Towards forward-looking nature governance to meet conservation goals of Natura 2000 sites in the European Union: experts' perspectives

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Abstract

As Natura 2000 missed challenges of halting biodiversity decline, its' management is being affected by factors of ecological, political, and economic character. To address the shortcomings revealed during the Fitness Check and to facilitate meeting the EU's biodiversity targets, the European Commission developed an "Action Plan for Nature, People and the Economy" prioritizing areas for improvement. However, mixed views still exist on the Natura 2000 governance; it is not certain that Action Plan would address existing drawbacks. The aim of the research was to identify divergent and convergent experts' attitudes towards biodiversity conservation in Europe, with a focus on forward-looking environmental governance and policy-informing perspective. Participants representing multiple disciplines and professional backgrounds related to planning, governance, or management of Natura 2000 sites provided a comprehensive overview on the topic and address-related challenges. Based on the results of a Delphi survey, we established a framework for illuminating the spaces of disjunction in experts' views towards Natura 2000 conservation. We distinguished three main divergence areas in views towards future network operation: (1) raising public awareness of environmental problems in the network, (2) the role of the European Commission in building political ownership of Natura 2000 sites among landholders, and (3) funding of Natura 2000. Then, based on revealed dichotomies, we return with drawing a roadmap for promoting more consensual outcomes. The results should help enable the practical management of conflicting views and the effective engagement of future biodiversity conservation strategies in Europe and beyond.

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1 Introduction

Global condition of biodiversity continues to decline as a result of continued and increasing anthropogenic pressures on the biosphere (Newbold et al., 2016; Steffen et al., 2015, 2018). Indeed, the IPBES Europe and Central Asia Assessment pointed to an ongoing decline in biodiversity and delivery of ecosystem services including habitat maintenance, pollination, regulation of freshwater quantity and quality, soil formation, and regulation of floods, with land use change being the major direct driver of the losses (Pascual et al., 2017). These negative trends are inextricably linked to the uneven conservation performance of protected areas (PAs) around the world, which has long been characterized by a very patchy and scattered distribution (Watson et al., 2014). Growing awareness of the environmental problems only in the second half of the twentieth century led to the creation of the first international networks of PAs beginning with the Ramsar Convention and its List of Wetlands of International Importance in 1971 (Davidson, 2014). In Europe, that process started mainly with the creation of the European Network of Biogenetic Reserves formed in 1973, followed by the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) in 1979 (Evans, 2012). Under the Bern Convention the Emerald Network of Areas of Special Conservation Interest was implemented, now covering virtually all Europe and some other territories (Bevz, 2018). Next, in order to comply with the Bern Convention, the European Union (EU) adopted the Directive on the Conservation of Wild Birds (1979) and the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992). The two acts constitute the foundation of the European ecological network Natura 2000 (Evans, 2012), being the only continental network existing to this day (Santini et al., 2016).

The main concept behind the Natura 2000 network is to support the long-term condition and survival of the most valuable and threatened species and habitats on the European continent (Evans, 2012). It spans over 28 European countries, comprises more than 27000 sites, and covers circa 18% of the EU land territory, being the largest ecological network in the world (Battisti et al., 2022) next to the Yellowstone-to-Yukon Conservation Initiative in North America (Chester, 2015) and the Australian Alps-to-Atherton Connectivity Conservation Area in Australia (Pulsford et al., 2010). The protected species and habitats may be either endangered, endemic, or characteristic of the EU's 14 biogeographical regions; and the wide diversity of PAs makes the network a key biodiversity conservation tool in the EU (Orlikowska et al., 2016). However, the recent evaluation (so-called Fitness Check) of the Birds and Habitats Directives of the EU concluded that the Directives have not met their general conservation objectives, and it is unknown when they will be fully achieved (Ferranti et al., 2019). To address the shortcomings revealed during the Fitness Check procedure and to facilitate meeting the EU biodiversity targets, the European Commission (EC) has developed an "Action Plan for Nature, People and the Economy". This plan defines four priority areas: (a) improving guidance and knowledge and ensuring better coherence with broader socio-economic objectives, (b) building political ownership and strengthening compliance, (c) strengthening investment in Natura 2000 (the EU-wide network of PAs) and improving synergies with EU funding instruments, and (d) better communication and outreach, by engaging citizens, stakeholders and communities (EC, 2017).

The performance of the network has been assessed in several scholarly reviews since its initiation, typically with mixed results and differing views, both regarding the human dimensions (Blicharska et al., 2016) and the ecological aspects of the network (Orlikowska et al., 2016). Some conservation scientists tend to be overall satisfied with the achievements

of Natura 2000 implementation, stressing in particular the large extent and the representativeness of the network (Kati et al., 2014). Others suggest that although the network may sufficiently cover target species and may have minimized the representation of so-called gap species (endangered species not adequately protected in their habitats), it will likely remain suboptimal to some degree in terms of conservation goals. This is partly because of its inherent political, social, and economic features, self-constraining its effectiveness, as well as building on the already existing network of PAs (Gruber et al., 2012). Conservation efforts are further hampered because they are often disconnected from the social and political realities of Natura 2000 implementation (Popescu et al., 2014). The implementation process met substantial opposition from various stakeholder groups from its very beginning in 1992 (Grodzinska-Jurczak & Cent, 2011; Hiedenpää, 2002; Krott et al., 2000). Such antagonism towards the network originated in the majority from procedural issues exacerbated by contradictory interests and perceptions among local land users (Blondet et al., 2017).

Mixed views also exist on the governance and policy implications of Natura 2000. Although some experts see positive social effects (e.g., policy effectiveness for protecting biodiversity, societal support for biodiversity policies (Popescu et al., 2014), positive involvement of non-governmental organizations (Kati et al., 2014), many social science studies reveal a variety of negative social and policy implications of Natura 2000 implementation (Popescu et al., 2014). In particular, many studies point out that participatory processes are rather virtual (Apostolopoulou et al., 2012) or not inclusive enough (Cent et al., 2014). The management of the Natura 2000 network has also been negatively affected by climate change (Araujo et al., 2011), even though local actors have often expressed doubts about this (de Koning et al., 2014). Likewise, agricultural practices and the rules of the Common Agricultural Policy (CAP) are of particular relevance to meeting conservation targets, as the Natura 2000 network covers not only wilderness, but largely biologically diverse landscapes that are used for agriculture and forestry (Tsiafouli et al., 2013). Barriers to effective implementation of Natura 2000 at the national and local levels have been summed up as: (1) absence of a clear vision and support among local, regional, and national governments; (2) low stakeholder awareness of PA benefits; (3) low stakeholder involvement in their conservation; (4) difficulties in balancing conservation goals with economic and social drivers; (5) problems associated with consensus-based decision-making; and in some cases (6) policy interpretation mismatches between national policy makers and the EC (Blondet et al., 2017; Ferranti et al., 2010; McCauley, 2008). Use of creative, socially inclusive conservation approaches is critical to address these issues and make PAs worldwide, including the Natura 2000 network, more effective in regard to safeguarding biodiversity, ecosystem services, and human well-being (Metzger et al., 2017; Muhar et al., 2018; Raymond et al., 2013). Actual progress to secure key biodiversity areas has stalled and more than a quarter of the species assessed by the IUCN Red List are threatened with extinction (Díaz et al., 2019). Therefore, Natura 2000 serves currently as a tool in the frame of the 2030 Agenda for Sustainable Development, including 17 Sustainable Development Goals (SDGs), especially Goals 14 and 15 (Concepción, 2020; Ferreira et al., 2021), and the new EU Biodiversity Strategy to 2030 being a part of the EU Green Deal. Besides, it is also considered critical for the implementation of the Convention of Biological Diversity (CBD) (Blicharska et al., 2016). The main objective of the network is then maintaining the equilibrium between effective conservation of biodiversity and compatible land uses (Concepción, 2020). Additionally, the role of Natura 2000 in a wider global context may be supportive of the achievement of the Nature Needs Half target (Locke, 2013) in those

ecoregions where it is unlikely to quickly restore nature protection in more than 50% of their area because of the amount of available habitat outside PAs (Dinerstein et al., 2017).

The problem addressed in the study is that factors of ecological, political, and economic character hamper management of the Natura 2000 network, so it misses the challenge of halting biodiversity decline. Moreover, it is not certain whether the Action Plan submitted by EC would address existing drawbacks in the network's governance. Therefore, the research aimed to identify convergent and divergent experts' attitudes towards biodiversity conservation in Europe, with a focus on forward-looking environmental governance. Then, based on revealed differences, we aimed to build a synthetic picture of directions for discussing the future governance of the Natura 2000 network. The results of the study may help practitioners enable the management of conflicting views as well as inform academia and policymakers on further works on biodiversity conservation strategies in Europe and beyond.

2 Materials and methods

The Delphi technique is a multistage panel survey of professionals in a field of interest. It may be constructed with various degrees of structure allowing very wide flexibility and possibility of adaptation to different needs of problems or issues being addressed (Hasson et al., 2000). It can also mitigate social pressures that normally may negatively affect other group-based survey types such as focus group discussion or nominal group technique. Moreover, Delphi may reduce or exclude the risk of potential biases that affect various techniques supporting group decision-making related to biodiversity conservation and management (Mukherjee et al., 2018). Although Delphi is an established method in a range of disciplines within the health and social sciences, it has been relatively rarely applied in conservation biology and environmental management. Therefore, there are no commonly used guidelines for its application in this field (but see Mukherjee et al., 2015). Contrary to quantitative research methods (e.g., questionnaire, statistical aggregation, public voting), Delphi technique may be especially suitable for studying conflict issues related to conservation as it introduces iterative feedback and the possibility of anonymous discussion among respondents. Therefore, it can help clarify vague and complex concepts related to conservation (Mehnen et al., 2013) or submit novel ideas and solutions (Orsi et al., 2011). Furthermore, using quantitative methods to study expert opinions could be burdened with a substantial introduction of errors as such techniques depend strongly on sample size. On the other side, limitations of the Delphi technique include higher input of respondents' participation, and considerable planning and preparation time, otherwise, it may be affected by, e.g. inappropriate selection of participants, formulation of questions, or high attrition rate between rounds. It also requires skilled facilitators and expert judgment to avoid socalled shared information bias and dilution of results due to too much focus on seeking consensus. Lastly, it may be not appropriate when the respondents' group size is large, especially in case of dissensus and need for direct interaction or debate (Mukherjee et al., 2015, 2018).
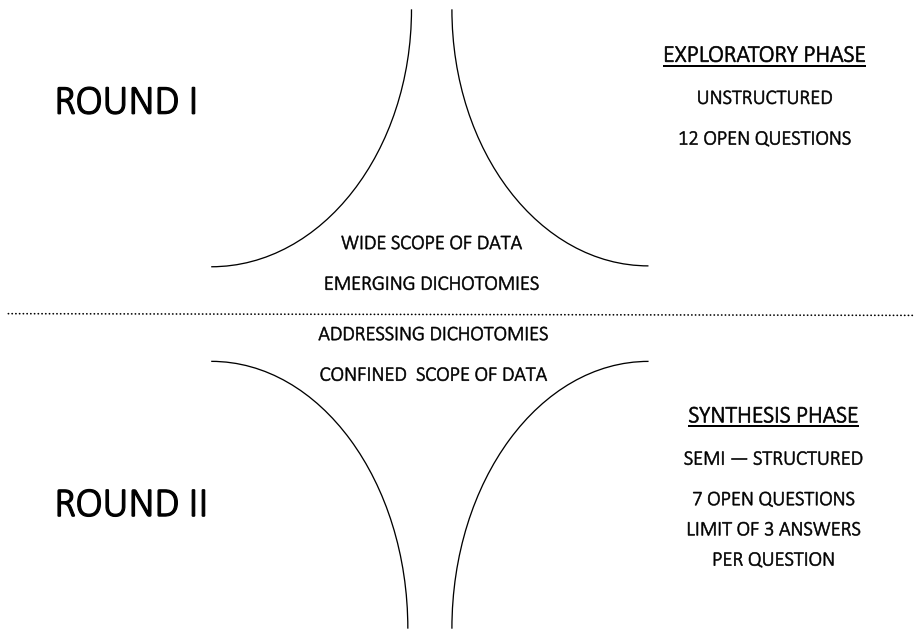
Our study was addressed to professionals engaged in research and practical management of the Natura 2000 network in Europe. We purposively sampled (Patton, 2002) information-rich respondents who represented several EU countries and multiple disciplines, being familiarized with the problems of Natura 2000 at various scales (Table 1). Most of them also have experience in international cooperation beyond Europe. Therefore, we could

Table 1 Summary of participants of the Delphi survey

No.	Type	Education level	Country of stay and work	Disciplinary background	Current position held	Years of expertise[a]
1	Academic	Professor	Germany	Forest science	Head of research programme	10
2	**Academic**	**Phd**	**Sweden**	**Biodiversity conservation (interdisciplinary)**	**Senior lecturer**	**3**
3	**Academic**	**Phd**	**Romania**	**Conservation planning**	**Senior researcher**	**8**
4	**Academic**	**Phd**	**Spain**	**Environmental sciences**	**Postdoc**	**8**
5	**Practitioner**	**Msc**	**Germany**	**Land use policy**	**Senior project manager**	**7**
6	**Academic**	**Professor**	**Germany**	**Planning**	**Scientist**	**3**
7	**Academic**	**PhD**	**Poland**	**Ecology**	**Researcher**	**7**
8	Practitioner	PhD	Spain	Ecology	Director of Foundation	25
9	Academic	PhD	Poland	Social science, communication	Sociologist	2
10	**Academic**	**PhD**	**Poland**	**Sociology**	**Adjunct**	**12**
11	**Academic**	**Phd**	**Poland**	**Social science**	**Assistant professor**	**13**
12	**Academic**	**Professor**	**Austria**	**Social science**	**Professor**	**10**
13	**Academic**	**Professor**	**Sweden**	**Systems ecology, social-ecological systems**	**Researcher/Associate Professor**	**15**
14	**Practitioner**	**Msc**	**Hungary**	**Biology**	**Policy officer**	**8**

Participants marked in bold took part in both two rounds of the survey

[a]Related to planning, governance, or management of Natura 2000 sites

ROUND I

EXPLORATORY PHASE

UNSTRUCTURED

12 OPEN QUESTIONS

WIDE SCOPE OF DATA

EMERGING DICHOTOMIES

ADDRESSING DICHOTOMIES

CONFINED SCOPE OF DATA

SYNTHESIS PHASE

SEMI — STRUCTURED

ROUND II

7 OPEN QUESTIONS
LIMIT OF 3 ANSWERS
PER QUESTION

Fig. 1 Overall scheme of the Delphi survey employed in the research

expect obtaining an array of opinions useful for determining the forthcoming priorities of conservation actions in Europe which can translate globally. The Delphi technique helped us to bring more neutrality and objectivity into the judgement process than if we used other facilitation techniques such as focus groups. Relevance of the results obtained was not dependent on the sample size of the respondents, yet rather on the range of expertize and perspectives of the carefully chosen participants and their anonymous indirect interactions.

The Delphi tool employed in this study was organized into two rounds of online surveys (Fig. 1). In the exploratory phase 35 respondents were invited, out of which 14 respondents participated. The respondents were asked a set of 12 open questions (Online Appendix 1), divided into six parts: introductory questions on the functioning of the Natura 2000 network (part 1), more detailed questions related to the key priorities identified in the Action Plan for Nature, People and the Economy (EC, 2017) and the associated Fitness Check of the Birds and Habitats Directive (parts 2–5), and questions on personal characteristics (part 6). Following this pattern, part 1 asked generally about the effectiveness of the Natura 2000 network; part 2 inquired about ways to improve guidance and knowledge about Natura 2000; part 3 covered the building of political ownership and the role of the EC; part 4 referred to strengthening investment in Natura 2000 and finally part 5 presented ways for better communication and outreach, engaging citizens, stakeholders and communities. Before running the survey, we sent a pilot to two experts (that were not included in the Delphi later) for getting critical feedback. All respondents were given a summary of the outcomes (Online Appendix 2) of the survey after participation.

Based on the results from the exploratory phase, we prepared a second survey (Online Appendix 3). In order to clarify the divergent views emerged in round I and to seek further consensus, we drafted seven open questions, each of them constrained to a maximum of three distinctive options/suggestions given. The synthesis phase involved probing revealed

dichotomies and creating a more consensual picture of issues that are potentially arousing management conflicts. This time the scope of questions was narrower and concerned more directly to the future management of Natura 2000 sites across the EU. The main thematic axes for deliberation were: management strategies for conflicts, options for improving signage or eco-labelling of Natura 2000, alignment of investments in Green Infrastructure (GI) and Nature-Based Solutions (NBS), network building actions to support cross-sectoral collaboration, changes to the CAP, tailoring of incentives towards local businesses and lastly tools for assessing locally preferred scenarios alongside global change scenarios. From the 14 respondents of round I, 11 participated in round II. After the completion of round II, we again circulated a final report (Online Appendix 4) to all participants.

To analyse the text data obtained in both rounds of the study, we applied qualitative data analysis (Miles et al., 2013) involving coding techniques. We followed the procedures described by Saldaña (2013), namely, for a small-scale study case, we used manual coding using standard word processing software. We performed the process of coding in each round in cycles: we began with precoding the whole raw text material received, then we codified and categorized the first emerging groups of text blocks. Next, we recoded and recategorized the grouped text blocks assigning them to conceptualized themes and concepts. We then further compressed the results, rewriting them into narratives, which served for preparing a summary of outcomes (feedback report) at the final stage of each round. Finally, we have extracted the leading themes from the final report (Online Appendix 4) and synthesized them into a concise picture of the identified possible directions for future considerations (and potential areas for improvement) in the management of the Natura 2000 network.

3 Results

3.1 Exploratory phase

3.1.1 Points of convergence in opinions

Biggest achievements and failures of the Natura 2000 network

The most valuable achievement of the network according to Delphi participants is creating a transnational collaboration, which has proved to some extent to be successful in terms of meeting environmental goals. However, respondents noted that failures seem to outweigh successes for now; for example, problems related to funding, communicating, and engaging people, and the perception of the network as an impediment to development. Immediate and effective actions proposed for addressing these failures were: improving collaboration between relevant stakeholders, solving general problems with funding mechanisms of the network, rethinking conservation paradigms, e.g., towards more anthropocentric thinking or shifting focus from functional networks (main attention to nodes of the network) to the functional landscape mosaics (main attention to linkages of the network).

Most immediate and effective actions that could address failures

Participants perceived the ecosystem services concept as a useful tool to communicate, explain, and illustrate the complexity and interdependencies of social-ecological systems

within deliberative processes. Future management of the Natura 2000 network could be informed through participatory and open learning processes at the local level. The role of local systems and local people was also emphasized, since local knowledge can provide cultural context (traditional use, history of natural resources use, etc.) as well as ecological data. Participatory monitoring of Natura 2000 sites should be enhanced by the application of the flow of constantly reliable and spatially explicit data.

The role of European Commission in the implementation and management of Natura 2000
Participants were predominantly positive about the role of the EC in promoting cooperation between local, regional, and national authorities across biogeographical regions. The cooperation of the EC with cross-national institutions, such as EUROPARC or IUCN, was perceived as particularly beneficial, e.g., through promoting pilot projects dealing with participatory management or providing guidelines for cooperation.

Recommended business models to strengthen investment into Natura2000 sites
Here, participants recommended business models that should build upon synergies between biodiversity and ecosystem services being provided by its components. Especially, participants felt that traditional uses and locally rooted businesses may be fostered through public–private partnerships and cooperatives. The key elements of Natura 2000-related investments were seen in systems of product validation, embedding value chains and complying with the idea of circular economy. Participants also suggested numerous changes in agri-environment-climate measures, including more funding and better targeting of the CAP pillars. Despite a clear divergence in detailed proposals (shown below), most participants underlined the general need of reforming the CAP.

Scenarios or future visions of Natura 2000 to engage local communities and businesses
When asked about their future visions for Natura 2000 management, participants recommended that policy makers focus on strategies that promote the human well-being benefits of the designations, and new forms of community engagement. For example, demonstrating possible losses of ecosystem services that would truly affect people's well-being, and developing communication and engagement strategies that recognize local communities as stewards of nature, thereby empowering their involvement in management actions.

3.1.2 Points of divergence in opinions

The exploratory phase revealed seven areas of divergent views concerning the management of Natura 2000 sites (Table 2). The nature of the identified dichotomies is of qualitative character, and they represent all bold and relevant contradictory pairs of opinions that were expressed in this phase.

Effectiveness of promoting the network
Firstly, the perception of successes in raising public awareness about the multifaceted goals of the network varied considerably. While some say that the network drew awareness of the general public and overlapping sectors to valuable natural assets across the EU, contradictory voices listed numerous problems regarding to communicating with and engaging people living within or close to Natura 2000 areas. Moreover, lack

Table 2 Divergent views (dichotomies) concerning the management of Natura 2000 sites

Pair	Complementary view I		Complementary view II
I	Natura 2000 is perceived to enhance socio-economic well-being of people inhabiting Natura 2000 sites	versus	Natura 2000 is still perceived as impediment to economic development within Natura 2000 sites
II	Natura 2000 successfully raises public awareness of the need to balance conservation and socio-economic goals	versus	There are still major problems with raising public awareness of the multiple goals of the Natura 2000 network
III	In the future management of Natura 2000 one should maintain focus on protection of species or habitats (and related ecosystem services)	versus	In the future management of Natura 2000 one should shift to focus on protection of ecosystem services delivered by whole network
IV	The EC is not the right entity to create a feeling of ownership amongst landowners	versus	The EC could support a network of Natura 2000 and develop strategies to foster landowner ownership of Natura 2000 sites
V	In the future management of Natura 2000 one should create an independent fund for Natura 2000 management/operation	versus	In the future management of Natura 2000 one should upgrade/adapt existing tools, e.g. CAP pillars to better fund Natura 2000 sites
VI	To fund Natura 2000 more effectively one should withdraw Pillar 1 from funding Natura 2000	versus	To fund Natura 2000 more effectively one should invest more into Pillar 1 funding
VII	In the future promotion of Natura 2000 one needs to highlight the value of the whole network (in scenarios/visions)	versus	In the future promotion of Natura 2000 one should shift to locally-based scenarios highlighting specific problems and opportunities

of adequate information to all stakeholders and low level of interaction between the authorities supervising Natura 2000 areas were expressed.

Choice of focus on particular functional aspects

The next point of divergence in opinions regards functional aspects of the network. There were explicit voices suggesting to go beyond "traditional" conservation with a focus on species and habitats towards more anthropocentric thinking, as mentioned above. However, there was an opposition argument saying that such a shift may bring a threat of weakening implementation after opening up a discussion about making changes to aspects of the Directives or their annexes.

The role of the European Commission in creating a sense of ownership

The role of the EC in creating a feeling of ownership of Natura 2000 sites among landholders was seen as ambiguous among respondents, with some of them proposing bottom-up processes, while others proposing top-down processes. In support of bottom-up processes, respondents remarked: "the EU seems a bit far away" to communicate with landholders or that "the EC is not the right entity to create the feeling of ownership among landholders". Conversely, others noted that there might be a room for action taken by the EC, such as personally contacting landholders in order to highlight the relevance of their land or creating networks integrating landowners from various areas and countries.

Further funding of the Natura 2000 network

A very clear divergence was seen in proposals on the further funding of the Natura 2000 network. Two poles were observed: one was based on creating completely new and independent instruments for funding its operation and management. This could include taking the funding mechanisms for Natura 2000 out of payment schemes in the Common Agriculture Policy and creating a new specific own fund at EU level, e.g., a new unified fund under LIFE programme. Another was based on upgrading and adapting existing tools, for example, in transnational agri-environmental measures for European farmers. The need of reforming the Common Agriculture Policy was proposed in two specific ways. One proposal was "to remove the mechanism (enabled via 'national flexibility') that allows to shift funds from the Pillar 2 of the CAP (which is concerned with public money) to Pillar 1 (subsidies for land acreage, thus only promotes farm enlargement and unsustainable agricultural practices)". The other one was creating "better links with Pillar 1 (if continued in the same form)" and "greening especially the environmentally sensitive grassland payment, which is currently variably applied to Natura 2000 sites".

Future promotion of the Natura 2000 network

Finally, respondents supported either local or EU-wide approaches in the further promotion of Natura 2000. An EU-wide approach is to highlight the value of the network as a whole and linking sites as opposed to seeing them individually. This, in view of some, might develop an alternative vision of regional or Pan–European development. On the opposite, other respondents would rather draw scenarios presenting issues important to the local communities, including both problems and real opportunities. In their opinion, it should envision local initiatives utilizing green economy and circular economy, providing long-term information about activities promoted in the Natura 2000 sites. Additionally, local stakeholders should have the possibility to design their own scenarios, this way strengthening social movements and informal groups.

This pattern of dissenting voices may mark possible tensions between different perspectives of management of the Natura 2000 network. These unearthed points of reference helped us in drawing a more narrow and precise scope of interest in the synthesis phase.

3.2 Synthesis phase: probing divergences

The topics of the questions in the synthesis phase were direct and indirect derivatives of conflicting pairs of views obtained from the exploratory phase. We informed participants of existing dichotomies and structured answers by limiting their number and shifting focus of questions to potential solutions in terms of proactive means and actions. We instructed participants that part of the research was to clarify those divergent views and to seek further consensus. We included questions that probed the points of divergence (Online Appendix 3).

Our synthesis, as presented in Table 3, served as a foundation and framework for debate and further discussions on the future perspectives of the Natura 2000 network. In the synthesis phase, we selected the most compelling remarks from the respondents, helping to determine upcoming priorities for conservation actions and addressing the unrealized ecological performance of the network.

Management strategies for conflicts between authorities and local people

In relation to the first point of divergence from phase 1 (Table 2), respondents proposed a variety of tools/methods for facilitating the creation of better strategies in multi-stakeholder partnership decision processes, including: participatory scenario building, backcasting, multicriteria decision analysis, participatory mapping of priority areas for conservation and evaluation of landscape preferences. Landscape-based policy congruence/impact assessment was suggested as a prerequisite for all further policy revisions. According to participants, management strategies should include an initial "diagnostic stage" in which stakeholder groups' perceptions could be analysed and described before taking further actions. Participants recommended that scenarios aimed at avoiding conflicts and that win–win development should combine a mix of bottom-up and top-down approaches.

Options for improving signage or eco-labelling of Natura 2000 sites

In relation to divergence II from phase 1, participants expressed a need for stronger communication about Natura 2000. They felt that signage or eco-labelling of Natura 2000 sites contains too many elements and is not easily recognizable. They identified the following pathways to improve awareness: connecting key targets of the network to broader questions or creating sets of features for a specific site or clusters of sites that could be further communicated to the general public. Focus on development aspects should promote self-explanatory examples of local initiatives that show how protection objectives can be reconciled with social goals and needs.

Alignment of investments in green infrastructure and nature-based solutions with Natura 2000 priorities

In relation to divergence III from phase 1, participants highlighted that member states should be required to publish their investments in GI and link them clearly to the requirements of their prioritized action frameworks. Every new infrastructure within Natura 2000 sites should be, to quote one of the respondents, "GI compliant" and old infrastructure

Table 3 Synthesis of main directions and detailed issues for future discussions on Natura 2000 network

Main directions	Particular arenas of deliberation
Management strategies for conflicts between authorities and local people	Identifying areas of conflict and main friction areas
	Diagnostic stage/analysis and description of stakeholder group's perception
	Creating a framework for conflict resolution
	Bestowing convening power to a non-political actors
	Tools facilitating the creation of better strategies
	Building scenarios aimed at avoiding conflicts
	Creating advisory boards for single or clusters of Natura 2000 sites
	Clarification of roles and responsibilities
	Explaining rules and instruments supporting local benefit and burden sharing
	Building long-term relations amid local communities and public officials
Options for improving signage or eco-labelling of Natura 2000 sites	Stronger communication—better signaling/more appearances in the media/formal and informal education/visibility in the field and online
	Addressing different group pf stakeholders
	New unified system (or benchmarking) for signage of Natura 2000 ecosystem services
	Rebranding by connecting key targets of the network to broader questions
	Aligning different sectoral programs/policies with Natura 2000
	Promoting self-explanatory examples of local initiatives
	Visual awareness of the network linked with the co-management of Natura 2000 sites
Alignment of investments in GI and NBS with Natura 2000 priorities	Requirement for member states to publish investments in GI
	Identification of regional gaps (areas falling behind) regarding meeting of EU Habitat Directive goals and fostering these regions for the implementation of NBS and GI
	Emphasizing ecosystem-based solutions within NBS/ addressing multifunctionality
	Ecosystem services valuation mapping GI and Blue Infrastructure
	Assessment of new infrastructure GI compliance/ adjustment of old infrastructure if necessary
	Prioritizing research integrating NBS, Habitats directive and GI Strategy

Table 3 (continued)

Main directions	Particular arenas of deliberation
Network building actions to support cross-sectoral collaboration among various groups of stakeholders	Supporting mechanism in "Action Plan" for exchanging information between MS
	Establishing open access stakeholder platforms in areas of conflict
	Tailoring cooperation processes for Natura 2000 sites to local needs
	Considering governance levels before suggesting uniformed network building actions
	Fostering interactions between public and private activities
	More transnational demonstrative conservation projects
	Inclusion of powerful/popular individuals
	Shared meetings of relevant sector directors
	Co-development of eco-labels—PAs managers and producers
Changes to Common Agricultural Policy (CAP) pillars 1 and 2	General: Better alignment of CAP funding with nature conservation policies
	New specific nature conservation measures/top ups for NATURA 2000 lands
	Setting up a targeted N2000 fund
	Shifting from direct to result-based/project-based payments
	Pillar 1: Reorganizing towards environmental outcomes/more focus on ecosystem services/investment in NBS/weighting and selecting measures most beneficial to biodiversity
	Pillar 2: More funding/more emphasis on agri-environment and Natura 2000 measures/support for zoning and strategic pairing of land uses
Tailoring incentives towards different forms of local businesses	More targeted funding scheme with sufficient amount of funding for advice and administration
	De minimis aid for SME and individual landholders
	Delivering incentives (fiscal, economic) to "sustainable companies"
	Bounding incentives with: better promotion of the Natura 2000 sites/creating local committees for N2000 /building a community around N2000
	Strengthening local approach by existence of the nationwide Natura 2000 eco label
	Use of monitoring programme to check if Natura 2000 goals are not compromised
	Sustainability orientation as eligibility criteria for development projects

Table 3 (continued)

Main directions	Particular arenas of deliberation
Tools for assessing consequences of locally preferred scenarios alongside the consequences of global change scenarios	Participatory scenario planning/building as a key tool
	Assistance by researchers of local institutions
	Design example local scenarios and tools for creation of similar scenario development processes
	Backcasting method for assessing the consequences of scenarios
	Presenting outputs (scenarios obtained) with the use of envisioning tools
	Dissemination of know-how related to the process
	ES monitoring/valuation
	GIS/mobile/social media and gaming allowing learning process
	Accumulated evidence base connected to an EU maintained interactive platform

should be evaluated and adjusted if necessary. Participants felt it important to prioritize research within different projects in the Horizon 2020 perspective[1] (and beyond) that integrates Nature-based Solutions,[2] the Habitats Directive, and the EU Strategy on GI.

Network building actions to support cross-sectoral collaboration among various groups of stakeholders

Respondents perceived the need to acknowledge that collaborative networks are long-term and time-consuming entities, and that stakeholder platforms need to be established in areas of particular conflict as crucial (related to divergence IV). In such platforms there should be open access to working groups mainstreaming all interested people. Cooperation processes for Natura 2000 sites should be tailored to local needs. More transnational demonstrative conservation projects that improve and expand the participation of various stakeholders within the biogeographical process should be developed, according to respondents. They further advocated creating "committees" composed of PA managers together with other representatives of the public and private sectors. Such bodies should include powerful and/or popular individuals in order to recreate and spread a positive image of Natura 2000.

Changes to Common Agricultural Policy pillars 1 and 2

In relation to divergence V and VI, respondents believe that CAP funding based on its two structural pillars, should be better aligned with nature conservation policies. New nature conservation measures should be applicable only to farmers located in Natura 2000 sites, or there should be top ups for Natura 2000 lands. Pillar 1 of the CAP could include more focus on ecosystem services, investment in Nature-Based Solutions and linkages to

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[1] Horizon 2020—The Framework Programme for Research and Innovation of the European Union (EC 2011b).

[2] Nature-based Solutions (NBS) are defined by IUCN as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits". Typical NBS approaches supporting N2000 may be, e.g. ecosystem-based management or developing the GI (Cohen-Shacham et al., 2016).

Natura 2000 sites or surrounding landscapes. Greening infrastructure may be made more effective by giving much higher weighting the measures that deliver the most for biodiversity. Within Pillar 2 of the CAP, participants wanted more emphasis to be placed on agri-environment and Natura 2000 measures. Pillar 2 could also include support for zoning and strategic pairing of land uses. Finally, the most effective may be setting up a targeted Nature fund rather than making small changes to the CAP or at least resigning from direct payments and shifting to result-based/project-based payments.

Tailoring incentives towards different forms of local businesses

As proposed by the examined experts, incentives delivered to "sustainable companies" operating within Natura 2000 should come along with better promotion of the Natura 2000 sites among local stakeholders, presenting the values which particular sites host. The incentives should be linked to creating local committees for Natura 2000 and building a community around Natura 2000. They should be designed regionally, allowing for flexibility in adjusting goals and main areas of funding. Any type of incentive would need to come with a monitoring program to make sure that biodiversity protection and environmental quality are not compromised.

Tools for assessing consequences of locally preferred scenarios alongside the consequences of global change scenarios

In relation to divergence VII, one of the key tools in assessing scenarios alongside various scales that participants highlighted is again participatory scenario planning, preferably administered by an independent facilitator. Scenarios could be assisted by researchers of local institutions for the engagement of local society in the evaluation. In addition, multicriteria analysis and backcasting methods can help assess the consequences of scenarios by delineating desirable actions and policies. The outputs of the assessment processes could be presented with the use of envisioning tools. Apart from the scenarios themselves also dissemination of know-how related to the process were perceived as important. The recommended tools for scenario planning/building were: biodiversity and ecosystem services monitoring/valuation within and outside the protected sites, GIS-based tools also with mobile (smartphone) editions, specific social media activities and gaming allowing (social) learning processes. The results of gathering data should be stored in an evidence base connected to an interactive platform for knowledge exchange that is run at EU level.

4 Discussion

The aim of this study was to explore and address points of convergence and divergence in experts' views towards PA management (particularly the Natura 2000 network), and then move towards a synthesis of opinions. It responds to the knowledge gap that the majority of studies involving qualitative methods for eliciting views and judgments in conservation decision-making have been conducted so far outside of Europe (Mukherjee et al., 2018). Overall, we identified points of convergence and divergence, but we had difficulty resolving tensions using the Delphi technique. The broad set of ideas and recommendations obtained complement the diversity of perspectives revealed in the EU Fitness Check process, confirming that the implementation of the Natura 2000 network and the future of this policy may be perceived very differently among the actors dealing with it (Ferranti et al., 2019). Importantly, this large variety of perspectives was revealed even when considering a

relatively small sample of respondents. We suggest that the synthesized roadmap (Table 3) obtained in the two phases of data analysis (Fig. 1) is useful in surfacing and then delving more deeply into tensions between science and policy, and clarifying options for improving PA management strategies in Europe and beyond. Here we discuss the three main tensions.

The first main finding was to see that the perception of effectiveness in raising public awareness of environmental problems by the Natura 2000 network clearly diverged in experts. In phase 2, however, we observed a general movement toward convergence with overall agreement on a need of the stronger communication about the main goals of the Natura 2000 network and bringing a set of proposed options for improving signage or eco-labelling of the protected network sites (Online Appendix 4). Since approximately 2/3 of EU citizens live in a proximity of a Natura 2000 site (Beresford et al., 2016), the network has the natural potential to raise awareness of biodiversity and related conservation goals. Despite it, practice shows that low representativeness and quality of stakeholder's involvement may contribute to generally negative perceptions of the network (Blicharska et al., 2016). Similarly to our results, a need of constant improvement in communication and raising awareness has been therefore underlined repeatedly (Dimitrakopoulos et al., 2010; Kati et al., 2014; Pietrzyk-Kaszyńska et al., 2012). However, while the participation of landowners itself may lead to a greater overall acceptance of the Natura 2000, significant changes in management practices require context-depended, locally tailored engagement processes (Blondet et al., 2017). Similar focus on specific site-related communication was partly supported in our results, leaving options for broader, network-wide forms and channels of communication.

The potential role of the EC in building a political ownership of Natura 2000 sites among landholders was another area of considerable divergence in respondents, with an opposition between top-down and bottom-up approaches. Again, there we could see a fairly common shift towards convergence in phase 2, however, there might be still some possible tension observed between options at either local or regional scale in undertaking actions supporting the feeling of ownership and cross-sectoral collaboration among various groups of stakeholders (Online Appendix 4). Although respondents notice an overarching role of the EC, which can run transnational initiatives or support exchange of knowledge between countries, they seem to incline more towards local cooperation initiatives, strengthening feeling of ownership and tailoring them to site-specific needs. Therefore, as they say, before suggesting uniformed, EU-wide actions, it would be worth considering different governance levels. This corresponds with previous findings showing that carefully planned processes which emphasize interaction and co-operation between multiple local stakeholders offer better possibilities for the management of Natura 2000 sites than a more formal and hierarchical process (Beunen & deVries, 2011; Tsianou et al., 2013). Furthermore, the risk of an insufficiently implemented process of stakeholder involvement can lead to bigger conflicts (McCauley, 2008), so it is important to properly embed relevant landowners and managers in such a cooperation striving for positive social outcomes, even if direct conservation outcomes are not always completed (Young et al., 2013).

Finally, funding of the Natura 2000 network was arguably the most polarized area of divergence in participants during phase 1, revealing completely opposite strategies for further financing/supporting the network. This related to staying with existing payment schemes and upgrading them or, alternatively, developing new targeted fund scenarios from scratch. This time we still observed a variety of proposals in phase 2 and the tensions between them seemed to be unresolved (Online Appendix 4). While the lack of proper funding was so far explicitly reported in the literature as one of the main obstacles in an effective implementation of the Natura 2000 network (e.g., Ferranti et al., 2010;

Geitzenauer et al., 2017; Hochkirch et al., 2013), there was also a variety of submitted specific ideas addressing the problem. Similar to our results, some of them proposed establishing a new specific Natura 2000 fund solely dedicated to its implementation at the EU and national scales (Kati et al., 2014) and others supported upgrading already operating tools. The former may include alignment agricultural policies like, e.g., Common Agriculture Policy with nature conservation policies (Hodge et al., 2015) or developing and adjusting additional instruments such as payments for ecosystem services (Pellegrino et al., 2017). The need to quickly solve economic problems with Natura 2000 is even more urgent since we live in times when financial crises and uncertainty may really affect political decisions and conservation efforts (Paliogiannis et al., 2019). Additionally, long-term evaluation of conservation investments and improvement of their effectiveness is crucial in light of constantly limited resources (Santana et al., 2014). Revealing contradictory opinions also in the second phase, our results reflect ongoing lack of consensus and clear direction of future financing the Natura 2000 network.

We would like to point out that the Delphi method used in the study, despite obtaining valuable results, has several limitations. So called shared information bias can be a threat since conservation experts may tend to discuss issues that are familiar to most or all of them compared to less popular subjects (Mukherjee et al., 2018). This was revealed in our study when sometimes respondents directly expressed they would comment on topics they know or, respectively, they withdrew from commenting others for the same reason. Moreover, there is always some bias in the selection of respondents and the attrition rate might be a problem, especially when the initial number of respondents is low. The Delphi process may have benefited from a follow-up focus group to better resolve points of divergence in views among experts. While we could make a synthesis of the main points of convergence and divergence, we could not fully address points of conflict using the Delphi method. There are some issues with the wording of Delphi questions. While we as researchers constructed them in an arbitrary way based on our expertize, following Benitez-Capistros et al. (2014), we acknowledge that some responses (e.g., about "investments in Natura 2000", "creating a feeling of ownership" or "getting involved in nature protection") may have been affected by ambiguous question wording. We are also aware that while the uncertainty of future projections seems to be high, estimates or probability judgments of experts may be biased towards highly desirable scenarios, especially when they share common preferences for such events to happen (Ecken et al., 2011). This was revealed in our study as our experts are all somehow involved in the management of Natura 2000 practically or theoretically, and all of them are rather clearly supportive towards its overall goals and functioning. Perhaps having a bigger representation of experts including those who are more critical of current conservation goals in Europe and Natura 2000 itself would bring a wider perspective to the survey.

Discussing our results in the context of global perspectives of nature conservation, it is worth mentioning that EU Nature Directives since the very beginning have followed or corresponded with various multilateral environmental agreements including the CBD (Beresford et al., 2016). A decade ago, by adopting the EU Biodiversity Strategy to 2020 (EC, 2011a), the EU fully aligned with the global Strategic Plan for Biodiversity 2011–2020 and its twenty Aichi Biodiversity Targets (UNEP/CBD 2010). Through Aichi Target 11 the international communities made a pledge (eventually unmet) to increase by 2020 the terrestrial and inland water areas as well as marine areas under protection to at least 17% and 10%, respectively. What is equally important, they also agreed that PAs should be "effectively and equitably managed, ecologically representative and well connected". Later on, the EU along with its institutions and member states have played a crucial role in

adopting international agreements such as the Agenda 2030 around the SDGs and the Paris Agreement (Lafortune et al., 2020). In particular, the EU has committed to achieving the SDGs by submitting the European Green Deal, as part of an EC strategy to implement the aforementioned global initiatives (EC, 2019). One of the specific objectives expressed in the European Green Deal and supported by the resulting EU Biodiversity Strategy to 2030 is to "increase the coverage of protected biodiversity-rich land and sea areas building on the Natura 2000 network", adopting new ambitious EU conservation target which says that at least 30% of its land and sea should be protected (EC, 2020). It also states that "Member States should also reinforce cross-border cooperation to protect and restore more effectively the areas covered by the Natura 2000 network" (EC, 2019). The intertwining of European and global conservation priorities is gaining even more importance in the increasingly telecoupled world (Liu et al., 2013) where human activity in one particular area (e.g., Natura 2000 site) may have a large impact on socio-ecological systems in distant locations (Meyfroidt et al., 2013).

The aforementioned emphasis on proper management, representativeness, and connectivity of the PA network worldwide is especially relevant in light of apparent deficiencies in those domains. First, there still exist considerable global shortfalls in PA connectivity that must be addressed (Saura et al., 2018). While Natura 2000 is the only existing continental network, its overall performance is worse than the national networks of EU member states which are coordinated independently, resulting in weak transboundary connectivity (Santini et al., 2016). Therefore, in Europe, the suggested priorities for improving connectivity are: targeted designation of connecting PAs; increasing permeability of unprotected land; coordinated management of adjacent PAs and transboundary PA linkages (Saura et al., 2018). The second concern is a general lack of representation of ecosystems and species in PAs, both at the global and biogeographic levels (Gruber et al., 2012; Sayre et al., 2020). Although the Natura 2000 network formally already meets the terrestrial areal component of Aichi Target 11 (EEA, 2021), it still lacks in terms of representativeness of European ecoregions (Müller et al., 2018). Moreover, further revision and following amendments to lists of protected species, along with adequate updates of management plans, may be necessary to provide a better representation of threatened species (Maiorano et al., 2015; Hermoso et al., 2019). Speaking of the third deficiency in PA quality, the real conservation status of PAs is, in the end, always a function of management effectiveness (Sayre et al., 2020), so even the expertly designed ecological network such as Natura 2000 is pointless without adequate enforcement and governance (Müller et al., 2018). Only if PAs are whether large enough, well connected, representing diverse habitats or properly managed, they are successful in protecting threatened species compared to other land uses (Gray et al., 2016).Finally, cultural and institutional sources of social injustice exist regarding the management of PAs in the realities of the developing world (Martin et al., 2016), in which societies are most vulnerable to the detrimental effects of global environmental change (Ehrlich et al., 2012). At the same time, many developing countries steward a large share of threatened biodiversity while being highly underfunded for conservation (Waldron et al., 2013). Although different forms of decline in government support for PAs are widely observed worldwide, including high-income European countries (Watson et al., 2014), human pressures inside PAs increase greater in low-developed areas (Geldmann et al., 2019).

We can therefore conclude that the main shortcomings of the world network of PAs have already been recognized and they concern not only the total surface of these areas, but also their quality. Additionally, the creation and governance of protected areas become inseparably associated with securing social equity through the integration of conservation

and human development (Li et al., 2011), which is especially challenging in the Global South (Boillat et al., 2018). As can be seen above, the main priorities for improving the network of PAs have also been defined at the EU level, and a large part of these guidelines will apply to Natura 2000 sites. At the same time, global targets for the protection of biodiversity become even more ambitious, calling for the protection of half of the Earth's surface (Dinerstein et al., 2017; Wilson, 2016) and widening the scope of conservation efforts as PAs alone are not enough to conserve the biodiversity in the reality of the Anthropocene (Ellis, 2019). Taking into account the enormous social and economic impact of such proposals (Schleicher et al., 2019), it is very likely that introducing a variety of "other effective area-based conservation measures" will be essential to achieve future conservation targets (Dudley et al., 2018), e.g. by supporting Natura 2000 connectivity (de la Fuente et al. 2018). Nevertheless, PAs, including Natura 2000 sites, remain critical for nature conservation (Geldmann et al., 2019; Joppa et al., 2016; Watson et al., 2014) and their further expansion is being advocated (Müller et al., 2020).

As the previous strategic plan for biodiversity expired, the new post-2020 global biodiversity framework calls for a transformation of social relationships with biodiversity to attain the CBD vision of "living in harmony with nature" by 2050 (Maron et al., 2021). The present decade (until 2030) seems to be a crucial period for halting biodiversity loss and successful continuation towards the 2050 perspective (Mace et al., 2018). To achieve the former and secure road to recovery, multiple, coordinated goals and holistic actions unifying one vision are crucial (Díaz et al., 2020). Our results highlight that pursuing such a perspective in post-2020 Europe would entail a particular focus on the following aspects: (1) effectiveness in raising public awareness and involving landowners in policy discussions; (2) properly balancing the role of the EU in building political ownership of Natura 2000 sites among landowners; (3) increasing funding and aligning it with the achievement of specific EU and national targets. Because PA management strengths and weaknesses are remarkably similar throughout the world (Leverington et al., 2010), we believe that these findings may also be relevant internationally outside of Europe. At the same time, translating the global goals into a continental and national perspective should close the implementation gap between the supranational and national levels, which could be achieved, inter alia, by incorporating newly designated PAs reflecting different conservation values (Perino et al., 2021).

Adding new sites to Natura 2000 to meet the 30% or even 50% target could close the gap in ecoregion coverage, however, it would require more landowners' involvement in the designation process since more areas would overlap with seminatural ecosystems (Müller et al., 2020) and wider rural areas (Rodríguez-Rodríguez et al., 2011). This could be achieved by reforming CAP towards stronger support for landowners managing High Nature Value Farmlands (Anderson & Mammides, 2020). Economic instruments such as payments for ecosystem services or biodiversity-linked taxes and fees might be necessary to provide adequate biodiversity financial resources (Xu et al., 2021). Accordingly, incentives should also be targeted to increase native habitats within working landscapes that do not compete, but support an expanding the network (Garibaldi et al., 2021). Next, post-2020 network-oriented conservation instruments cannot overlook climate change impacts, as biodiversity targets may be compromised by future warming, which should be reflected in adequate dynamically responsive policies (Arneth et al., 2020). Moreover, isolated social and ecological targets need to be replaced with those acknowledging social-ecological interdependencies linked to supporting the role of biodiversity and ecosystem services in human development (Reyers & Selig, 2020). Lastly, decision-makers should strive to ensure that new conservation targets allow the translation into actionable policies that

can be successfully implemented both at the national and European levels (Green et al., 2019). It is also noteworthy that sustainability transitions related to the Natura 2000 network will also need reforming the knowledge architecture used to inform those involved, moving away from linear models of knowledge delivery towards transdisciplinary research, and better harmonizing with policy cycles (Oliver et al., 2021).

5 Conclusions

This study aimed to identify options for improving the future governance of the Natura 2000 network. We created a a roadmap for future deliberation on the most pressing challenges jeopardizing the functioning of the network. We claim that our results portraying areas of convergence and divergence in the experts' opinions on desirable management of the Natura 2000 may help in drawing forward-looking conservation strategies for European ecosystems and beyond.

We found that main areas of divergence are those related to communication of conservation goals to wider audiences, the role of the EC and top-down approach in network management (and governance), and lastly, but very importantly, the desirable ways of financially securing the future operation of conservation efforts. We recommend focussing on those spaces in next attempts to improve nature conservation of PAs in Europe. Then, we also suggest that focusing particularly on the three revealed main tensions between science and policy can be crucial in safeguarding more effective implementation of the network. First, improvements in public awareness and stakeholder involvement may contribute to greater acceptance of the network and its subsequent development. Second, considering different governance levels when tailoring initiatives for building ownership in stakeholders should significantly improve their involvement and overall management outcomes. Third, solving the pressing dilemma of future financing of the Natura 2000 network will be essential in providing overall stability of the functioning of the network and its effectiveness in the long-term outlook.

Our roadmap with identified spaces of deliberation (Table 3) shows shared priorities for future communication and implementation efforts for academia, practitioners, and policymakers working on halting biodiversity decline. The next research step could be adding another panel comprised of a wider range of experts and following with other group techniques more effective in obtaining consensus amongst experts (e.g., scenario planning). Robust research must ultimately involve a variety of stakeholders, including experts and communities. Moreover, integrating geospatial studies into Natura 2000 in Europe may enlighten readers in understanding the impact of Natura 2000 in Europe. Problems of further research we point out through navigating axes organized by revealed dichotomies and then detailed panels (Table 3). The results obtained are useful not only in the European context but also for international efforts to achieve the main goals of nature conservation around the world.

Availability of data and materials (data transparency) The authors declare that [the/all other] data supporting the findings of this study are available within the article [and its supplementary information files].

Declarations

Conflict of interest The authors have no a conflict of interest in relation to this work.

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