bioagora

Bio Knowledge Agora: Developing the Science
Service for European Research and Biodiversity

Actors in the EU science-policy-society interface related to biodiversity

D2.1. Assessing the community of key actors for the Biodiversity Strategy for 2030
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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Meaning / Full text
BISE	Biodiversity Information System for Europe
CEEweb	Central and Eastern European Web for Biodiversity
CINEA	European Climate, Infrastructure and Environment Executive Agency
COPA-COGECA	Committee of Professional Agricultural Organisations in the European Union and General Confederation of Agricultural Co-operative in the European Union
DG AGRI	European Commission Directorate-General for Agriculture and Rural Development
DG CLIMA	European Commission Directorate-General for Climate Action
DG EAC	European Commission Directorate-General for Education, Youth, Sport and Culture
DG ENV	European Commission Directorate-General for the Environment
DG INTPA	European Commission Directorate-General for International Partnerships
DG MARE	European Commission Directorate-General for Maritime Affairs and Fisheries
DG REGIO	European Commission Directorate-General for Regional and Urban Policy
DG RTD	European Commission Directorate-General for Research and Innovation

DG SANTE	European Commission Directorate-General for Health and Food Safety
EAA	European Anglers Alliance
EEA	European Environment Agency
EEB	European Environmental Bureau
EFI	European Forest Institute
Eionet	European Environment Information and Observation Network
Eklipse	Establishing a European Knowledge and Learning Mechanism to Improve the Policy-Science-Society Interface on Biodiversity and Ecosystem Services
ELO	European Landowners' Organization
eLTER	Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research
ERCE PAN	European Regional Center for Ecohydrology
ESP	Ecosystem Services Partnership
ESSRG	Environmental social science research group
ETC	European Topic Centre
EU	European Union
EUBP	EU Biodiversity Platform
EURAF	European Agroforestry Federation
Euromarine	European Marine Research Network
EUSTAFOR	European State Forest Association
FAO	Food and Agriculture Organization
FECOF	Fédération européenne des Communes forestières
FISE	Forest Information System for Europe
FSC	Forest Stewardship Council
GBIF	Global Biodiversity Information Facility
GEO	Group on Earth Observation
GEO BON	Group on Earth Observations Biodiversity Observation Network
GKSSB	Global Knowledge Support Service for Biodiversity
ICES	International Council for the Exploration of the Seas
IEEP	Institute for European Environmental Policy
IGB	Leibniz Institute of Freshwater Ecology and Inland Fisheries
INRAE	Institut national de la recherche agronomique
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature - Europe
JRC	Joint Research Centre of the European Commission
KCBD	Knowledge Centre for Biodiversity
NGFS	Network for Greening the Financial System
NINA	Norwegian Institute for Nature Research
OECD	Organisation for Economic Co-operation and Development
PEFC	Programme for the Endorsement of Forest Certification
Syke	Finnish Environmental Institute
TNFD	Taskforce on Nature-related Financial Disclosures
UB	University of Bucharest
UFZ	Helmholtz Centre for Environmental Research
UKCEH	UK Centre for Ecology & Hydrology
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UniTrento	University of Trento

UNSD	United Nations Statistics Division
WCMC	World Conservation Monitoring Centre
WISE	Water Information System for Europe
WHO	World Health Organization
WWF	World Wide Fund for Nature

BACKGROUND: ABOUT BIOAGORA PROJECT

This document is a deliverable of the BioAgora project. BioAgora is a collaborative European project funded by the Horizon Europe programme (Horizon Europe research and innovation programme, grant agreement No. 101059438).

The project's main outcome is intended to be the development of a Science Service for Biodiversity, the principal EU mechanism to connect research and knowledge on biodiversity to the needs of policy making through a continuous dialogue.

The ultimate goal of BioAgora and of the Science Service is to support the implementation of the Biodiversity Strategy for 2030, and more broadly the sustainability transition required by the EU Green Deal.

The BioAgora project was launched in July 2022 for a duration of 5 years. It gathers a Consortium of 22 partners, from 13 European countries, led the Finnish Environment Institute (Syke). Partners represent a diversity of actors coming from academia, public authorities, SMEs, and associations.

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EXECUTIVE SUMMARY

BioAgora project aims at developing the Science Service for Biodiversity, which will be the principal EU mechanism connecting biodiversity knowledge holders and policymakers (and possibly other decisionmakers) in a targeted and continuous dialogue supporting the implementation of the EU Biodiversity Strategy for 2030. Efficiently conveying actionable knowledge for decision-making is challenged, among other factors, by the dynamic and fragmented nature of the policy-science-practitioner landscape on biodiversity. This requires understanding the role of key actors at national, European and international level, such as for example, governmental and intergovernmental organizations, civil society organizations, private interest groups, research organizations, think tanks, data management platforms.

Overall, the analyses in this deliverable support the identification and conceptual framing of relevant stakeholders for the Science Service, aiding its development and long-term functioning. The results in this deliverable include:

1) an extensive list of relevant organized actors collected through a desk search, which resulted in N=215 actors identified (Section 4.1 and Annex 1 in Section 7.1).
2) a social network analysis mapping interactions (or lack thereof) between 101 actors, highlighting the most central ones, as well as thematic communities. The data were collected using questionnaire-based interviews with representatives of organizations (N=28) deemed relevant in the biodiversity science-policy-society interface (Section 4.2).
3) a qualitative analysis exploring the roles of different actors in knowledge co-creation and in the implementation of the Biodiversity Strategy for 2030, and their potential contribution to the Science Service. Interviews were conducted with a subset of the organizations contacted for the social network analysis (N=17), comprised of those outside the expected governance of the Science Service (Section 4.3).

Along with WWF Europe, EU and other intergovernamental organizations (DG ENV, EEA, IPBES, IUCN, Biodiversa+, UNEP, FAO) had the highest number of reported connections. A more varied mix of organizations were found to hold potential to act as bridges between unconnected actors, including, in addition to IUCN, EEA and IPBES, also private sector organizations (EUSTAFOR, the Capitals Coalition, COPA-COGECA), organizations dedicated to the management of ecological units (EUROPARC Federation, the International Network of Basins Organizations), and science-based networks (Future Earth and the Ecosystem Services Partnership). Overall, the role of DG ENV wasdominant in the network compared to other Directorate-General departments. Four thematic communities were identified based on the interactions recorded (from the largest to the smallest community): biodiversity data and knowledge for EU policy-making, land ownership and management (focus on agriculture and forest), sustainable development through natural capital enhancement, conservation and participation. The social network analysis also offered insight into missing links, and weaknessed and opportunities in the network (e.g. strengthen representation for water ecosystem, support potential brokers, foster cross-community dialogue).

While the social network analysis aids the identification of important stakeholders for the Science Service (Section 4.2), due to methodological limitations and the temporal dynamicity of networks, results should be considered a starting point, and are thus complemented by an extensive database of organizations (Section 4.1 and Annex 1). Additional work in the BioAgora project could focus on identifying more marginal actors.

The qualitative analysis of opinions elicited from the organizations' representatives (Section 4.3) reveals that multiple public and private actors (e.g. international organizations, the European Commission, its agencies and the member states, the business sector, landowners and managers, scientists and experts, and civil society actors) at various scales are deemed responsible for the implementation of the strategy, and thus can simultaneously be potential enablers and disablers. As a point of reflection for the development of the Science Service, respondents suggested that the Science Service should be inclusive in terms of both potential participants to knowledge co-creation (e.g. expert and local knowledge in addition to scientists) and users or beneficiaries beyond policymakers (e.g. citizens, landowners).

NON-TECHNICAL SUMMARY

In 2020, the European Union adopted a new Biodiversity Strategy towards 2030. The strategy is part of an ambitious package of plans, called the Green Deal, aiming at supporting European industries, businesses and households to transition towards more sustainable activities, particularly by tackling climate change and biodiversity loss. Among the several challenges facing the implementation of the strategy, including addressing remaining knowledge gaps on biodiversity, there is a strong need to improve the flow of existing information between scientists (as well as other knowledge providers) and decisionmakers, especially policymakers.

In order to make relevant knowledge more efficiently and promptly accessible to policymakers and other decisionmakers, the European Commission has set-up a number of initiatives and infrastructure, such as open access databases containing environmental data, and platforms fostering dialogue between diverse societal actors. As part of these efforts, a Science Service for biodiversity will be designed and piloted by BioAgora's project during the next four years. The Science Service will help address the biodiversity-related knowledge needs of EU policymakers, and possibly of other decisionmakers, ensuring that a wide range of knowledgeable actors can be involved in informing such dialogues.

Overall, the analyses presented in this document can support the development of the forthcoming Science Service regarding identifying and managing relevant and different stakeholders, for example types of societal actors and specific organizations which can act as knowledge providers and brokers in specific areas of expertise, organizations with potential to connect otherwise disconnected actors, and potential users of the Science Service, other than policymakers. These include actors at national, European and international level.

Detailed findings from the analyses are as follows. First, we developed an extensive list of 215 organizations working with biodiversity issues (governmental and intergovernmental organizations, civil society organizations, private interest groups, research organizations, think tanks, data management platforms). We focused on European organizations, but also included relevant international and national ones (Section 4.1).

Through interviews with representatives of 28 organizations deemed highly relevant within and outside the governance structure of the Science Service, we mapped a network of 101 organizations. In the network, we recorded interactions between organizations, highlighting the most connected organizations and those with potential to act as bridges for otherwise disconnected organizations (Section 4.2). We also identified missed interactions, and opportunities for strengthening the network. Four thematic communities of actors were identified based on their interactions: data and knowledge, ownership and management of agricultural and forest land, sustainable development, and habitat conservation and restoration.

We then further focused on 17 organizations (out of the 28) currently envisioned to remain outside of the Science Service governance, but deemed highly relevant in the science-policy-society landscape. Through in-depth interviews with the representatives of these organizations, we gathered insights regarding the roles that the organizations can play in developing and sharing biodiversity knowledge. We also inquired about which actors are perceived as enablers and disablers for implementing the strategy, as well as actors important for the inclusive and effective functioning of the forthcoming Science Service (Section 4.3).

1. Introduction

The information collected in this report supports the BioAgora project goal to develop the Science Service for Biodiversity, which will be the principal EU mechanism to efficiently connect research and other forms of knowledge on biodiversity to the needs of decision-making towards the implementation of the EU Biodiversity Strategy for 2030. Currently, the Science Service is mainly conceptualised as a science-policy platform aiming at connecting EU policymakers with providers of scientific knowledge. As such, it would ideally develop a timely, targeted and continuous dialogue between knowledge producers and users. As flagged in the results produced by BioAgora's Deliverable 1.1 (Lenti et al., 2023), the effective implementation of the many and diverse goals of the EU Biodiversity Strategy will require, in addition to addressing remaining knowledge gaps on biodiversity, improving the flow of existing information between scientists (as well as other knowledge providers) and decisionmakers, especially policymakers. This creates a further rationale and momentum for the development of the Science Service for Biodiversity and the role of different societal actors in it. The Science Service will be the scientific pillar of the Knowledge Centre for Biodiversity (KCBD) and an integral part of a newly organized landscape within the European biodiversity governance. However, the development of the final structure, functions, and governance of the Science Service will be shaped, during the BioAgora project, by interactions with several actors in science, policymaking, practice and society, with the aim of co-developing insights and solutions towards a fair, inclusive and functional system.

The EU science-policy-society interface related to biodiversity is a highly heterogeneous landscape, which, for the purpose of the Science Service can be roughly divided into decisionmakers and knowledge holders. The decision-making side includes EU-level and national or sub-national level policy-making bodies and individuals, as well as a range of other actors such as business organizations and private interest groups, landowners and managers, civil society organizations, citizens and consumers. Knowledge holders include international, EU, national and sub-national research projects, research organizations and networks, as well as the providers of other types of knowledge, such as expert knowledge of practitioners, administrators, landowners and managers: citizen science; and the traditional knowledge of local and indigenous communities.

A number of actors and initiatives are already in place connecting EU decision-making (especially policymaking) and knowledge holders in the context of biodiversity and sustainability. The European Commission and the European Environment Agency (EEA) have committed to establishing a Europe-wide data and knowledge base for environmental policy and biodiversity and to facilitate its sharing while fostering cross-sectorial policy dialogue. This has included setting up the Knowledge Centre for Biodiversity (KCBD), to which the Science Service will be linked, as well as web-based spaces meant to facilitate access to data and information for societal stakeholders beyond researchers. These spaces include the Biodiversity Information System for Europe (BISE), the Forest Information System for Europe (FISE) and the Water Information System for Europe (WISE). Other EU initiatives, such as Oppla, Eklipse and Biodiversa+ are supposed to support and improve the collation, translation, and dissemination of biodiversity-related research into adequate and effective policies. Different types of actors and communities, such as research projects, networks of scientists, experts or practitioners, interest groups, government agencies, and other organizations or fora, feed into, collaborate in, and engage with the

above-mentioned initiatives. European actors are furthermore embedded in a wider international science-policy-society landscape, including, for example, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the newly established Global Knowledge Support Service for Biodiversity (GKSSB), which is expected to support the implementation of the Kunming-Montreal Global Biodiversity Framework. At national level, governments may have access to more or less permanent inhouse services, which support legislative and political processes by providing scientific and expert advice on a range of scientific issues. Examples include the Parliamentary Office of Science and Technology in the UK, the Parliamentary Scientific Services of the Chamber of Deputies in Luxembourg, the Office of Science and Technology Office of the Congress of Deputies in Spain. The Belgian Biodiversity Platform is a government-funded science-policy interface, acting as a broker between policy, science and society on biodiversity issues.

Despite existing efforts at various governance levels, efficiently converting biodiversity research, data and expertise into actionable knowledge will remain the key challenge for the forthcoming EU Science Service for Biodiversity, due to, among other reasons, knowledge gaps, difficulties in accessing existing knowledge, and the still emerging, fragmented and dynamic nature of the policy-science-society interface (Sarkki et al., 2014; Sarkki et al., 2020; Tinch et al., 2018; Watt et al., 2019; Nesshöver et al., 2016). To this end, it is necessary to gather an understanding of the actors operating in this landscape.

The objectives of the analysis reported in this document were to:

1) develop an extensive list of organizations operating at the science-policy-society interface related to biodiversity, focusing on the EU level and including some relevant national or international actors. This was achieved through an iterative desk search building upon existing databases and resulted in N=215 actors identified.

2) perform a social network analysis to map interactions between organizations, highlighting the most central organizations, and identifying thematic communities. The data were collected using a questionnaire (administered through interviews or by email) targeting leaders or key representatives of organizations (N=28) deemed highly relevant in the biodiversity science-policy-society interface, some of which are also currently expected governance structure of the Science Service.

3) elicit perceptions about the roles of different actors in knowledge co-creation and in the implementation of the Biodiversity Strategy for 2030, as well as their potential contribution to the Science Service. The data were collected using a questionnaire (administered through interviews or by email) targeting leaders or key representatives of a subset of organizations (N=17) contacted for the social network analysis (objective 2), focusing on those which are currently not explicitly part of the governance of the Science Service.

The analyses in this document offer a picture of potentially important stakeholders for the Science Service, for example knowledge providers and brokers, organizations with potential to connect otherwise disconnected actors, and potential user groups for the Science Service other than policymakers. The rest of this document is structured as follows. Section 2 provides an understanding of the key concepts used in this document. Section 3 details the methods used for identifying the organizations operating at the

science-policy-society interface related to biodiversity, and for interviewing a selected number of key organizations. Section 4 presents the results, while conclusions are synthetised in Section 5. The Annexes provide the full list of organizations identified through the desk search, as well as the questionnaire used to elicit the opinions of interviewed organizations.

2. Conceptual background

2.1. The goals of the EU Biodiversity Strategy for 2030 and the challenges to its implementation

In 2020, the EU has adopted a new Biodiversity Strategy towards 2030. The strategy is part of an ambitious package of plans, the Green Deal, aiming at supporting European industries, businesses and households towards a sustainable and carbon neutral Europe where biodiversity is protected and valued. **The current Biodiversity Strategy includes 16 targets** aimed at strengthening a coherent network of protected areas and at restoring ecosystems in Europe, including both land and sea. Such targets aim, for example, at halting the decline of pollinators, reducing pesticides use, addressing invasive alien species, adopting organic and agroecological practices, remediating contaminated soils, greening urban and peri-urban areas, and enhancing river and marine ecosystems restoration. In addition to such targets, **a number of actions are also listed as necessary to enable transformative change** in Europe and to multiply the EU's efforts internationally towards an ambitious global biodiversity agenda. Such actions include, for example, strengthening EU biodiversity governance and legislation, leveraging the role of business and financing for biodiversity, enhancing knowledge and education on biodiversity, raising worldwide ambition and a commitment to enforcing biodiversity-related provisions in trade agreements. The full list of targets and actions, including progress towards them, is shown in the EU Biodiversity Strategy Dashboard and Action Tracker (https://dopa.jrc.ec.europa.eu/kcbd/dashboard/; https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/).

Given the diversity of the targets and actions embedded in the EU Biodiversity Strategy for 2030 and their level of ambition, effective implementation will require the coordinated effort of an array of competencies, resources and actors. Eight main **challenges to policy planning and implementation towards the strategy** were identified by BioAgora's project Deliverable 1.1 through a literature review coupled with stakeholder interviews (Lenti et al. 2023; Hermoso et al., 2022). These include:

- availability of knowledge: lack of sufficient data or robust scientific knowledge, or ineffective communication and lack of interaction between science and policymaking;
- funding: insufficiency and inadequacy of financial instruments allocated to biodiversity conservation goals;
- horizontal policy coherence: incompatibility or lack of coherence between nature conservation policy and other sectoral policies, such as agriculture, forestry, urbanisation, energy and climate, or trade policies;

- management effectiveness: difficulties of carrying out comprehensive area-based management actions which fit local ecological, cultural, and socio-economic contexts;
- systematic spatial planning: lack of transparent spatial priorities and clear conservation targets in conservation planning that are based on solid ecological, social, and economic criteria and avoid taxonomic bias;
- vertical implementation: poor incorporation of EU strategic targets and directives into the national and regional laws and regulations of EU Member States;
- stakeholder engagement: difficulties and contradictions related to stakeholder participation and public engagement;
- dominant economic and political system: include, among others, limitations to public interest deriving from the market society, or short-sighted political vision for biodiversity due to shortcomings of representative democracy.

Lenti et al. (2023) found strong interconnections among the eight challenges, and highlighted how knowledge availability was central in that it both influenced and was influenced by almost all the other challenges. This finding further points to the need to address existing knowledge gaps on biodiversity, and to improve the availability and accessibility of knowledge to diverse user groups.

2.2. Knowledge co-creation in science-policy-society interfaces and the challenges faced by the forthcoming Science Service

One of the explicit principles underpinning the forthcoming EU Science Service for Biodiversity is to shy away from linear processes of knowledge production where policymakers are simply the end-receivers in the information flow. In opposition to this widely refuted linear model, knowledge co-creation (synonym to co-production, see Hakkarainen et al., 2021) represents 'the processes by which knowledge, including scientific knowledge, is framed, collated, and disseminated through social interaction and change, and how such knowledge also impacts upon such change' (Forsyth, 2003, p. 104). Typically, knowledge co-creation involves multiple actors (e.g. scientists, policymakers, experts, civil society) and may result in different types of outputs and outcomes (e.g. written reports, workshops, dialogues) (Miller and Wyborn, 2020).

Knowledge co-creation often occurs in the context of science-policy-society interfaces, which are social processes comprised of relations and exchange between scientists and other societal actors (McConney et al., 2016; van den Hove et al., 2007). Such interfaces are the many ways in which scientists, policy makers and others link up to communicate, exchange ideas, and jointly develop knowledge for enriching policy and decision-making processes and/or research. They involve exchange of information and knowledge leading to learning, and ultimately to changed behaviour – 'doing something differently as a result of the learning' (Young et al., 2013, p. 15). As such, they 'can operate at different political levels, and at different stages of the policy process (early warning, issue identification, policy design, implementation, assessment, review) and they can be closer to policy or

to scientific processes' (Young et al., 2013, p. 39). Science-policy-society interfaces can be very diverse entities, characterised by different governance structures (from very formal and institutionalised to informal and more flexible) and aims (where stated aims may be coupled with additional tacit ones). As a result, they are sometimes identified with well-established organized actors or networks (in this deliverable such actors are called 'science-policy-society platforms' to distinguish them from the concept of science-policy-social interface as a process rather than an organized entity).

Science-policy-society interactions should be understood and managed as 'collaborative, non-linear processes, scientists, decision makers, and representatives of the general public are engaged in an iterative process and negotiate together what information is needed and what kind of evidence is relevant in the given situation' […] This 'creates a space for debate over conflicting beliefs, values and interests' (Kelemen et al., 2021, p. 92). Despite the iterative nature of knowledge co-creation and of science-policy-society interactions, it is useful to recognize that different actors (people or organizations) retain specific institutional roles and therefore knowledge capacities or needs. This translates in determined activities in the process of knowledge co-creation, of which we conceptualize seven general categories, which are however not mutually exclusive (i.e. the same organization can contribute to different activities) (Wang and Ahmed 2005; Balian et al. 2012).

- Knowledge provision: actors creating relevant knowledge in certain fields or areas, including scientists from different scientific disciplines, experts and practitioners in administrative bodies, companies and NGOs, as well as indigenous and local people (Stepanova et al., 2020).

- Knowledge brokering: intermediary actors dedicated to collating, re-framing and making knowledge accessible by leveraging and developing relationships and networks. This could also be interpreted as actors (sometimes referred to as boundary organizations) whose explicit aim is to 'improve the relationships between science, policy, markets and civil society' (Sarkki et al., 2020, p. 21). They may range 'from relatively small-scale, narrowly focused initiatives to broad-reaching institutions acting on a global scale' (ibid). This may also entail mediating tensions or problems arising from institutional heterogeneity in the context of complex issues (Morin et al., 2017).

- Capacity building and leadership: actors offering guidelines, training or other activities to develop and strengthen the skills of individuals or the capacities of organizations (e.g. training courses for experts, practitioners, managers, workers). They may also provide guidance and leadership as beacons in certain areas, practices or competences.

- Knowledge requesting and usage: actors responsible for decision-making (either policymakers or private actors e.g. business, unions, consumers) requesting knowledge in order to plan and inform strategies and decisions.

- Data and information systems management: actors responsible for collecting and storing data or other forms of information with a long-term purpose and making it available to third parties freely or for a fee.

- Knowledge funding: local, national or international agencies and bodies providing financial or other types of support to knowledge production, distribution or request/use.

- Advocacy/lobbying: actors representing certain topics or issues and, as such, aiming at influencing the policy-making process accordingly.

Given the institutional diversity of actors and their values and needs, the science-policy-society interface is comparable to a value chain where knowledge and resources are transformed, and value is co-created (Wang and Ahmed 2005). Schorr et al (2021, p. 5) defines a global knowledge value chain as 'the full range of intellectual tasks by which knowledge is produced and intertwined at the local, regional, and global levels required to comprehensively inform a specific desirable state or phenomena'.

To further complicate such interactions, biodiversity governance and knowledge co-creation are shaped by multiple and overlapping non-hierarchical actors, which may have compatible or antagonistic agendas (Morin et al. 2017; Raustiala and Victor, 2004). In order to produce credible (i.e. valid, reliable), relevant (timely, useful) and legitimate (value plural) outcomes, which are typically considered criteria of success for functional science-policy interfaces (Heink et al., 2015), **the forthcoming Science Service will have to navigate the above-mentioned diversity of actors, capacities and interests, across all its functions**: building up the knowledge base and improving its mainstreaming in decision-making, supporting EU biodiversity commitments and the integration of biodiversity in all sectors, building topical networks and capacities within them, answering knowledge requests from policymakers, identifying future research needs through horizon scanning processes, and providing feedback to the policy-process. Regarding inclusivity, one key challenge for the Science Service will be to identify and engage with relevant, yet diverse actors rapidly and efficiently. Rather than developing an additional and redundant interface ex novo, the Science Service should leverage and strengthen the network of existing science-policy-society actors and activities. Figure 1 shows a preliminary understanding of the governance for the forthcoming Science Service.
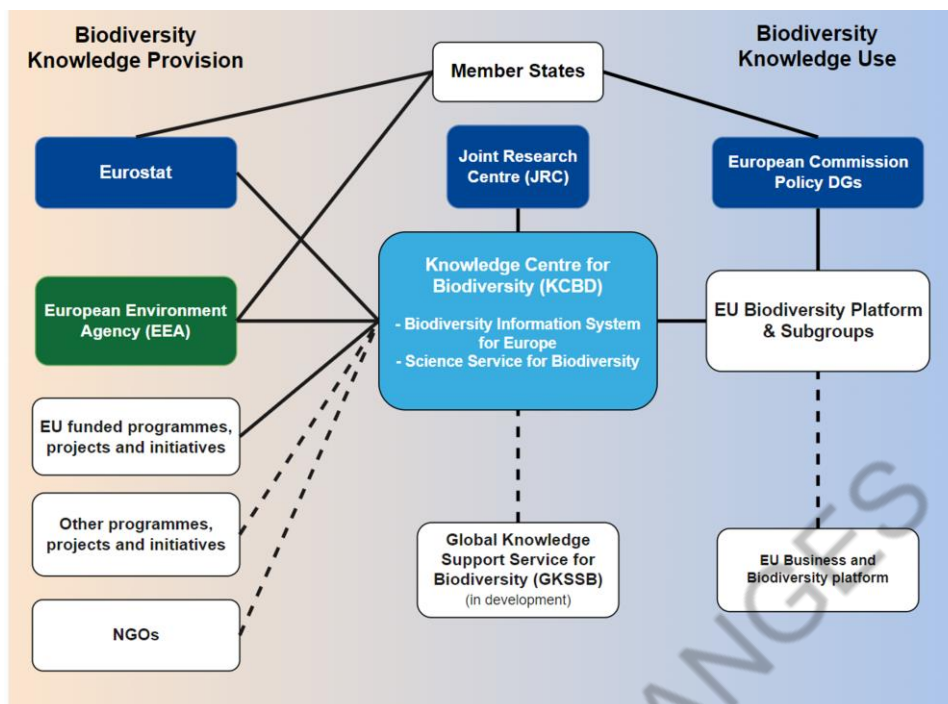
Figure 1: Preliminary governance structure for biodiversity-related knowledge in the EU. Solid lines represent formal collaboration, dashed lines consultative roles. Source: Marei Viti et al. (2024).

Setting-up the Science Service will thus require developing a conceptual framework for categorising actors based on their roles and competences, as well as an operative protocol and a tool (e.g. a register) through which actors can be identified, contacted and engaged. Moreover, the Science Service will have to find solutions to address the numerous practical constraints which hinder stakeholder participation and engagement. These include lack of financial and time resources of the actors involved, a mismatch between policy and science expectations and time horizons and/or a need for developing capacities towards effective exchange and communication (Kelemen et al., 2021).

3. Methods

The findings presented in this deliverable were obtained through an articulated data collection process (Figure 2), which was designed and carefully coordinated by the BioAgora project to meaningfully engage with internal and external stakeholders and harmonize data collection across work packages. The steps of data collection and analysis presented in Figure 2 are described in detail in the subsequent sections below.
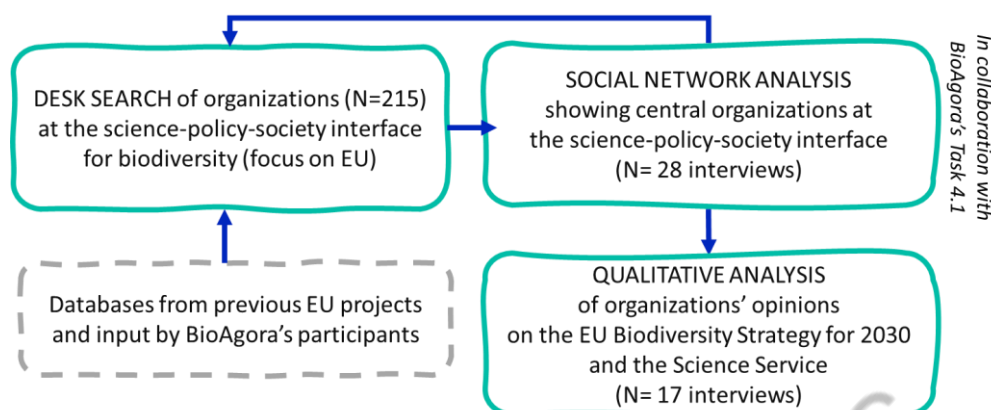
Figure 2: Data collection strategy and analysis for this deliverable.

3.1. Identification and selection of relevant organizations

A thorough desk search was conducted during September 2022-April 2023 (updated until June 2024) in order to compile an extensive, albeit not exhaustive, list of organizations and networks of organizations operating at the science-policy-society interface in the context of biodiversity and sustainability in Europe. **A total of 215 actors, including organizations and networks, were identified through the desk search**. In collating the list (available in Annex 1, Section 7.1), we focused on actors operating at EU level, although we also included particularly relevant international, regional or national organized actors. Importantly, the desk search built upon the work already developed in the context of two pan-European projects, funded by the Seventh Framework Programme of the European Union: 'Developing a Knowledge Network for EUropean Expertise on biodiversity and ecosystem services to inform policy making and economic sectors (KNEU, 2010-2014, grant 265299) and 'Establishing a European Knowledge and Learning Mechanism to Improve the Policy-Science-Society Interface on Biodiversity and Ecosystem Services' (Eklipse, 2016-2020, grant 690474). The two above-mentioned projects preceded BioAgora in that they aimed at understanding and improving the effectiveness of the biodiversity science-policy (-society) interface in Europe. Such projects have thus already compiled extensive databases of relevant organizations and networks in Europe (including national and international actors, in addition to EU level actors), and assessed the relevance of such organizations based on votes cast by project members and based on interviews with key organizations. The database developed through the desk search conducted for this deliverable was further refined with suggestions of relevant organizations provided by BioAgora partners and by the representatives of the organizations interviewed during the other steps of the data collection (see Section 3.2).

3.2. Data collection through questionnaire-based interviews

Organizations deemed highly relevant to the biodiversity science-policy-society landscape were selected from the database developed through the desk search for interviews (Section 3.1). The selection was based on deliberation among the participants in Task 2.1, using the following criteria. The organization had to: a) be long-term (e.g. no research projects, which were already targeted in the data collection for BioAgora's Task 3.1); b) deemed an influential player in the landscape, also based on findings by Eklipse or KNEU projects; c) focused on nature and biodiversity, with a strong European presence or influence.

Task 2.1 developed a questionnaire administered using an online platform (https://www.webropol.fi/) to organizations with no current direct engagement or relation to the forthcoming EU Science Service for biodiversity. The questionnaire was composed of 17 questions (Annex 2, Section 7.2), including open-ended and closed questions (both multiple and single-choice). The questionnaire elicited the frequency of contact and nature of relations of the interviewed organization with other organizations: never (although the organization was known), less than once a year, multiple times a year, or weekly. Respondents also had the option to state that some organizations were unknown. The responses to these questions were used as data for the social network analysis, a well-established method widely applied in environmental governance studies (Gómez-Mera et al., 2020; Guerrero et al., 2020). In addition, the questionnaire also inquired about the role of the interviewed organization in the science-policy-society landscape, such as its ethos, its participation to knowledge co-creation and its areas of competence. Furthermore, it probed opinions about factors and actors enabling or hampering the EU Biodiversity Strategy for 2030, and expectations about the forthcoming Science Service. In the questionnaire, the multiple options available on the role of the organization in knowledge co-creation (question 4) were based on the conceptual background presented in Section 2.2. The options proposed for the for the competence areas of the organizations (question 5) were based on a synthesis of the targets and actions of the Biodiversity Strategy for 2030, while question 10 was based on the challenges identified in BioAgora's Deliverable 1.1 (Lenti et al., 2023). The questionnaire was administered during video-calls (ca. 1.5 hours each) with the key representatives (e.g. director, Chair, president) of the organizations. In some cases, if no one from the organization was available for an interview, the questionnaire was filled by the organizations' representatives in their own time.

Interviews in Task 4.1 included the question on inter-organizational relationships necessary for the social network analysis developed in Task 2.1 (question 6 of the questionnaire, see Annex 2, Section 7.2) to organizations expected to be part of, or otherwise highly involved in the governance of the Science Service. Qualitative questions were also posed to these organizations through a dedicated questionnaire (different from the one in Task 2.1) focused on eliciting information about existing experiences and expectations towards the future Science Service, but these data will be analysed and reported in Task 4.1. A total of 17 organizations completed the questionnaire including both the qualitative and quantitative (social network analysis) questions administered by Task 2.1, while additional 11 organizations answered

exclusively the quantitative social network analysis questions (Table 1). Overall, all the interviews were conducted during summer and autumn 2023.

Table 1: Organizations interviewed for the data collection.

ID	Name of organization	Type of organization	Data collected
1	Alternet Europe	Science-based community or network	Social network analysis data
2	Capitals Coalition	Business / sectoral organization and private interest group	Social network analysis data, open-ended qualitative data
3	Central and Eastern European Web for Biodiversity (CEEweb)	Public interest group	Social network analysis data, open-ended qualitative data
4	Committee of Professional Agricultural Organisations in the European Union and General Confederation of Agricultural Co-operative in the European Union (COPA-COGECA)	Business / sectoral organization and private interest group	Social network analysis data, open-ended qualitative data
5	Directorate-General for Agriculture and Rural Development (DG AGRI)	EU-related organization or agency	Social network analysis data
6	Directorate-General for Climate Action (DG CLIMA)	EU-related organization or agency	Social network analysis data
7	Directorate-General for the Environment (DG ENV)	EU-related organization or agency	Social network analysis data
8	Ecosystem Services Partnership (ESP)	Science-based community or network	Social network analysis data, open-ended qualitative data
9	Eklipse	Science-policy or science-policy-society platform	Social network analysis data
10	EUROPARC Federation	Organization or network of organizations managing ecological units	Social network analysis data, open-ended qualitative data
11	European Agroforestry Federation (EURAF)	Expert / practitioner community	Social network analysis data, open-ended qualitative data
12	European Climate, Infrastructure and Environment Executive	Funding bodies for research or environmental funds	Social network analysis data

	Agency (CINEA, inc. LIFE programme)		
13	European Environmental Agency (EEA)	EU organization or agency	Social network analysis data
14	European Network of Freshwater Research Organisations (EurAqua)	Science-based community or network	Social network analysis data, open-ended qualitative data
15	European State Forest Association (EUSTAFOR)	Business / sectoral organization and private interest group	Social network analysis data, open-ended qualitative data
16	Future Earth	Science-based community or network	Social network analysis data
17	Global Biodiversity Information Facility (GBIF)	Data platform and/or research infrastructure	Social network analysis data, open-ended qualitative data
18	Global Knowledge Support Service for Biodiversity (GKSSB)	Science Service	Social network analysis data, open-ended qualitative data
19	Institute for European Environmental Policy (IEEP)	Think tank / para-research organization	Social network analysis data, open-ended qualitative data
20	Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research (eLTER)	Science-based community or network	Social network analysis data, open-ended qualitative data
21	International Network of Basins Organizations (INBO)	Networks of organization managing ecological units	Social network analysis data, open-ended qualitative data
22	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	Science-policy or science-policy-society platform	Social network analysis data
23	International Union for Conservation of Nature (IUCN) Europe	Intergovernmental / international organization	Social network analysis data, open-ended qualitative data
24	Oppla	Data platform and/or research infrastructure	Social network analysis data
25	Partnership for European Environmental Research (PEER)	Science-based community or network	Social network analysis data, open-ended qualitative data
26	The Taskforce on Nature-related Financial Disclosures (TNFD)	Business / sectoral organization and private interest group	Social network analysis data, open-ended qualitative data

27	United Nations Environment Programme (UNEP)	Intergovernmental / international organization	Social network analysis data
28	Wetlands International Europe	Public interest group	Social network analysis data, open-ended qualitative data

3.3. Analysis of data

Open-ended questions collected through the questionnaire in Task 2.1 were analysed using **qualitative content analysis** (Drisko and Maschi, 2015) through an inductive approach (e.g. questions 3 and 13 of the questionnaire, see Annex 2, Section 7.2). This means that, through a process of iterative reading and examination of the raw data, these are condensed into categories or themes, which emerge freely (i.e. without the grouping being informed by a previous theory). Close-ended questions with multiple options (questions 4, 5 and 10) were analysed using descriptive statistics. Close-ended question 6 (single option) was analysed using social network analysis (SNA).

Social network analysis has been widely applied in the context of environmental governance studies. The method has also been used to analyze 'the multiple interconnections among the various legal instruments, organizations, and public and private actors in regime complexes' (Gómez-Mera et al., 2020, p. 10). Social network analysis displays information about the network of relations and interactions between actors. In the resulting network, **nodes represent actors** and are characterized by a unique identifier and attributes (e.g. type of organization). **Edges represent the relational ties between nodes**. Edges are characterized by directions (or lack thereof) and attributes (e.g. frequency of communication). A number of statistical measurements can be derived from the analysis of the network in order to determine its characteristics. The software Gephi v 0.10 (Bastian et al., 2009) was used to calculate degree of centrality and in betweenness centrality for each actor, identifying those most interacted with and potential system brokers. An unsupervised modularity algorithm (settings: randomize on, use wedge weights on, resolution 1.25) was used to identify clusters of nodes that were more densely connected together than to the rest of the network (Blondel et al., 2008).

Table 2: Terms and definitions for the social network analysis as applied to the organizations in the science-policy-society landscape related to biodiversity.

Term	Definition	Context in this deliverable
Social network	Relations linking one actor to others, and consequently multiple actors in a social structure composed of nodes and edges.	The network unveiled by the social network analysis, composed of the number of organized actors and their interactions in the context of the biodiversity science-policy-society interface, with a focus on the EU level.

Nodes	Actors in a network.	Organized actors operating in the science-policy-society interface related to biodiversity, with a focus on the EU level.
Attributes of nodes	Variables characterising the actors of the network.	Type of organization (e.g. business / private interest group; EU organization or agency; science-based community or network); geographical scale of operations (e.g. international; EU / (pan-) European; national); See Table 3.
Edges	Relational ties between actors.	The relations (in the form of interactions) between organized actors operating in the science-policy-society interface related to biodiversity, with a focus on the EU-level. For example, communication about various biodiversity-related issues.
Direction of edges	Edges can be directed (i.e. the relationship has a direction from one node to another), undirected (no defined direction between the nodes) or mixed.	Direction of reported interaction, e.g. actor A stated that they have a relationship with actor B (direction A → B) and/or vice versa (reciprocal A ↔ B).
Attributes of edges	Variables characterising the relational ties between actors.	Frequency of interaction between two organized actors (never; less than once a year; multiple times a year; weekly).
Out-degree	Number of edges leaving a node.	Number of relations an organized actor has self-reported with others (A → B, C, D, etc.).
In-degree	Number of incoming edges to a node.	Number of relations an organized actor has according to the other actors, i.e. the number of times an actor has been nominated by others (A ← B, C, D, etc.).
Degree centrality	A measure of the number of edges a node is connected to. Centrality can be measured as in-degree or out-degree centrality, or as the sum of both. Weighted centrality considers the edge's attributes (weights).	A high degree centrality for an organization shows its 'popularity' in the network. Particularly, *in-degree centrality* indicates how many times an organized actor has been named by others, indicating its importance in information networks.
Betweenness centrality	Number of times a node represents the shortest path between other nodes.	A high betweennes centrality for an organized actor indicates its potential to be an 'intermediary' in the network, meaning its many relations and positioning in the network could be leveraged to bridge disconnected actors.
Modularity	Allows to separate the network into clusters. Higher modularity scores mean that there is a greater number of connections within communities compared to connections between them.	Thematic communities of actors (clusters) are identified by the software based on network interactions.

4. Results

4.1. Overview of organizations in the science-policy-society interface

The 215 organizations (and networks of organizations) identified through the iterative desk search were grouped into thirteen macro-categories (Table 3). The thirteen categories are not mutually exclusive, in that an organization can belong to more than one category. In our analysis we assigned one main category to each organization, and a secondary one whenever necessary. The full list of organizations (including their secondary categories) is available in Annex 1 (Section 7.2). The database is not an exhaustive list, but an overview of relevant actors and actor types, valid at the time the search was conducted.

Table 3: Types of organizations in the EU science-policy-society interface for biodiversity.

Type of organization	Example	Level
Business / sectoral organizations and private interest groups	Committee of Professional Agricultural Organisations-General Confederation of Agricultural Cooperatives (COPA-COGECA)	(Pan-) European
Conventions and other policy process	Convention on Biological Diversity (CBD)	International
Data platforms and/or research infrastructures	Biodiversity Information System for Europe (BISE)	EU
Expert / practitioner communities	European Agroforestry Federation (EURAF)	(Pan-) European
Funding bodies for research or environmental funds	Biodiversa +	EU
EU organizations or agencies	EU Biodiversity Platform (EUBP)	EU
Intergovernmental / international organizations	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	International
Networks of organizations managing ecological units (e.g. protected areas, basins)	EUROPARC Federation	EU
Public interest groups	World Wildlife Fund (WWF) European Policy Office	(Pan-) European
Science-based communities or networks (inc. citizen science)	Ecosystem Services Partnership (ESP)	International

Science services	Global Knowledge Support Service for Biodiversity (GKSSB)	International
Science-policy or science-policy-society platforms	Belgian Biodiversity Platform	National
Think tanks and para-research organizations (e.g. policy analysis)	Institute for European Environmental Policy (IEEP)	(Pan-) European

4.2. Social network analysis

The social network analysis maps the relations between organizations which were asked to disclose whether and how frequently they interacted with each other (Figures 3-5). Based on interviews with 28 organisations, the network resulted in 101 nodes and 657 connecting edges (network diameter=4; average path length=2.025; density=0.058). The number of nodes suggests that 56 more actors were additionally suggested by the interviewees, in addition to the initial list of 45 organized actors presented in the questionnaire.

The main actor groups were science-based communities or networks (16.3% of actors in the network), EU organizations or agencies (15.3%), business / sectoral organizations and private interest groups (14.4%), public interest groups (12.5%), intergovernmental / international organizations (11.5%), science-policy(-society) interfaces (6.7), data platforms and/or research infrastructures (6.7%) and expert / practitioner communities (5.7%). The majority of actors were international (34.6%), EU level (30.7%) or (Pan)European (25%), with a small part being European offices of international organizations (5.7%) or national-level actors (3.8%). Figure 3 and Table 4 highlight **the organizations with the highest in-degree centrality,** i.e. the number of times each organization in the network was named by others as an organization they interact with, and hence an indication of the importance of that organization for information networks. The organizations with the highest in-degree centrality are represented in the figure by the biggest nodes.

Table 4: The most central organizations for information exchange in the EU science-policy-society interface for biodiversity, based on in-degree centrality.

| Organization	In-degree centrality
Directorate-General for the Environment (DG ENV)	26
European Environmental Agency (EEA)	25
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	23
European Regional Office of the International Union for Conservation of Nature (IUCN Europe)	23
European Policy Office of the World-Wide Fund for Nature (WWF Europe)	22

Biodiversa+	21
United Nations Environment Programme (UNEP)	21
Food and Agriculture Organization of the United Nations (FAO)	20
EU Biodiversity Platform (EUPB)	18
DG for Maritime Affairs and Fisheries (DG MARE)	18
Knowledge Centre for Biodiversity (KCBD)	18
LIFE programme	18
Intergovernmental Panel on Climate Change (IPCC)	17

The organizations with the highest betweenness centrality (i.e. the number of times an organization represents the shortest path between other organizations) are represented in Table 5 and in Figure 4 by the biggest nodes. These have the highest potential to act as 'intermediaries' in the network, meaning they are positioned in the network so that they could, in theory, connect more peripheral actors.

Table 5: The organizations with most potential to act as an information intermediary in the EU science-policy-society interface for biodiversity, based on betweenness centrality.

Organization	Betweenness centrality
European office of the International Union for Conservation of Nature (IUCN Europe)	520.0
European Environmental Agency (EEA)	342.9
Directorate-General for the Environment (DG ENV)	213.0
European State Forest Association (EUSTAFOR)	169.1
EUROPARC Federation	165.5
United Nations Environment Programme (UNEP)	161.9
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	156.1
Capitals Coalition	142.1
Future Earth	137.5
International Network of Basin Organisations (INBO)	110.7
Committee of Professional Agricultural Organisations in the European Union and General Confederation of Agricultural Co-operative in the European Union (COPA-COGECA)	99.9
Ecosystem Services Partnership (ESP)	59.4
Directorate-General for Climate Action (DG CLIMA)	56.8
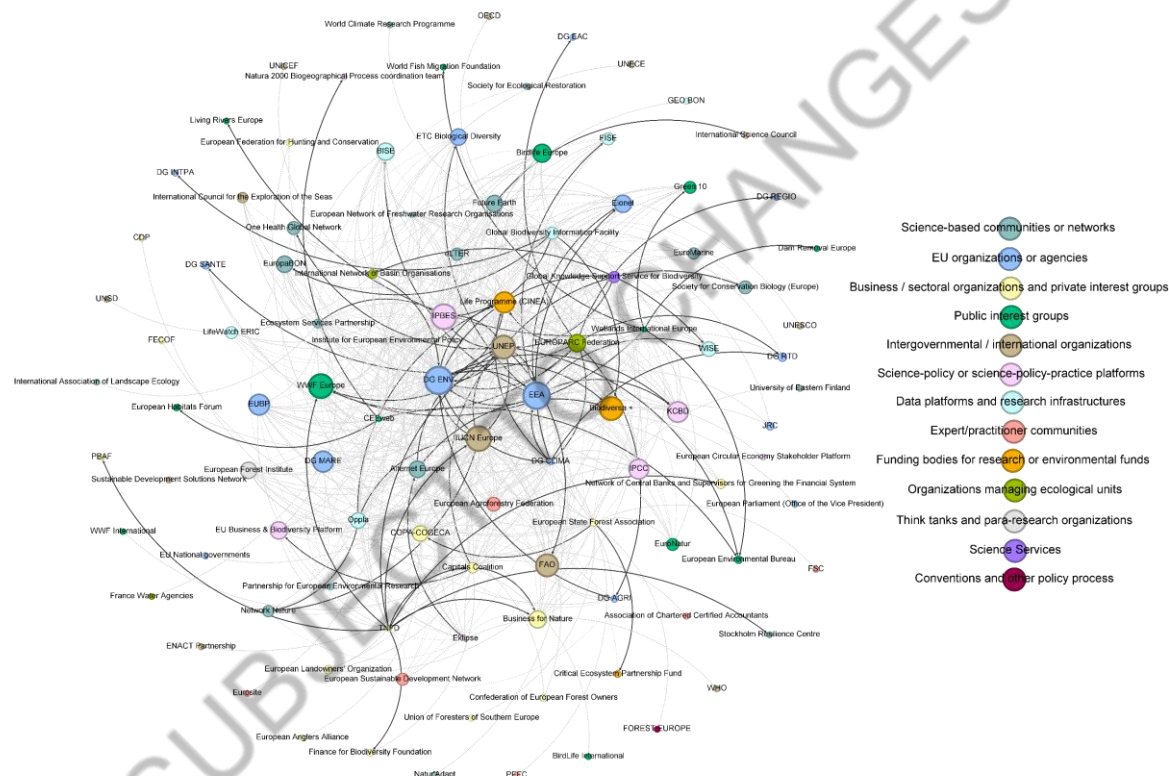
Figure 3: Network of organized actors in the biodiversity science-policy-society interface, focusing on the EU level. Light grey arrows indicate interactions occurring at least once a year; dark grey arrows indicate interactions occurring weekly. Node size is proportional to in-degree centrality. Full names for acronyms can be found in D'Amato et al. (2025).

Figure 4: Network of organized actors in the biodiversity science-policy-society interface, focusing on the EU level. Light grey arrows indicate interactions occurring at least once a year; dark grey arrows indicate interactions occurring weekly. Node size is proportional to betweenness centrality. Full names for acronyms can be found in D'Amato et al. (2025).
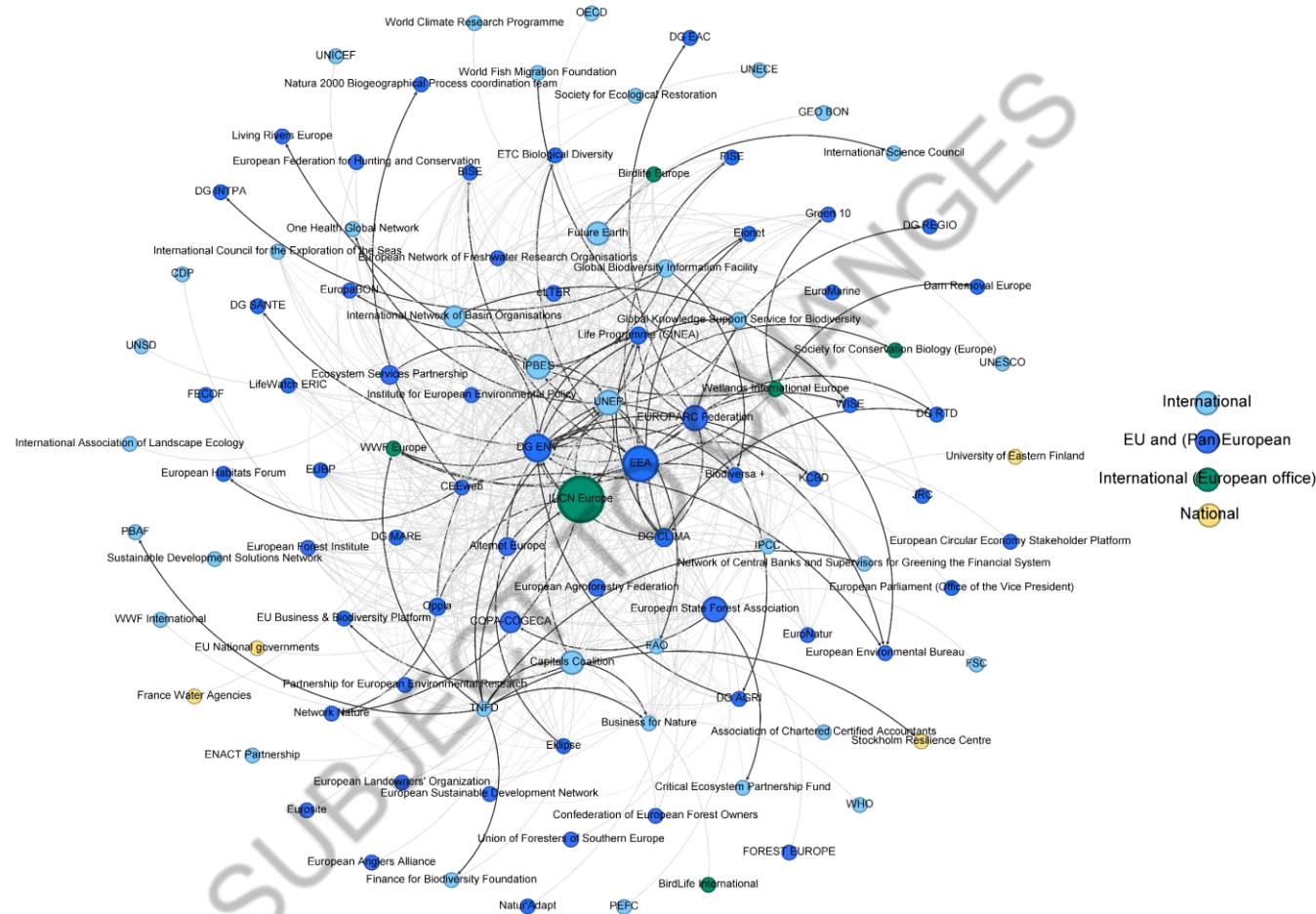
In the questionnaire, we asked respondents to state 'missing connections'. We found 327 instances when an actor knew another, but had no interaction with it, and 333 instances where one actor did not know another. The actors known but not interacted with by ten interviewees or more included the European Marine Research Network (EuroMarine), the Ecosystem Services Partnership (ESP), the European Sustainable Development Network (ESDN), the Intergovernmental Panel on Climate Change (IPCC), the One Health Global Network (OHGN), BirdLife Europe and Central Asia, the Committee of Professional Agricultural Organisations in the European Union and General Confederation of Agricultural Co-operative in the European Union (COPA-COGECA), the European Forest Institute (EFI), the Global Biodiversity Information Facility (GBIF), and the International Council for the Exploration of the Seas (ICES).

The organizations unknown by ten interviewees or more included Green 10, the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), the International Network of Basin Organizations (INBO), the Capitals Coalition, the Global Knowledge Support Service for Biodiversity (GKSSB), LifeWatch Eric, ESP, EuroNatur, the Forest Information System for Europe (FISE), ICES, NetworkNature, the Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research (eLTER), Europa Biodiversity Observation Network (EuropaBON), Oppla, the Society for Conservation Biology, and the Water Information System for Europe (WISE). By comparing the list of actors with higher betweenness centrality (Table 5) and those who are not interacted with because either unknown or for other reasons, it is possible to highlight some actors who already have a good position as brokers, and have potential to further consolidate such role in the landscape, namely the Capitals Coalition, COPA-COGECA, ESP, INBO, and Future Earth. Similarly, IPCC features as a central organization (Table 4), but there is potential to further expand connections in the biodiversity network.

Four macro communities (Figure 5) were identified using the modularity algorithm (modularity score=0.207, modularity resolution=0.360). The clusters are detected by the software based on network structure, rather than on nodes' attributes (i.e. the labels attached to the nodes by the researcher). Although seven clusters were found in total, the ones with less than three nodes were excluded. The four communities found should be interpreted based on community composition, without singling out the positioning of individual actors.

About 40% of network actors are grouped around the theme of '**biodiversity science-policy'**, with a variety of actors involved: science-based organizations and networks, governmental and international organizations, data platforms, funding agencies, public interest organizations, think tanks and science-policy-society interfaces. Examples of actors in this community are the Directorate-Generals for the Environment, Climate Action and Maritime Affairs and Fisheries (DG ENV, DG MARE, DG CLIMA), the European Environmental Agency (EEA), the Knowledge Centre for Biodiversity (KCBD), the Biodiversity Information System for Europe (BISE), Biodiversa+, LIFE programme, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Alternet, Eklipse, the Global Biodiversity Information Facility (GBIF), the Group on Earth
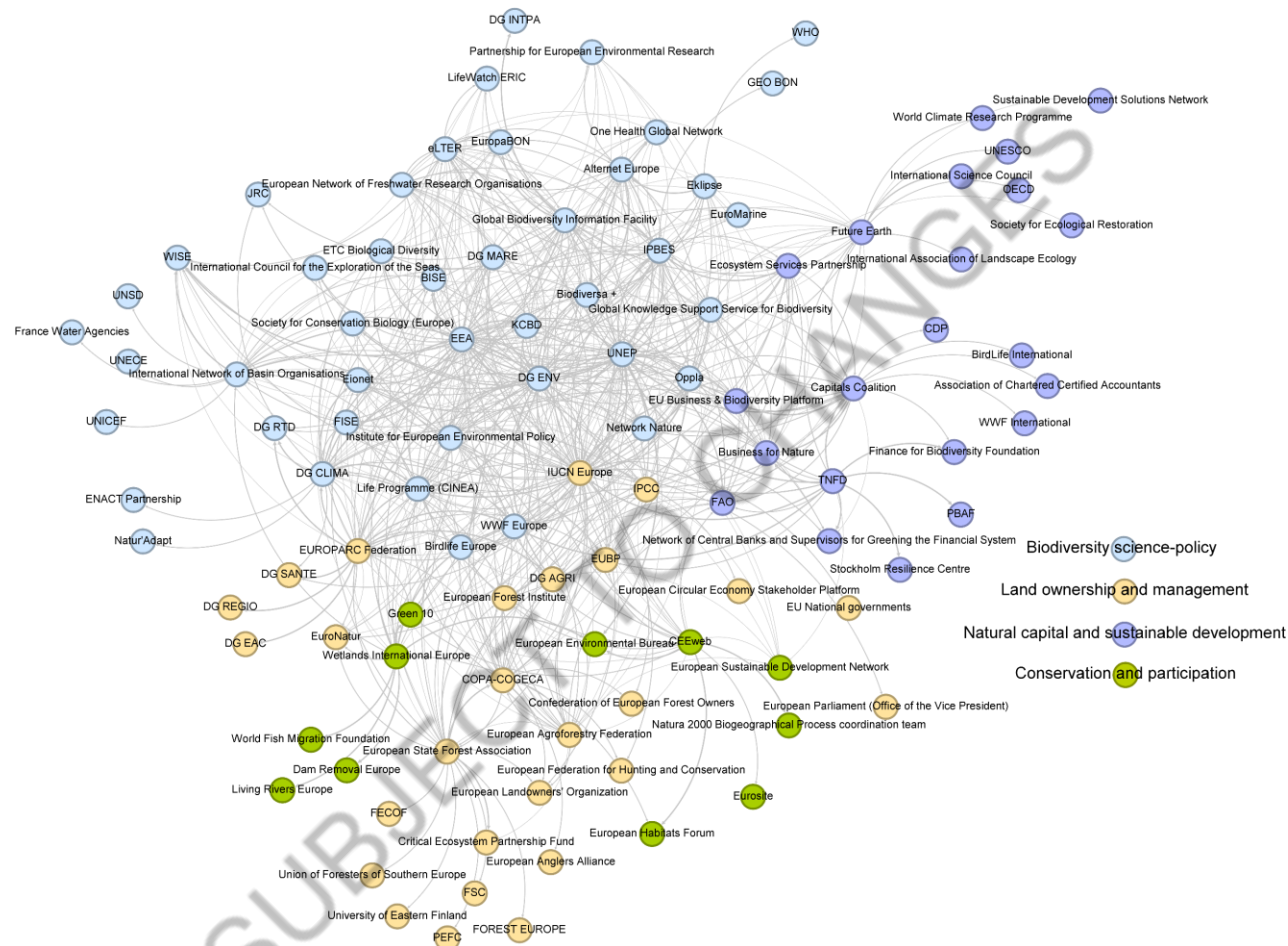
Observations Biodiversity Observation Network (GEO BON), the United Nations Statistics Division (UNSD), the European Policy Office of the World Wildlife Fund (WWF Europe), and the Institute for European Environmental Policy (IEEP).

The community labelled '**land ownership and management'** (24% of network actors) focuses on agriculture and forest systems, and it is dominated by private interest groups such as COPA-COGECA, the European Agroforestry Federation (EURAF), the European State Forest Association (EUSTAFOR), the European Landowners' Organization (ELO), and the European Anglers Alliance (EAA). Other actors in the community are EUROPARC Federation, the Directorate-General for Agriculture and Rural Development (DG AGRI), the International Union for Conservation of Nature (IUCN), and the European Forest Institute (EFI).

The '**natural capital and sustainable development'** community (23%) includes actors such as Capitals Coalition, Business for Nature, the Taskforce on Nature-related Financial Disclosures (TNFD), and Future Earth. The smallest community (10%), '**conservation and participation'** focuses on habitat conservation and restoration, with public interest group actors such as Wetlands International Europe, the European Environmental Bureau (EEB), CEEweb, and the network of conservation practitioners Eurosite.

Figure 5: Communities of organized actors identified in the EU science-policy-society interface. Full names for acronyms can be found in D'Amato et al. (2025).

4.3. Contribution of societal actors to the EU Biodiversity Strategy for 2030 and in the Science Service

4.3.1. Role of organizations in the science-policy-society interface

The 17 organizations which answered the qualitative questionnaire (administered through interviews by Task 2.1, see Section 2.2 and Table 1) covered a variety of activities in the context of biodiversity and sustainability knowledge co-creation (Figure 6). In answering the questionnaire, an organization was allowed to self-report multiple activities. **The most frequently reported activities** (by at least 40% of the organizations) were **scientific knowledge production, knowledge production other than academic research** (e.g. statistics, expert knowledge, traditional knowledge), **knowledge brokering, and data storage and management.** Some organizations suggested additional activities which were not provided among the initial options of the questionnaire, namely advocacy/lobbying and leadership.

The organizations also self-reported their competences in areas related to the implementation of the Biodiversity Strategy for 2030 (Figure 7). **The most frequently reported competences** (by at least 50% of the organizations) **were related to nature restoration, EU biodiversity governance and legislation; energy and climate change; knowledge, education and skills on biodiversity and sustainability; agriculture; soil systems; nature valuation integrated into decision-making; international cooperation, neighbourhood policy and resource mobilisation; freshwater ecosystems; forests health and resilience; urban and peri-urban green area; fostering worldwide ambition and commitment to biodiversity; business and biodiversity; and financing for biodiversity.**

Respondents also suggested that the options for competences that we had provided in the questionnaire, which were based on the targets and actions of the EU Biodiversity Strategy for 2030, were very focused on natural sciences. They pointed out that fewer options were available to open up competences related for example to social sciences and humanities, such as the circular economy, nature and health (well-being), communities and stakeholder perspectives.
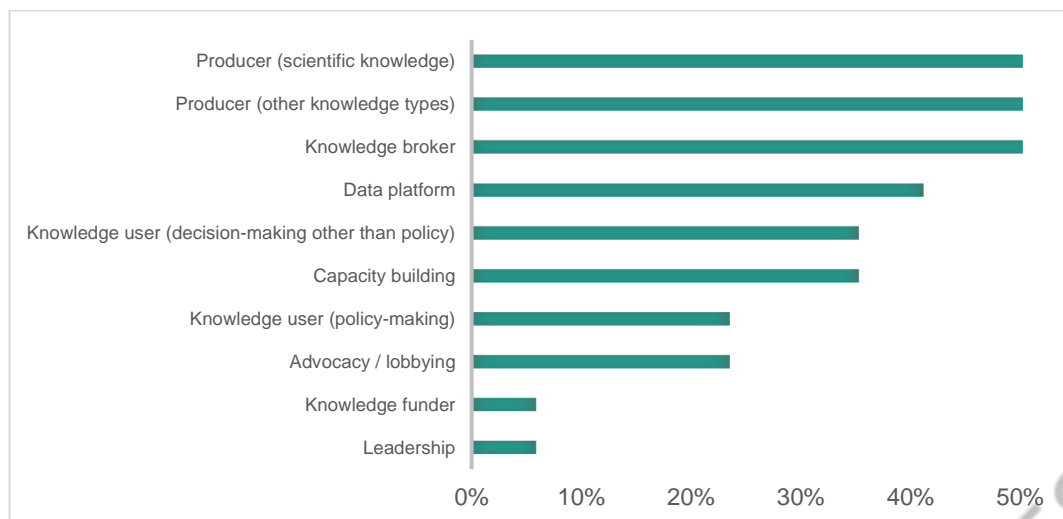
Figure 6: The main activities of the interviewed organizations (n=17) in relation to knowledge on biodiversity (the same organization could self-report multiple activities).
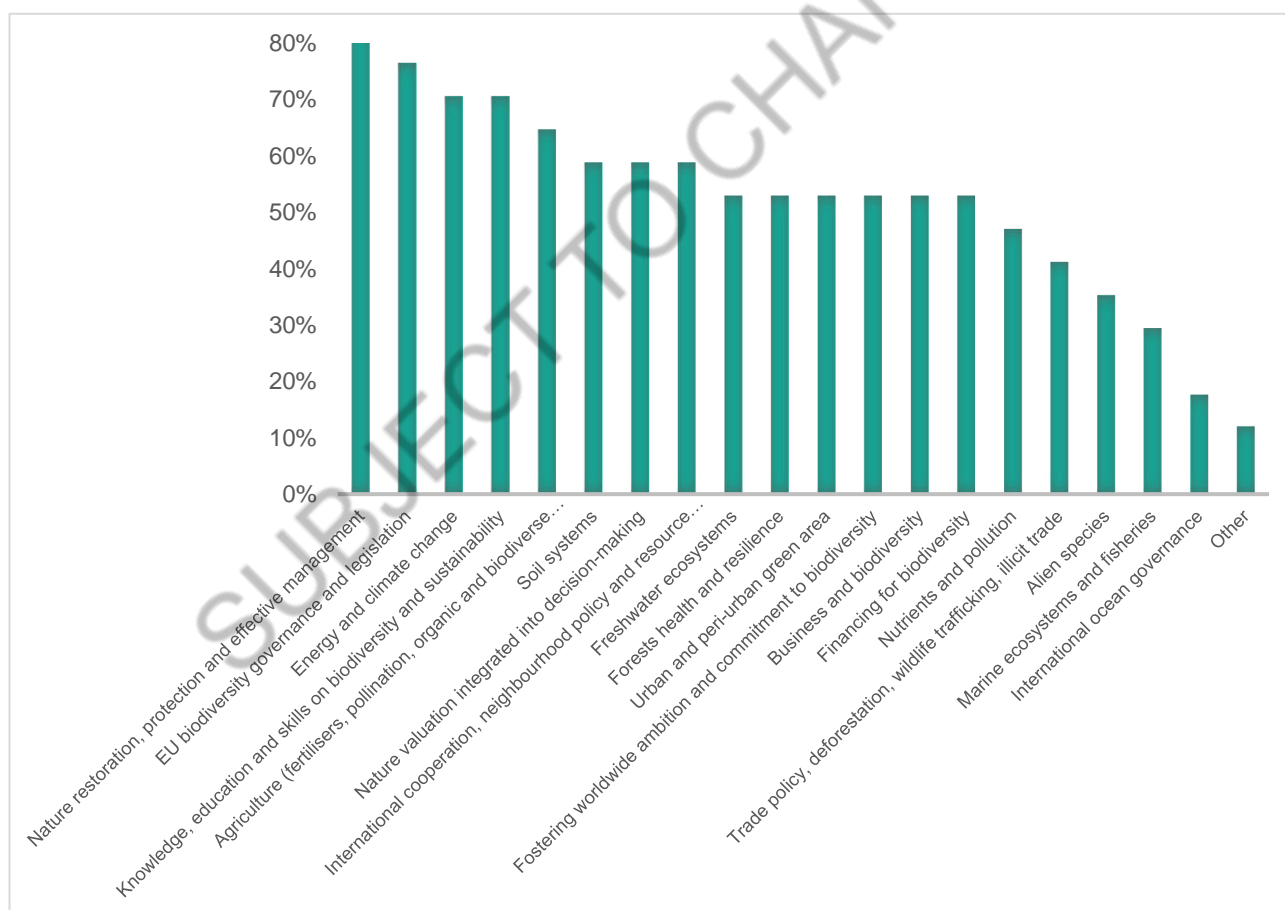

Figure 7: The main areas of competence of the interviewed organizations (n=17) in relation to the targets and actions of the EU Biodiversity Strategy for 2030 (the same organization could self-report multiple areas).

Five themes emerged from the analysis of the statements the interviewed organizations provided in regard to their ethos, i.e. their essential goal and its added value in the biodiversity landscape. Networking was highlighted across all themes as a fundamental element. Themes emerging around the ethos and/or mission of the organizations were the following (note these are not mutually exclusive):

a) acting as science-policy-society interface to advance sustainability / biodiversity conservation, for example by facilitating discussions on biodiversity and sustainability involving actors with different perspectives and values;

b) bringing individuals and/or organizations together around specific topics and aims (e.g. knowledge creation and sharing, mainstreaming the value of nature in decision-making, capacity building);

c) producing and/or gathering evidence and insight to support policy and decision-making, including standard setting;

d) promoting the adoption of biodiversity-friendly and sustainable practices and/or management of resources, such as agroforestry or sustainable forest management;

e) representing and advocating for certain issues of private or public interests, and thus influencing policies and their implementation.

4.3.2.   Societal actors enabling and disabling the implementation of the EU Biodiversity Strategy 2030

Based on the qualitative data collected from the 17 interviewed organizations (see Section 2.2 and Table 1), a variety of actors emerged as relevant in enabling or hampering the implementation of the EU Biodiversity Strategy 2030. These could be roughly divided into those influencing the implementation at a policy/political level (e.g. policymakers, scientists) and those enabling the implementation on a practical or administrative level (e.g. land managers). Overall, the answers provided by the organizations suggest that implementation requires a dynamic interaction between top-down pressures (e.g. legislation, incentives) and bottom-up pressures (e.g. public awareness and interest). As one of the respondents suggested: '*It is key that national EU or international actors in the political arena need to push the political agenda in order for the biodiversity strategy to be successfully implemented. Along this line, it is crucial to influence the stakeholders. Everyone had done such a fantastic work to get the Green Deal and the biodiversity strategy through. However, we need to keep our foot on the pedal and make sure that the remainder of the Green Deal aspects is that it remains the integrated vision for Europe and doesn't get hijacked by other political agendas, as the situation that happened with the voting of the restoration law.*'

Globally there are many **international organisations** and platforms in which the EU collaborates and tries to drive high ambition coalitions, including for example the United Nations Economic Commission for Europe (UNECE), the United Nations Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN) (the latest having an important role as a facilitator for stakeholder dialogue and provider of knowledge). **EU institutions** were unsurprisingly mentioned in the effective

implementation of the EU Biodiversity Strategy for 2030. Respondents called for cross-policy engagement of Directorate-Generals such as the Directorate-General for Maritime Affairs and Fisheries (DG MARE), the Directorate-General for Agriculture and Rural Development (DG AGRI), and the Directorate-General for Trade (DG TRADE), in addition to the Directorate-General for the Environment (DG ENV) which is the most obvious actor for the strategy. At the same time, these DGs were also mentioned as potential disablers of the Strategy in relation to pushing back more ambitious policies. One respondent explained: '*the complexity of our social systems makes it extremely difficult to create real coherence, even just related to one topic – like biodiversity conservation*'. Another respondent stated: '*Systemic change is needed, which requires the dominant and political structures to re-invent themselves. The EU is doing something good here, as the biodiversity strategy is also supported by a sustainable financing strategy which goes to the heart of the political and economic structures. At the same time, it could be argued that further commitment and effort is needed. For example, the EU taxonomy for sustainable activities does not embed biodiversity in itself; although the disclosure regulation is important, it is perhaps not necessarily embedded / focused on the deeper organizational transformations needed. Moreover, the EU is hardly addressing the reform of biodiversity-harmful incentives (energy, agriculture). DGs responsible for energy, agriculture and forestry subsidies need to play a leading role in reforming them*'. One respondent pointed out fairness could be improved in regard to the fulfilment of targets about protecting nature, for example with weighted contribution of different member states based on their possibilities and specific land use issues, and with dedicated funds to fulfil the targets of the restoration law, other than for instance common agricultural policy.

In addition to the European Commission and its agencies (e.g. European Environmental Agency, Joint Research Centre, European Climate, Infrastructure and Environment Executive Agency, the Knowledge Centre for Biodiversity) and other European institutions (CoRegions, Parliament, European Court of Justice), EU cross-border initiatives were mentioned as important actors, such as EU-funded projects (Horizon, LIFE, Interreg, Copernicus). An important avenue for the European Commission is to support the implementation by facilitating exchange between **member states**, who are truly key to the implementation of the strategy, along with their representatives, including national governments, their ministries and agencies. Beyond the pivotal role of environment ministries and environmental agencies, inter-policy collaboration was deemed crucial also within member states. Public bodies at subnational level and policy champions (i.e. active people who push for implementation in the countries) were mentioned as particularly relevant for practical implementation. However, national governments, ministries and agencies failing to set long-term political priorities and ambitions for biodiversity, also because pressures from economic and private interests, were mentioned as problematic, resulting for example in a lack of official mandates to representatives and funding to pursue certain avenues.

Collaboration with **business and the financial sector** was also mentioned in several interviews. Business sustainability multistakeholder platforms, parks and protected areas organizations, as well as farmers, foresters and fishermen unions/organisations have a role in providing guidance, capacity and network support. At national and sub-national level, **landowners and land managers**, farmers, hunters, fishermen and miners and local communities were regarded as the key actors to be engaged for the concrete implementation of biodiversity-friendly practices on the ground. Dysfunctionalities were identified in certain business or private interest groups (e.g. some landowners, primary producers and industry

organizations) recognized to lobby against change in certain circumstances, in actors slowing down efforts because they were unable or unwilling to understand and manage change, and in actors avoiding engagement (for example towards ratcheting up private investments). In addition, a market-based economic system coupled with lack of citizen and consumer awareness keeps rewarding cheaper goods and services despite potential externalities.

While **scientists and experts** were mentioned as important players in informing and influencing agenda setting of EU policies, there was a call for critical reflection on the role of science and scientists, as well as the need for science to engage with non-academic stakeholders in knowledge co-creation and sharing. One of the respondents explained that the tendency of science '*to think of itself as above, somehow, of politics is naive and can be potentially dangerous, particularly because they [the scientists] cannot ignore that science is not being used as a political weapon. The example of the nature restoration law shows that science can be interpreted and used in politics in very different ways, so it is fundamental that researchers reflect on their role and pay attention to the translation of their research since it could contribute to hindering the implementation of the biodiversity strategy*' […]*There is a clear need to bridge the gap between knowledge and policy and society, and for that, also science needs to reflect on its role and build forces with NGOs and other organisations together towards the translation of research*' [...] *There is a huge amount of data but big barriers in the presentation/translation, timeliness, type of information needed, and access to the information*', which calls for knowledge brokers and skilled communicators inside and outside science organizations. Also, it was pointed out that scientists and experts need to have a better understanding of political processes to be able to influence them.

Civil society organizations acting from local to international levels were deemed important for their ability to be aligned with the public sentiment and thus their potential for influencing policymaking. One of the interviewees suggested that': '*In terms of enabling the implementation, the NGO community and especially those that are working at international levels, whether that's European or Central Eastern European, are really important actors, and they should be recognized as such to support the implementation of the biodiversity strategy, particularly because NGOs have freedoms to operate within the political arena that governmental organizations and science bodies do not necessarily have*'. However, lack of pragmatism in demanding too ambitious goals (as opposed to incremental progress), as well as individual ability to engage with organizations holding different values and agendas, by conservation organizations was in some cases pointed out as an obstacle to dialogue and engagement.

The respondents were also asked to elaborate on the relevance of specific challenges to the implementation of the EU Biodiversity Strategy for 2030, as well as on the potential actors able to mitigate them. The challenges (as identified by BioAgora's Deliverable 1.1, Lenti et al., 2023) included knowledge availability, funding allocated for biodiversity conservation, horizontal policy coherence, management effectiveness of area-based conservation, lack of systematic conservation planning, vertical policy coherence, stakeholder engagement, and dominant economic and political structures (see Section 2.1 for full definitions). On average, all challenges were confirmed to be of relevance to the implementation of the strategy, although their severity was sometimes deemed to vary across member states (Table 6).

Table 6: Main challenges to the implementation of the EU Biodiversity Strategy for 2030 and actors involved in addressing them.

Challenge	Actors involved in addressing the challenge
Knowledge availability	Knowledge gaps (e.g. costs-benefits of changing practices and sustainability transition, conditions of certain habitats) to be assessed and funded by ministries, governmental agencies, science organizations and other knowledge producers. Knowledge producers responsible for openness and transparency of data/knowledge accessibility. Dearth of skilled knowledge brokers (scientists or other actors) to translate and convey digestible information to policymakers and other actors (e.g. business and private interest groups) and raise awareness on data availability. Cooperation between States and policy-making can foster the disclosure and use of available knowledge (e.g. open access science, mandating companies to assess and disclose impacts and dependencies on ecosystem services).
Funding allocated to biodiversity conservation	DG ENV, national and sub-national authorities to analyse funding gaps and costs of transitions, and enhance long-term public funding by also leveraging policies not directly targeted to biodiversity or nature restoration, e.g. agriculture, regional development, energy and recovery/resilience policies. Private investments require financial institutions and civil society to demand change (e.g. dismiss perverse incentives, aligning financial flow with biodiversity outcomes, nudging private actors towards biodiversity-friendly measures, reducing impact before restoring).
Horizontal policy coherence	Public authorities (EU and national institutions) to enhance cooperation (e.g. between DGs) in implementing complex policies, engage investors and addressing push back by industry in regard to policies affecting the private sector (e.g., EU Corporate Sustainability Reporting Directive). Silo thinking in policy and science to be avoided in favour of more systemic, solution-oriented thinking.
Management effectiveness of area-based conservation	National/sub-national authorities and protected areas managers must address gaps in planning and set clear objectives and measures at landscape level. Fostering biodiversity-friendly practices outside nature conservation areas starts with related institutions (e.g., Directorate-General for Agriculture and Rural Development). Environmental organisations and citizens/to pressure towards change. Science to shift towards innovative, solution-oriented approaches.
Lack of systematic conservation planning	European commission to enhance legal frameworks through a clearer land-use strategies/visions (e.g. forest-related legislative proposals not aligned). National and sub-national authorities should interact with researchers and protected area managers at all levels for spatial planning. Strong agricultural and forestry lobbies may hamper cross sectoral and systemic thinking in institutions, and thus systematic planning.
Vertical policy implementation	Members states, national ministries and agencies, and local policy champions are key in effectively/concretely implementing EU policies. Need to align EU and national strategies with global biodiversity targets as well. Excessive emphasis on vertical policy coherence however implies celebration of top-down policymaking, while a disconnect between the local/regional/EU level results in lack of ground-level understanding how and why EU policies are decided and should be implemented.
Stakeholder engagement	Private and public decision makers (e.g. primary producers, local communities) to be engaged with better and more inclusive communication in consideration of different stakeholder values and perspectives to promote ownership of the environmental targets by the non-environmental organizations. Intermediary organizations to fill this gap include civil society organizations, business and private interest groups, national governments, scientific institutions and citizen science organizations. Education throughout the entire spectrum of ages to develop knowledge and awareness as a generational challenge.

Dominant economic and political system	Short-term thinking, decision-making and investments (e.g. measured in legislative periods) treat symptoms rather than causes, while the unaccounted costs of loss and biodiversity systems externalized in the economic system. Need for policymaking at EU and national level to drive forward ambitious nature restoration targets ,through more agency and resources for biodiversity actors. Beyond the conservation community, need to change business models and consumption behaviours. International protectionism and trade dynamics lead the EU to consider how to protect own industries, shifting focus from sustainability issues.

4.3.3. Societal actors needed for an inclusive, effective and credible Science Service

The 17 organizations who participated in the qualitative interviews (see Section 4.3.1 and Table 1) were asked what kind of actors should participate in the Science Service to be effective, credible and inclusive. As stated by one of the interviewees: *'the fact that research needs to be tailored to the policy implementation and to the needs of society in a timely manner is a critical point'.* According to the interviewees, **the Science Service should thus include representatives from both scientific and policy community**, but it should not be dominated by one side, and especially it should not be science dominated. In the context of policymaking, the engagement of member-state levels, in addition to the EU-level was mentioned, including as well as that of policymakers at regional and local levels, of national agencies in charge of biodiversity protection and UN agencies.

In addition to policymakers and scientists, several respondents aligned with the view that **participation of multiple knowledge providers is needed**, '*considering that knowledge does not come from science*' (as one interviewee explained). **Expert knowledge was thus to be also sought from knowledge providers other than scientists**, including conservation or other relevant NGOs, private land managers, strategic environmental and spatial planners, protected areas managers and planners, field experts, experimental and innovation communities or projects showcasing good practices and real-life solutions and evidence-based results, as well as Indigenous peoples and local communities involved in the generation and use of biodiversity knowledge. On top of their role as providers of expert knowledge, **organizations other than those dedicated to science and policy were mentioned as potential brokers and intermediaries**. For example, platforms dedicated to business viability and sustainability (e.g. chambers of commerce) were suggested to be conveners fostering cooperation with business organizations.

Finally, some respondents also suggested that the **knowledge developed in the Science Service should be available to actors other than policymakers, in particular those involved in the practical implementation of the Biodiversity strategy in Europe**, including for example laypeople such as citizens, local groups and landowners. One respondent explained that '*the Science Service should be accessible to everyone, not just policymakers, but also people on the ground who are responsible for the concrete implementation of the strategy, and for knowledge brokers who can channel that*

knowledge further to 'laypeople'. It should be focused on how to better educate groups, and on the creation of knowledge groups and/or groups of implementors'.

The need for a **fair, inclusive and participatory Science Service** was highlighted in some interviews, especially in relation to the involvement of non-science and non-policy actors. One interviewee invited '*to consider the structure in which these actors interact to avoid current power and rigid structures that hinder the implementation of the strategy. This could also contribute to a more effective, credible and inclusive approach in which policymakers, science, practitioners and society have more balanced and constructive relations*'. One of the respondents also signalled a risk in involving non-policy and non-science actors related to their tendency to dominate the discussion or affect narratives in certain directions. Finally, in regard to the skills needed in the Science Service, '*good communicators who have standing would be important in such a mechanism, but these people are hard to find and are busy*'.

5. Conclusions and recommendations

In 2020, the European Union has adopted a new Biodiversity Strategy until 2030 as part of the Green Deal, a wider ambitious policy package which places strong emphasis on sustainability. Knowledge availability, accessibility and uptake is one of the pivotal challenges towards implementing the Biodiversity Strategy for 2030. In addition to addressing knowledge gaps, there is a strong need to improve the flow of information between scientists (as well as other knowledge providers) and decisionmakers, especially policymakers.

To address the challenge of enabling an efficient dialogue between biodiversity research, data and expertise and the needs for actionable knowledge for decision-making, the European Commission is investing in a number of measures which complement existing public and private efforts at national and international scales. Key among such measures, the Science Service for Biodiversity will be developed, through BioAgora project, as the principal EU mechanism to connect research and knowledge on biodiversity to the needs of policy making through a continuous dialogue. The final structure, functions, and governance of the Science Service is to be co-developed through iterations and interactions with several actors in science, policymaking, practice and society. Effective science-policy interfaces are typically measured against the criteria of credibility, legitimacy and relevance, meaning that the Science Service will need to be effective and efficient in providing valid, reliable, timely and useful knowledge, while being fair and inclusive in taking into account plural societal values.

The analyses presented in this document support the development of the forthcoming Science Service by mapping the organized actors and defining their roles in the science-policy-society interface for biodiversity. These actors include, for example, EU and intergovernmental organizations, civil society organizations, private interest groups, research organizations, think tanks, and data management platforms. We focused on organizations and networks of organizations operating at European level, but we also included relevant national and international actors. Overall, the results are useful in two ways. First, they allow to develop a preliminary framework for categorising actors

based on their institutional roles, part-taking in knowledge co-creation processes, and competence areas. These categories can be operationalised in the future work in BioAgora and in the Science Service towards the identification and management of relevant stakeholders. Second, the results offer insights about potentially important stakeholders for the Science Service, in addition to those already explicitly included in its governance. These include, for example, knowledge providers, brokers, and potential user groups for the Science Service other than policymakers. Accordingly, recommendations for BioAgora and the Science Service are articulated as follows.

1) A framework for categorising actors in the science-policy-society interface

Part of the work in this deliverable included developing a **categorization of stakeholders in the Science Service** based on their main institutional role (e.g. EU and intergovernmental organizations, science-based communities or networks, public and private interest groups, see Table 3); based on the activities they part-take in the knowledge co-creation value chain (e.g. knowledge production, knowledge brokering, capacity building, advocacy/lobbying, see Figure 5); and based on their competence areas (e.g. nature restoration, energy, freshwater ecosystems, alien species, governance, business, knowledge and education, international cooperation, see Figure 6). These frameworks will be useful to **navigate stakeholder engagement, communication and dissemination** in the Science Service (see target groups already identified in Deliverable 7.1). We recommend using and refining these categories in **BioAgora's future work**, for example in the development of a stakeholder database for the Science Service.

2) Relevant stakeholders for the Science Service

The social network analysis (Section 4.2) revealed an heterogeneous network of organized actors, including a a good balance of science-based communities or networks, EU organizations or agencies, intergovernmental / international organizations, public interest groups, and business / sectoral organizations and private interest groups. Numerically, the network included fewer data platforms and/or research infrastructures, expert and practitioner communities, (networks of) organizations managing ecological units, think tanks, science services, and funding bodies for research or environmental funds, and science-policy(-society) platforms. The network was almost equally composed of organizations representing international, EU or Pan-)European levels, while few national organizations were identified in the network (understandably, as the interviewed organizations operated at European or international level).

With the notable exception of the European Policy Office of the World Wide Fund for Nature (WWF Europe), **the most central organizations in the network** (meaning the ones that had been most frequently named by others, i.e. not self-reported), **were EU and other intergovernmental organizations**: the Directorate-General for the Environment (DG ENV), the European Environmental Agency (EEA), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the European Regional Office of the International Union for Conservation of Nature (IUCN Europe), Biodiversa+, the United Nations Environment Programme (UNEP), the Food and Agriculture Organization (FAO), the Knowledge Centre for Biodiversity (KCBD), the Life Programme, and the Intergovernmental Panel on Climate Change (IPCC).

A more varied mixed of organizations were found to hold potential to act as bridges between unconnected actors, due to their central position in the network as nodes representing the shortest paths between other actors. These included EU and other intergovernmental organizations, such as the European office of the International Union for Conservation of Nature (IUCN Europe), the European Environmental Agency (EEA), the Directorate-General for the Environment (DG ENV), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the United Nations Environment Programme (UNEP); as well as private sector organizations, such as the European State Forest Association (EUSTAFOR), the Capitals Coalition, the Committee of Professional Agricultural Organisations-General Confederation of Agricultural Cooperatives (COPA-COGECA); organizations dedicated to the management of ecological units, like EUROPARC Federation, the International Network of Basins Organizations; and science-based networks, likeFuture Earth and the Ecosystem Services Partnership (ESP).

The thematic grouping of network actors reveals four communities. A large community of actors interact on the co-production of data and knowledge for EU policy-making, including EU government organizations, data platforms, and mediating mechanisms such as Alternet, and Eklipse. A second community of actors interact around the themes of landownership and management, with a focus on agriculture and forest systems. This community included many landownership unions and similar interest groups. A third community is about sustainable development, especially represented by actors dedicated to natural capital valuation and business sustainability. The smallest community is about habitat conservation and restoration dominated by public interest group actors.

Overall, the role of **DG ENV was dominant in the network compared to other Directorate-General departments**. **Some organizations remain disconnected, despite being aware of each other.** Although not all organizations have institutional reasons to interact (e.g. their work is not strictly relevant to each other), some missing interactions may be due, for example, to a lack of trust, willingness to collaborate (ideological or personal), or ability to network. Based on the results we suggest that areas for strengthening the network include increasing the role of data plarforms and/or research infrastructures (e.g. the Biodiversity, Forest and Water Information Systems for Europe BISE, FISE, and WISE), as well as the role of freshwater and marine organizations, which remains limited in the network.

The social network analysis, however, should not be interpreted as a performance evaluation. The results are influenced by the number and type of organizations consulted for gathering the data. To mitigate this issue, during the data collection process, we strived to interview different types of actors (in terms of societal role and agenda), carefully selected among the ones widely recognized as the pivotal ones in the biodiversity science-policy-landscape in Europe. Nonetheless, the results are to be considered as exploratory. Moreover, because of the very nature of the method used, the social network analysis fails to capture actors who are currently not well-established and embedded in the existing network of interactions. As networks are temporally dynamic, with new actors and relations emerging and others dissolving, the social network analysis only offers a snapshot picture of the network, which is fixed in time. To this end, a more extensive list of organizations operating in the

science-policy-practice interface is provided in the supplementary material to complement the social network analysis (Section 4.2 and Annex 1 in Section 7.1).

The qualitative analysis (Section 4.3) revealed that the multiple public and private actors from international to local level deemed responsible for the implementation of the strategy are seen simultaneously as potential enablers and disablers in reference to general and specific implementation challenges. These actors included international organizations, the European Commission, its agencies and the member states, the business and financial sector, landowners and managers, scientists and experts, and civil society. Overall, the interviews confirmed that **the Science Service is expected to be inclusive both in terms of potential participants to knowledge production (e.g. expert knowledge) as well as in terms of beneficiaries/users of such knowledge extending beyond to policymakers (e.g. citizens, groups).** These considerations offer points of reflection to underpin the fair and inclusive functioning of the Science Service

The overall findings from the deliverable should be considered in BioAgora's work related to the governance, inclusiveness, and collective agency of the forthcoming Science Service. The findings, and especially the community analysis in the deliverable, can provide relevant insights for BioAgora's function dedicated to creating and supporting thematic networks. **Future efforts in BioAgora should be spent on strengthening the network and further identifying and including marginal or unrecognized actors and actor types** operating in the realm of biodiversity and related sustainability issues. It would also be useful to **further explore the reasons underpinning actors' lack of engagement**. Finally, a key point for BioAgora and the Science Service is **how to reconcile inclusiveness and rigour in the context of knowledge co-creation**, or in other words, how to integrate non-scientific knowledge into the scientific method for the purpose of supporting sound evidence for policy and decision-making.

Key considerations for the further development of the Science Service

1. The categorizations of actors based on institutional role, position in the knowledge co-creation value chain, and key competence areas can be used to inform stakeholder engagement in the Science Service, for example in developing a stakeholder database, and in involving and diversifying participants in knowledge requests and in topical networks.

2. The analysis confirmed the most central actors in the EU biodiversity science-policy-society interface, who are to be considered as integral to the development of the Science Service. These are well-established EU and other intergovernmental organizations.

3. Potential network brokers, who could be further leveraged in the Science Service, include private interest actors, organizations dedicated to the management of ecological units, and science-based networks. The role of data platform and/or research infrastructure in the network could be further strengthened. Overall, non-policy and non-science actors have an important role to play in co-creating solutions in the context of the EU Biodiversity Strategy for 2030.

4. More deliberative and participatory methods may be needed to identify relevant, but currently marginal, unconnected and/or unrecognized actors and actor types. Future efforts in BioAgora should consider biodiversity expertise beyond natural sciences, for example related to social sciences (other than economics) and humanities, health sciences, and local and indigenous knowledge. Freshwater and marine issues need strengthening in the biodiversity science-policy-society interface.

5. Developing inclusive, transdisciplinary and scientifically robust co-creation mechanisms underpinning the Science Service remains a key challenge.

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6. References

Balian, E., Berhault, A., Jones-Walters, J., Torre-Marin, A., Neßhöver, C., Vandewalle, M. 2012. Overview of experts and requesters of a potential NoK: Mapping knowledge holders, identifying requesters and barriers on how to link them. Deliverable 1.1 of the KNEU project (Developing a Knowledge Network for EUropean expertise on biodiversity and ecosystem services to inform policy making economic sectors).

Bastian, M., Heymann, S., & Jacomy, M. 2009. Gephi: An Open Source Software for Exploring and Manipulating Networks. Proceedings of the International AAAI Conference on Web and Social Media, 3(1), 361-362. https://doi.org/10.1609/icwsm.v3i1.13937

D'Amato, D., Rantala, S., Korhonen-Kurki, K. (2025). Organized actors at the biodiversity science-policy-interface (Version 2) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10077772

Drisko, J., Maschi, T. 2015. Content Analysis. Pocket Guides to Social Work Research Methods. Oxford Academic, New York.

Forsyth, T. 2003. Critical Political Ecology: The Politics of Environmental Science. Routledge, New York.

Gómez-Mera, L., Morin, L., Van de Graaf, T. 2020. Regime Complexes. In: Biermann, F., Kim, R.E. Architectures of Earth System Governance. Cambridge University Press.

Guerrero, A.M., Barnes, M., Bodin, Ö., Chadès, I., Davis, K.J., Iftekhar, M.S., Morgans, C., Wilson, K.A. (2020). Key considerations and challenges in the application of social-network research for environmental decision making. Conservation Biology 34, 733-742. https://doi.org/10.1111/cobi.13461

Hakkarainen, V., Mäkinen-Rostedt, K.E., Horcea-Milcu, A-I., D'Amato, D., Jämsä, J., Soini, K. 2022. Transdisciplinary research in natural resources management: Towards an integrative and transformative use of co-concepts. Sustainable Development 30(2), 309-325. https://doi.org/10.1002/sd.2276

Heink, U., Marquard, E., Heubach, K., Jax, K., Kugel, C., Neßhöver, C., Neumann, R.K., Paulsch, A., Tilch, S., Timaeus, J., Vandewalle, M. 2015. Conceptualizing credibility, relevance and legitimacy for evaluating the effectiveness of science–policy interfaces: Challenges and opportunities. Science and Public Policy 42(5), 676–689. https://doi.org/10.1093/scipol/scu082

Hermoso, V., Carvalho, S.B., Giakoumi, S., Goldsborough, D., Katsanevakis, S., Leontiou, S., Markantonatou, V., Rumes, B., Vogiatzakis, I.N., Yates, K.L. 2022. The EU biodiversity strategy for 2030:

opportunities and challenges on the path towards biodiversity recovery. Environmental Science & Policy 127, 263-271. https://doi.org/10.1016/j.envsci.2021.10.028

Kelemen, E., Pataki, G., Konstantinou, Z., Varumo, L., Paloniemi, R., Pereira, T.R., Sousa-Pinto, I., Vandewalle, M., Young, J. 2021. Networks at the science-policy-interface: challenges, opportunities and the viability of the 'network-of-networks' approach. Environmental Science & Policy 123, 91-98. https://doi.org/10.1016/j.envsci.2021.05.008

Lenti, A., Kelemen, E., Czett, K., Carla, K., Pataki, G. 2023. Typology of challenges that hinder the implementation of BDS 2030. Zenodo. https://doi.org/10.5281/zenodo.7685651

Marei Viti, M., Gkimtsas, G., Liquete, C., Dubois, G., Borg, J., Dalla Costa, S., Teller, A., Hauser, R., Robuchon, M. 2024. Introducing the progress monitoring tools of the EU Biodiversity Strategy for 2030. Ecological Indicators 164, 112147. https://doi.org/10.1016/j.ecolind.2024.112147

McConney, P., Fanning, L., Mahon, R., Simmons, B. 2016. A First Look at the Science-Policy Interface for Ocean Governance in the Caribbean Region. Frontiers in Marine Science 2, 119. https://doi.org/10.3389/fmars.2015.00119

Miller, C.A., Wyborn, C. 2020. Co-production in global sustainability: histories and theories. Environmental Science & Policy 113, 88-95. https://doi.org/10.1016/j.envsci.2018.01.016

Morin, J. F., Louafi, S., Orsini, A., Oubenal, M. 2017. Boundary organizations in regime complexes: a social network profile of IPBES. Journal of International Relations and Development 20(3), 543-577. https://doi.org/10.1057/s41268-016-0006-8

Nesshöver, C., Vandewalle, M., Wittmer, H., Balian, E.V., Carmen, E., Geijzendorffer, I.R., Görg, C., Jongman, R., Livoreil, B., Santamaria, L., Schindler, S., Settele, J., Sousa Pinto, I., Török, K., van Dijk, J., Watt, A., Young, J.C., Zulka, K.P., the KNEU Project Team. 2016. The Network of Knowledge approach – improving the science and society dialogue on biodiversity and ecosystem services in Europe. Biodiversity and Conservation 25 (7), 1215-1233. https://doi.org/10.1007/s10531-016-1127-5

Raustiala K, Victor DG. 2004. The Regime Complex for Plant Genetic Resources. International Organization. 58(2), 277-309. https://doi.org/10.1017/S0020818304582036

Sarkki, S., Balian, E., Heink, U., Keune, H., Nesshöver, C., Niemelä, J., Tinch, R., Van Den Hove, S., Watt, A., Waylen, K.A., Young, J.C. 2020. Managing science-policy interfaces for impact: Interactions within the environmental governance meshwork. Environmental Science & Policy 113, 21-30. https://doi.org/10.1016/j.envsci.2019.05.011

Sarkki, S., Niemelä, J., Tinch, R., van den Hove, S., Watt, A., Young, J. 2014. Balancing credibility, relevance and legitimacy: a critical assessment of trade-offs in science–policy interfaces. Science and Public Policy. 41(2), 194–206. https://doi.org/10.1093/scipol/sct046

Schorr, B., Braig, M., Fritz, B., Schütt, B. 2021. The Global Knowledge Value Chain on Sustainability: Addressing Fragmentations through International Academic Partnerships. Sustainability 13(17), 9930. https://doi.org/10.3390/su13179930

Stepanova, O., Saldert, M. Polk, H. 2020. Understanding mechanisms of conflict resolution beyond collaboration: an interdisciplinary typology of knowledge types and their integration in practice. Sustainability Science 15, 263-279. https://doi.org/10.1007/s11625-019-00690-z

Tinch, R., Balian, E., Carss, D., De Blas, E. Geamana, N.A., Heink, U., Keune, H., Nesshöver, C., Niemelä, K., Sarkki, S., Thibon, M., Timaeus, J., Vadineanu, A., van den Hove, S., Watt, A., Waylen, K.A., Wittmer, H., Young, J.C. 2018. Science-policy interfaces for biodiversity: dynamic learning environments for successful impact. Biodiversity and Conservation, 27(7), 1679–702. https://doi.org/10.1007/s10531-016-1155-1

van den Hove, S. 2007. A rationale for science–policy interfaces. Futures 39(7), 807-826. https://doi.org/10.1016/j.futures.2006.12.004

Wang, C.L., Ahmed, P.K. 2005. The knowledge value chain: a pragmatic knowledge implementation network. Handbook of Business Strategy 6(1), 321-326. https://doi.org/10.1108/08944310510558115

Watt, A.D., Ainsworth, G., Balian, E., Cojocaru, G., Darbi, M., Dicks, L., Eggermont, H., Furman, F., Goudeseune, L., Huybrecht, P., Kelemen, E., Koch, F., Konstantinou, Z., Livoreil, B., Locher-Krause, K., Lux, A., Lyytimäki , J., Mehring, M., Neßhöver, C., Paloniemi, R., Saarela, S-R., Saarikoski, H., Sousa Pinto, I., Vandewalle, M., Varjopuro, R., Varumo, L., Wittmer, H., Young, J.C. 2019. EKLIPSE: engaging knowledge holders and networks for evidence-informed European policy on biodiversity and ecosystem services. Evidence and Policy 15(2), 253-264. https://doi.org/10.1332/174426418X15314036194114

Young, J.C., Watt, A.D. van den Hove, S., the SPIRAL project team. 2013. The SPIRAL synthesis report: A resource book on science-policy interfaces. https://oppla.eu/product/24372

7. Annexes

7.1. Annex 1 List of biodiversity-related organizations in the science-policy-society interface

The full list of 211 biodiversity-related organizations and networks of organizations operating in the science-policy-society interface (focus on EU level), developed in the context of this deliverable (Section 3.1) is available at the following sources.

D'Amato, D., Rantala, S., Korhonen-Kurki, K. (2025). Organized actors at the biodiversity science-policy-interface (Version 2) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10077772

7.2. Annex 2 Questionnaire used for the data collection

bioagora

https://bioagora.eu/

Invitation to take part as a respondent in a scientific study about the biodiversity science-policy interface

BioAgora is a collaborative project funded by the Horizon Europe programme (Project No.: 101059438). Your participation to this survey supports our work in developing the forthcoming Science Service for Biodiversity, which will be the principal EU mechanism to connect research and other forms of knowledge on biodiversity to the needs of decision-making towards the implementation of the EU Biodiversity Strategy for 2030.

1. Data Protection *

⦿ I consent to the collection and processing of the data as described above

2. What is the name of the organization you represent and your role in it?

3. What is the essential goal of your organization and its added value in the landscape of organizations working for the protection of biodiversity (e.g. why was it created, what makes it unique)?

4. What is the main role of your organization in relation to knowledge on biodiversity? *You can choose more than one option.*

- ☐ We mainly produce scientific knowledge (e.g. universities, research institutes, research projects, research networks)
- ☐ We mainly produce knowledge other than scientific, such as statistics, expert knowledge, traditional knowledge (e.g. practitioners, NGOs, companies)
- ☐ We mainly manage data platforms and information systems (available to third parties freely or after a fee)
- ☐ We mainly provide financial or other type of support to knowledge production, distribution or request/use (e.g. national or international funding agencies)
- ☐ We mainly broker knowledge (e.g. national or international science-policy platforms)
- ☐ We mainly request and make use of knowledge to make policy decisions (e.g. local or national policy makers)
- ☐ We mainly request and make use of knowledge to support or operate other forms of decision-making (e.g. business, unions, consumers)
- ☐ We mainly develop and strengthen the skills of people (e.g.training courses for experts, practitioners, managers, workers) ....
- ☐ Other, please specify:

5. What are the main areas of competence of your organization? *You can choose more than one option.*

- ☐ Nature restoration, protection and effective management
- ☐ Agriculture (fertilisers, pollination, organic and biodiverse management)
- ☐ Forests health and resilience
- ☐ Soil systems
- ☐ Energy and climate change
- ☐ Freshwater ecosystems
- ☐ Alien species
- ☐ Nutrients and pollution
- ☐ Urban and peri-urban green area
- ☐ Marine ecosystems and fisheries
- ☐ EU biodiversity governance and legislation
- ☐ Business and biodiversity
- ☐ Financing for biodiversity
- ☐ Nature valuation integrated into decision-making
- ☐ Knowledge, education and skills on biodiversity and sustainability
- ☐ Fostering worldwide ambition and commitment to biodiversity
- ☐ International ocean governance
- ☐ Trade policy, deforestation, wildlife trafficking, illicit trade
- ☐ International cooperation, neighbourhood policy and resource mobilisation
- ☐ Other, please specify: ....

6. Who are the main actors you interact with in regard to the implementation of the EU Biodiversity Strategy 2030 and what is your relationship with them? *Not all organizations may be relevant or known to yours, but the aggregate answers will help us understand how multiple organizations interact with each other.*

	Frequency of contact (if organization is known but there is no interaction, choose "never")	The organization		If you wish to mention other organizations, specify the name here you may also use this box to add other comments
		supplies us with e.g. knowledge, capacities, resources	is our user / target group for e.g. information, lobbying	
A Long-Term Biodiversity, Ecosystem and Awareness Research Network (Alternet)	Organization unknown — Organization unknown / Weekly	☑	☐	
Biodiversa+	Never — Organization unknown / Weekly	☐	☑	
Biodiversity Information System for Europe (BISE)	Less than once a year — Organization unknown / Weekly	☑	☑	
BirdLife Europe and Central Asia	Multiple times a year — Organization unknown / Weekly	☐	☐	
Business for Nature	Weekly — Organization unknown / Weekly	☐	☐	
Capitals Coalition	Organization unknown — Organization unknown / Weekly	☐	☐	
Committee of Professional Agricultural Organisations-General Confederation of Agricultural Cooperatives (COPA-COGECA)	Organization unknown — Organization unknown / Weekly	☐	☐	
Ecosystem Services Partnership	Organization unknown — Organization unknown / Weekly	☐	☐	
EU Biodiversity Platform (EUBP)	Organization unknown — Organization unknown / Weekly	☐	☐	

Organization				
EU Business & Biodiversity Platform	Organization unknown / Organization unknown / Weekly	☐	☐	
EuroNatur	Organization unknown / Organization unknown / Weekly	☐	☐	
EuropaBON	Organization unknown / Organization unknown / Weekly	☐	☐	
EUROPARC Federation	Organization unknown / Organization unknown / Weekly	☐	☐	
European Agroforestry Federation (EURAF)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Commission Directorate-General for the Environment (DG ENV)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Environment Information and Observation Network (Eionet)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Environmental Agency (EEA)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Forest Institute (EFI)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Marine Research Network (EuroMarine)	Organization unknown / Organization unknown / Weekly	☐	☐	
European Sustainable Development Network	Organization unknown / Organization unknown / Weekly	☐	☐	

SUBJECT TO CHANGES

European Topic Centre on Biological Diversity	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Food and Agriculture Organization (FAO)	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Forest Information System for Europe (FISE)	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Future Earth	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Global Biodiversity Information Facility	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Global Knowledge Support Service for Biodiversity	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Green 10	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Intergovernmental Panel on Climate Change (IPCC)	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
International Council for the Exploration of the Seas	Organization unknown Organization unknown — Weekly	☐	☐	[ ]
International Network of Basin Organisations	Organization unknown Organization unknown — Weekly	☐	☐	[ ]

International Union for Conservation of Nature (IUCN) - Europe	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Knowledge Centre for Biodiversity (KCBD)	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Life Programme	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Long-Term Ecosystem Research in Europe (eLTER)	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Network Nature	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Network of Central Banks and Supervisors for Greening the Financial System	Organization unknown ▼ Organization unknown Weekly	☐	☐	
One Health Global Network	Organization unknown ▼ Organization unknown Weekly	☐	☑	
Oppla	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Society for Conservation Biology - Europe	Organization unknown ▼ Organization unknown Weekly	☐	☐	
The e-Science Research Infrastructure biodiversity and ecosystem research (LifeWatch ERIC)	Organization unknown ▼ Organization unknown Weekly	☐	☐	
United Nations Environment Programme (UNEP)	Organization unknown ▼ Organization unknown Weekly	☐	☐	
Water Information System for Europe (WISE)	Organization unknown ▼ Organization unknown Weekly	☐	☐	

World Wildlife Fund (WWF) Europe	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	
Other, specify	Organization unknown Organization unknown	Weekly	☐	☐	

7. Who are the national, EU or international actors enabling the implementation of the EU Biodiversity Strategy 2030, and why?

8. Have you or your organization participated or are aware of research projects or initiatives that contributed to the EU Biodiversity Strategy for 2020 and for 2030? If yes, please list name and policy impacts of these projects.

9. Who are the national, EU or international actors hampering the implementation of the EU Biodiversity Strategy 2030, and why?

10. How problematic are the following challenges in relation to your organization's contribution towards the implementation of the EU Biodiversity Strategy 2030, and who are the actors that could help mitigate/overcome them?

	1=not problematic at all; 5=very problematic	Write here which actor could mitigate/solve the challenge
		if you want to mention additional challenges, specify them here along with the relevant actors
		you may also use this box to add other comments
Availability of knowledge ⓘ	I don't know · · · · · 5	
Funding allocated to biodiversity conservation ⓘ	1 · · · · · 5	
Horizontal policy coherence ⓘ	2 · · · · · 5	
Management effectivness of area-based conservation ⓘ	3 · · · · · 5	
Lack of systematic conservation planning ⓘ	4 · · · · · 5	
Vertical policy implementation (from EU to national) ⓘ	5 · · · · · 5	
Stakeholder engagement ⓘ	I don't know · · · · · 5	
Dominant and political structures ⓘ	I don't know · · · · · 5	
Other, specify	I don't know · · · · · 5	
Other, specify	I don't know · · · · · 5	
Other, specify	I don't know · · · · · 5	
Other, specify	I don't know · · · · · 5	
Other, specify	I don't know · · · · · 5	

11. What hinders the effective use of available knowledge towards the implementation of the EU Biodiversity Strategy 2030?

53/54
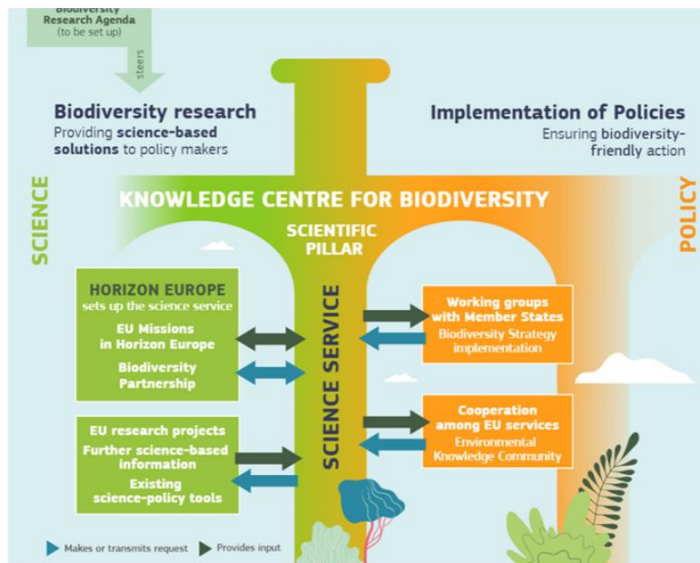
The Biodiversity Science Service is currently being developed by the EU-funded project BioAgora with the goal to support the implementation of the Biodiversity Strategy 2030. It will become the scientific pillar of the European Commission, aiming to connect research results on biodiversity to the needs of policy making by fostering dialogue between scientists, other knowledge holders and policy actors. The exact structure and functioning of the Science Service is still to be developed, and we would like to hear your opinion about your expectations and insights for the Science Service.

12. How do you imagine the Science Service could support or hamper the implementation of the EU Biodiversity Strategy 2030?

13. What kind of actors should participate for the Science Service to be effective, credible and inclusive?

14. What relations could your organization have with the Science Service, and at which conditions?

15. What measures would enable the effective participation of your organizationand its members in the Science Service, including in terms of capacity building?

16. If your organisation is involved in a) horizon scanning, b) capacity building, or c) identifying knowledge needs/research gaps, please suggest people within your organization who can be contacted for further information about these activities.

17. Do you have any other comments?

18. Consent to being contacted further to receive the results from the study or for further data collection or communication purposes

☐ I consent (please write your email address or other contact details)

Save & continue later

Previous   Submit

☐ I want to submit my answers*