plan should indeed be seen as living documents). Biodiversa+ strongly encourages applicants to make available publicly the new databases, with metadata that they will produce within their project. Please note that the respective Funding Organisation may also have specific requirements in terms of open access to data. Applicants are thus strongly encouraged to plan resources to ensure data open access and comply with the requirements of their Funding Organisations (if any). For more information, please refer to the data policy (see "data policy" document 5 in the call documents) and Biodiversa Guidance document on data management, open data, and the production of Data Management Plans.

Applicants attention must be drawn to the fact that if they plan to use genetic resources and traditional knowledge associated with genetic resources in their project, they will have to ascertain towards the competent authorities and focal point that these used genetic resources and traditional knowledge associated with genetic resources have been accessed in accordance with applicable access and benefit-sharing legislation or regulatory requirements, and that benefits are fairly and equitably shared upon mutually decided terms, in accordance with any applicable legislation or regulatory requirements.¹⁵ Please refer to the competent authorities for more information.

Main contact points:

- For technical questions regarding submission, please contact the Call Secretariat: biodiversa.cs@agencerecherche.fr
- For technical questions regarding the Electronic Proposal Submission System (EPSS), please contact the EPSS technical helpdesk:

Taavi Tiirik: epss.biodiversa@g.etag.ee

For budgetary questions and other national/regional issues, please contact the relevant Funding Organisation Contact Point (FCP) - who are listed and updated at https://www.biodiversa.org/2017. Funding organisations' rules are also advertised and

¹⁵ Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (ABS) to the Convention on Biological Diversity and REGULATION (EU) No 511/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in the Union and related implementing acts.

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updated on the Biodiversa+ website and are mandatory. Should you have any question on these aspects, please contact the relevant FCP.