Protected area management in the EU

Supporting the advancement of the Trans-European Nature Network

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Abbreviations

BGI	Blue and Green Infrastructure
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CDDA	European inventory of nationally designated protected areas
EEA[1]	European Environmental Agency
ETC/BD	European Topic Centre on Biological Diversity
EU	European Union
GI	Green Infrastructure
GBI	Green and Blue Infrastructure
IUCN	International Union for Conservation of Nature
MPA	Marine protected areas
NGO	Non-governmental organisation
TEN-N	Trans-European Nature Network
TSES	Territorial System of Ecological Stability
OECMs	Other effective area-based conservation measures
UNEP	United Nations Environment Programme
WFD	Water Framework Directive

Disclaimer

The information and views set out in this report are those of the authors and do not reflect the official position of the Member States surveyed.

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[1] The European Economic Area is also abbreviated EEA, but is only referred to by EEA38

Executive Summary

The new EU Biodiversity Strategy for 2030 sets out ambitious goals to further advance the protection of Europe's nature. A central element of the Strategy is the target to increase protected area coverage on land and sea as well as the dedicated designation of strictly protected areas. Another focus lies on increasing connectivity between the natural European land and seascapes until 2030. Specifically, the strategy outlines that European protected areas shall be part of a broader Trans-European Nature Network (TEN-N) supported by transboundary cooperation. While a wealth of information on European terrestrial and marine protected areas is available, many aspects remain less known, such as qualitative descriptions about national and subnational implementation and management and the underlying reasons for similarities and discrepancies among the Member States. This study thus aims to bridge this knowledge gap by exploring national realities for the Member States, such as their individual approaches, challenges and successes in the management of protected areas. A semi-structured survey filled out by representatives of the following 12 Member States form the basis of the report: Austria, Czechia, Denmark, France, Germany, Greece, the Netherlands, Portugal, Romania, Slovakia, Spain and Sweden. ETC/BD partners and involved EEA staff conducted the survey in the individual countries. Following the structure of the survey, the report looks at the following themes, whose key results are summarised below: Designation procedures, Connectivity, Transboundary management and cooperation, Management effectiveness, OECMs and the EU Biodiversity Strategy for 2030.

European countries have a long tradition of **designating** protected areas with the aim of preserving certain natural features. However, incoherent national approaches to protected area designation and a lack of political will are widespread and hinder effective spatial protection for European habitats and species. The survey shows that Natura 2000 sites and all protected areas meeting the IUCN definition of a protected area are most important for nature conservation in the EU Member States. Yet, the various legislations establishing protected areas in Europe (more than 400 in number) fit the criteria of the six different IUCN management categories to varying degrees. Furthermore, sites designated under international conventions to protect nature, e.g. UNESCO World Heritage Sites, or Ramsar sites, also play a role in the composition of Europe's network of protected areas. Overall, existing protected areas tend to be expanded slightly more frequently than new sites are designated. Those that are newly designated are often marine or small terrestrial areas, with large protected areas being rarely designated on land. Strong land-use pressures, edge effects and often poor connectivity lead to fragmentation and insufficient coherence of the protected area network. Responses indicate that only a third of those Member States interviewed, consistently assign sites designated under national law with specific conservation objectives and corresponding conservation measures. Based on these findings, key priorities for future action include: selecting new sites based on biodiversity parameters, strengthening protection levels and extending buffer zones. An enhanced collection and sharing of biodiversity monitoring data is also needed to support an effective designation process. This requires long-term funding, as well as appropriate staff salaries for management and enforcement. Additional EU guidance is needed for the designation of protected areas to consider climate change and to build ecological corridors based on accurate connectivity assessments, among other factors.

Connectivity between landscapes is vital to maintain healthy species, communities and ecosystems as large-scale ecological and evolutionary processes rely on it. Yet natural landscapes across Europe are often fragmented and split into disconnected areas. The survey shows that while there is generally agreement that terrestrial connectivity can be defined as migration between habitat patches, there is less consensus on definitions and concepts for marine connectivity. General awareness of the topic was found to be rather high in the surveyed Member States and actions at different levels are in place to foster connectivity. As such, many countries have dedicated instruments, such as blue and green infrastructure strategies or national network concepts. These are mostly implemented on the regional or local levels, building on regional strategies, spatial planning priorities and site-based protected area

management. The EU supports ecological connectivity in the Member States largely via legal support from the Nature Directives and the Water Framework Directive, as well as through LIFE and INTERREG funding opportunities. Agriculture has been identified as the predominant barrier for landscape connectivity, followed by physical barriers such as settlements, roads and dams. Additional factors impeding connectivity in the landscape are a lack of coordination as well as harmful laws and incentives. On the other hand, success factors to systematically improve ecological connectivity in Europe include establishing a solid legal and/or strategic basis as well as robust connectivity zones along with long-term funding options and political prioritisation.

Transboundary management and cooperation between protected areas in Europe dates back to the early 20th century and it has increased significantly in the past decades, which can be largely attributed to the establishment of the Natura 2000 network. In practice, most EU Member States have multiple transboundary protected areas along their borders. According to the survey, transboundary perspectives are generally addressed on the regional or local level (predominantly in border regions) and are not strategically included in any national protected area design or planning procedures. Transboundary sites are most commonly designed via joining existing sites. However, in some cases, new transboundary sites are jointly designated. With many sites already in place, the management in and outside of areas near borders is seen as a growing field of cooperation. Overall, there are fewer initiatives for marine transboundary protected areas. The survey underlines that existing EU legislation and formats play an important role in fostering transboundary conservation, such as the Nature Directives, the Water Framework Directive and the Marine Strategy Framework Directive as well as the Biogeographical seminars. While many successful examples of transboundary cooperation already exist, numerous factors continue to act as barriers, such as national differences between legal administrative systems, protection approaches and cultural perspectives and to the lack of capacity and coordination. Most viable solutions to address these hurdles involve more systematic coordination efforts, capacity building or joint management tools for planning, data and related needs.

As part of the Aichi Target 11, CBD parties committed themselves to secure a system of 'effectively and equitably managed' protected and conserved areas. This requires undertaking a systematic assessment of the **management effectiveness of protected areas** to verify whether they achieve their conservation objectives or if management objectives and activities need to be modified. However, with the exception of national parks or specific species groups, the surveyed Member States have not implemented comprehensive – or, in some cases, any - monitoring to measure the effectiveness of protected areas. One of the reasons for the lack of monitoring of the effectiveness of management measures is the absence of a standardised measurement approach. While there are different approaches in the Member States, these are often not comprehensively applied and only target individual regions, protected areas, or selected species. To address this gap, several assessments are being developed by the Member States. In general, fewer approaches exist for marine protected areas than terrestrial areas. The IUCN WCPA framework and PAME guidelines on the status and trends of management effectiveness of protected areas are not well known and/or hardly implemented in the Member States. Reasons for this may be the perceived lack of relevance or political will for implementation. Although the importance of effective protected area management and assessment is recognised, significant challenges remain for the Member States. Challenges include the lack of sufficient financial and human resources and capacities as well as lacking and fragmented data, knowledge, standardised assessment methods and monitoring of the management on-site. Further hindering factors include the absence of legally binding specific and measurable conservation objectives and related management measures as well as the lack of a clear mandate to conduct such assessments and enabling governance structures. In response to those gaps, survey participants expressed the need for further guidance on standardised assessment methods and financial support from the EU to conduct such assessments, incorporating monitoring for protected areas in national biodiversity strategies and subsequent legislation and the exchange of best practices across regions and Member States.

The concept of **'Other effective area-based conservation measures' (OECMs)** is a new conservation approach, where (effective) conservation is mainly achieved as a by-product of other management objectives. This distinguishes it from recognised protected areas, where a legal designation process takes place and specific conservation objectives are defined. OECMs are part of the draft post-2020 global biodiversity framework and have also garnered attention in the new EU Biodiversity Strategy for 2030 as potential contributions towards the 30 % EU target on protected areas. The survey revealed that OECMs are still relatively unknown in policy development in EU Member States, with some initial consideration of OECMs in the context of conservation management. Types of OECMs mentioned in the survey include *inter alia* contractual nature conservation, forest management standards and certification (PEFC and FSC), fishery restricted areas or agro-environmental schemes. There is not yet an internationally agreed upon methodology to identify OECMs, but the IUCN is currently developing a standardised site-level methodology. At the national level, limited methodologies are available for identifying OECMs in the Member States. In addition, suggestions for quality criteria and enabling conditions vary significantly. Key challenges to OECM implementation as reported by the survey respondents mainly relate to the lack of human, financial and technical capacity regarding OECMs, limited land availability and resistance from landowners to implement OECMs, as well as the lack of a supportive legal framework and political will to promote the adoption of OECMs. Potential solutions to overcoming these hurdles include: raising awareness on the value of OECMs for nature (e.g. acting as ecological corridors between Natura 2000 sites) and rural economies (e.g. farming products produced in high nature value systems) as well as targeted guidance on OECM definition, criteria for their recognition, and examples, and the uptake of OECMs in existing nature conservation legislation.

The extent of protected area coverage is currently highly diverse across EU Member States. A key challenge to achieving the 30 % protection of land and sea target by 2030 as set out in the **EU Biodiversity Strategy for 2030** is the high administrative burden it places on Member States. This is compounded by the currently insufficient human, financial and technical capacities in the respective countries. In addition, some countries have little remaining area that is eligible for new designations, while others are able to utilise overseas territories and outermost regions to achieve the target. A clear process which considers fairness in terms of distribution across the Member States and biogeographical regions is urgently needed to collectively achieve the 30 % target. Gaining the support of local communities for new sites or elevating protection levels of existing sites presents a difficult task, especially in areas of high-intensity land use. Potential solutions include: providing guidance on OECMs, channelling funding into land acquisition, stakeholder compensation and employment as well as training (new) staff. Currently, Member States have different definitions of protected areas and the activities that take place within them. A common definition of 'strictly protected' was mentioned as an important prerequisite for the 10 % target on strict protection. More than half of the Member States surveyed use the term 'strict protection' in their national systems, but to varying degrees. Some apply it to specific zones within national sites, but it is rarely legally defined in nature conservation legislation or policy. Given these considerations, enabling factors for effective implementation of the target include: EU guidance including potentially binding requirements, supporting analysis for integrating strict protection in the Natura 2000 system, and rules on what level of human intervention is acceptable/desirable in strict protection regimes.

In **conclusion**, despite the considerable increase in protected area coverage in the last decades, habitats and species still overwhelmingly experience ongoing deterioration from human-introduced impacts and show low margins of improvement. Additional efforts are needed to improve the effectiveness of protected area designation and management, enhance ecological connectivity and harness the potential of other OECMs as well as to further extend the protected area network. In order to achieve this, improved governance support from national and European policy and legal frameworks is essential, combined with enhanced assessment methods and harmonisation of national approaches. This can enable much needed systematic cooperation across borders (e.g. capacity building, joint management tools) to achieve transboundary conservation, coherent management and

integrative decision-making. Adequate financial support is required to address the lack of human and financial resources that has been repeatedly highlighted across the assessed topics and enable achieving the biodiversity targets (e.g. through compensatory measures) and more effective monitoring measures (e.g. on management effectiveness). Building strategic partnerships with private and societal stakeholders, including networks of non-governmental organisations and bottom-up citizens' initiatives, can help to actively protect valuable land, e.g. by purchasing land with private and public funds. In addition to public instruments such as contractual nature conservation, such citizen-led initiatives can make a significant contribution to the development of a truly coherent European network of protected nature.

1   Introduction

The new **EU Biodiversity Strategy for 2030** entails ambitious goals to further advance the protection of Europe's nature. One of the central elements of the strategy targets is the increase of protected area coverage on land and sea as well as the dedicated designation of strictly protected areas. Until 2030, this should cover a minimum of 30 % of the EU's land area and 30 % of the EU's sea area, of which at least 10 % shall be managed via a strict protection regime. This goal shall not only be reached by a growing Natura 2000 network but also via nationally designated areas and other effective area-based conservation measures (OECMs). The strategy also aims to restore valuable ecosystems at land and sea by increasing organic farming and biodiversity-rich landscape features on agricultural land, halting and reversing the decline of pollinators, reducing the use and risk of pesticides by 50 %, restoring at least 25 000 km of EU rivers to a free-flowing state and even planting three billion trees by 2030. This will be further specified in the legally binding restoration law expected in 2022. These restoration efforts will support, inter alia, the connectivity between the natural European land- and seascape, and thus the establishment of the broad Trans-European Nature Network (TEN-N) until 2030.

The upcoming post-2020 global biodiversity framework that is being developed by Parties of the UN Convention on Biological Diversity (CBD) is expected to mirror the target of 30 % protected land and sea, among many other targets (CBD, 2021). The framework will most likely be finalised during the second part of the UN CBD Conference of the Parties in spring 2022.

At present, the Natura 2000 network covers over 18 % of the EU´s terrestrial area and around 11 % of the EU´s seas. With the addition of the protected areas that are only designated at the national level, protected land surface in the EU amounts to 26 % (EEA, 2020). A wealth of information on European **terrestrial and marine protected areas** (e.g. size, status, location and biodiversity) is available, particularly through a great body of research and extensive monitoring and reporting activities by the Member States. As such, there are comprehensive databases of protected areas, most importantly the CDDA dataset on nationally designated areas that includes all designated sites from the EEA38 countries and underpins the respective SEBI indicator[2]. Other tools, such as the EEA Natura 2000 Barometer or the Natura 2000 Network Viewer, inform on and present the newest developments on the network.

Still, many aspects – especially qualitative aspects regarding the practical implementation and management on a national and sub-national level – as well as the underlying reasons for similarities and discrepancies among the Member States are often still unknown. Thus, this study aims to contribute to bridging this knowledge gap. Based on a semi-structured survey, this study **explores national realities for the Member States, their individual approaches, challenges and successes** in the management of protected areas, focusing on six individual topics to gather in-depth insights on current practices:

(1)   Designation procedures
(2)   Connectivity
(3)   Transboundary sites
(4)   Management effectiveness
(5)   Other effective area-based conservation measures (OECMs)

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[2] https://www.eea.europa.eu/data-and-maps/indicators/nationally-designated-protected-areas-1/assessment

(6)   EU Biodiversity Strategy for 2030

The study further focuses on concrete case studies for each of the topics and presents innovative approaches, solutions and cooperation efforts. In addition, the survey aims to collect specific **needs of the Member States or single regions to be addressed by the EU** in order to support successful national implementation of the conservation targets of the EU Biodiversity Strategy for 2030. These inputs are also presented in the study to illustrate further activities from the European Commission and its bodies to support and increase the implementation in the Member States.

This work on protected areas complements other ongoing work of the European Commission, for example, the ongoing process on the biogeographical seminars and retrieving national pledges.

2   Methodology

The present study is largely based on a survey conducted in several EU Member States. The countries were selected based on representation with the aim of an even distribution across the EU and the intention to represent key biogeographical/marine regions. This, however, was limited by available ETC/BD partners and involved EEA staff that were able to support the national implementation of the survey. In total, representatives of the following **12 Member States** were covered by the survey: Austria, Czechia, Denmark, France, Germany, Greece, the Netherlands, Portugal, Romania, Slovakia, Spain and Sweden.

The main part of the national research was implemented by dedicated ETC/BD and EEA experts as well as one independent expert (Romania) for each EU Member State (later called '**country experts**'). These experts were to disseminate and organise the survey in their respective countries. To ensure a consistent understanding of the task, an online training was given in April 2021 by Ecologic. Additionally, a guidance document was distributed among the country experts. A central digital workspace was created to share instructions and provide all involved experts with the survey results on a regular basis. For the results, an Excel template as well as a case study document were provided on the platform.

Image 1:   Exemplary image of survey conducted via LimeSurvey
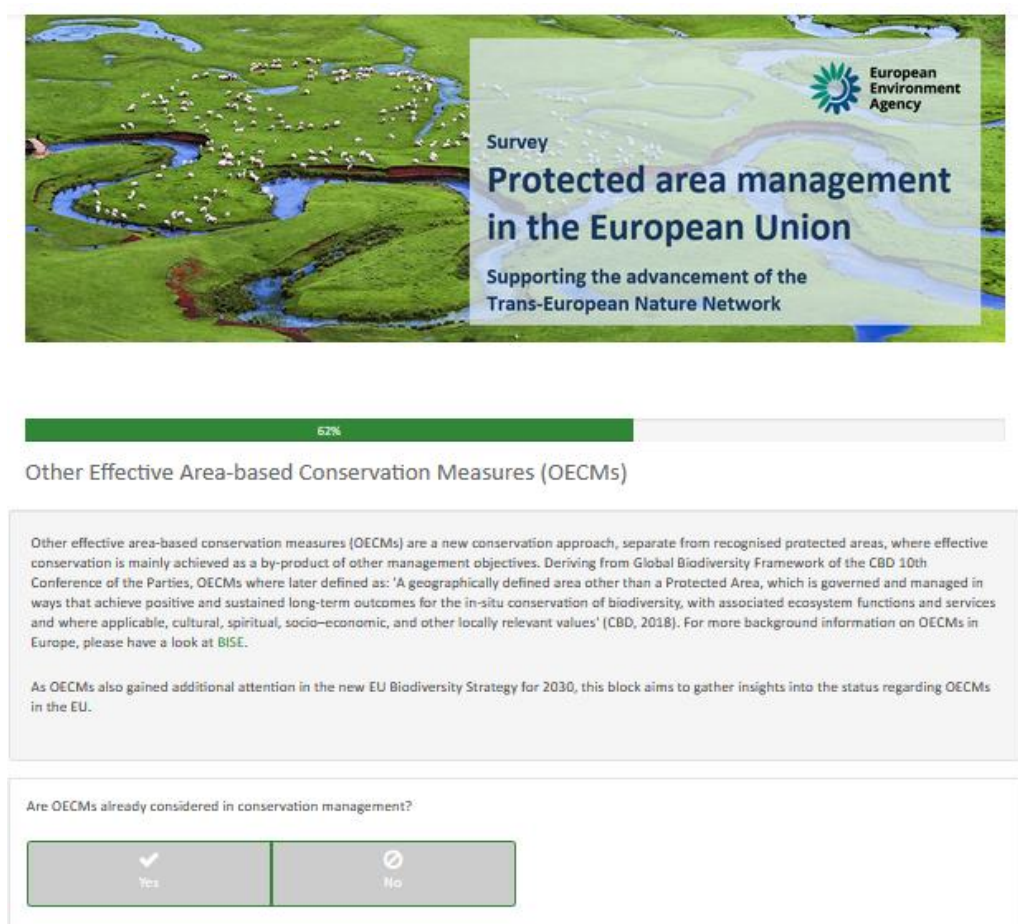
In order to obtain the most reliable information, a semi-structured survey was prepared and conducted as an **online survey via LimeSurvey** (see Image 1 for illustration). Following the six topics identified in the introduction, the authors divided the survey into separate blocks dedicated to each topic. The detailed survey and questions can be found in Annex I.

The country experts identified relevant national/regional actors specialised in the field of protected areas (e.g. national or regional nature conservation authorities, NGOs, research institutions and other experts) and made the survey available to them. The survey was conducted between May and August 2021 and counted over 60 participants. The country experts synthesised the national responses and provided the results in a dedicated Excel file. To collect best practice examples provided by the survey participants systematically, the country experts revised them and prepared 'ready-to-use' case study boxes, which are partly integrated into this report. The full compilation of case studies is available in a separate document (Annex II).

The methodological approach proved to be successful in deriving country-specific perspectives and insights, allowing the identification of a diversity of views and approaches for the different topics. **For interpreting the results, however, some limitations arise.** While the participation was high for some countries, less – or less detailed – feedback was received from other countries. For instance, while six respondents provided substantial feedback for Greece, only one meaningful response was submitted for Portugal. Another limitation stems from the qualitative nature of most of the survey questions. The perspectives of the participants reflect their professional positions, personal opinions, impressions and knowledge as well as available time resources to participate in the survey. Although the country experts rechecked the results, they could not be fully validated. The national information is also not expected to be comprehensive and might miss some important information (e.g. on policy processes, instruments used, etc.) that are thus not included in this analysis. The participants were selected carefully to address that risk and to ensure high-quality responses.

In addition to the survey, a parallel literature review was conducted to further address potential shortcomings of the survey and to supplement important information on the various aspects relevant to the development of a Trans-European Nature Network. The literature review is available via a literature database established in Excel, which is provided in Annex III (including a section on the methodological approach).

Where appropriate, results from the literature were used to complement the assessment.

3 Results

3.1 Designation procedures

Designation categories and associated management regimes for protected areas vary widely. Historically, they have taken many forms, from sacred sites of indigenous communities and medieval hunting reserves to more modern national parks and nature reserves. These different forms reflect the diverse needs that these areas were created to meet.

The **CDDA** is the European inventory of nationally designated protected areas containing information about designated areas and their designation types, which directly or indirectly create protected areas. The CDDA contains the entirety of all nationally designated protected areas (PAs) of all 38 countries in the European Economic Area. Among EEA38 countries and Great Britain, **685 designation-types** alone have been recorded for protected areas (EEA, 2012).

Member States of the European Union are required to designate sites within the **Natura 2000 network** of protected areas. Natura 2000 sites are selected by the Member States in accordance with the criteria set out in Annex III of the Habitats Directive and confirmed by the Commission. Moreover, they are considered as the contribution of the EU's Member States to the Bern Convention's **Emerald Network**[3]. However, the Habitats Directive and the Birds Directive only contain a few formal requirements on the design of the protected areas to be established. **The choice of the national legal framework** is largely **left to the individual Member States**; no specific protection level or accompanying legislation of a protected area is prescribed. However, Natura 2000 sites must have site-specific conservation objectives and related measures to achieve these requirements, which include a favourable conservation status of habitats and species.

There remains a need to complete the Natura 2000 network by the designation of additional sites or the extension of existing ones, particularly in the marine environment.[4]

Furthermore, to reach the 30 % and 10 % strict targets set in the Biodiversity Strategy 2030 and to build a coherent TEN-N, the designation of new protected areas (including Natura 2000 and other categories) or acknowledgement of existing sites will be crucial.

IUCN (2013) defines a protected area as 'a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.'

To describe and categorise the different management approaches in individual sites, the **definition is expanded by** six management categories (one with a sub-division):
- Ia Strict nature reserve
  Ib Wilderness area
- II National Park
- III Natural monument or feature

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[3] In addition, the Standing Committee to the Bern Convention regularly nominates officially as 'Candidate Emerald sites'
[4] Only 6 of 22 Member States had sufficiently met the Natura 2000 requirements in 2013, in terms of site designations for all relevant marine habitat types; only 4 Member States had met Natura 2000 requirements for all relevant marine species (EEA 2015). However, the total coverage of EU seas covered by marine protected areas has more than doubled in the last six years (EC, 2021)

- IV Habitat/species management area
- V Protected landscape or seascape
- VI Protected areas with sustainable use of natural resources

It is also important to distinguish between protected areas designated on private land, which are either privately protected areas (PPAs) or 'other effective area-based conservation measures' (OECMs, see chapter 4.5). The distinguishing criterion is that protected areas should have a primary conservation objective, whereas an OECM should deliver the effective in-situ conservation of biodiversity, regardless of its objectives (Mitchell et al., 2018). This section aims to provide insights into the various approaches to designation (procedures, categories, preferences etc.) of the EU Member States.

3.1.1 Designation categories

To gain a better picture of the individual approaches to protected area designation among the Member States, the survey asked participants for the most relevant designation categories used for nature conservation. In addition to Natura 2000 and the IUCN management categories, UNESCO World Heritage sites and Biosphere Reserves, as well as wetlands under the Ramsar Convention were listed as most relevant. The Member States further emphasised the importance of nationally designated sites and ranked the remaining categories within the CDDA database according to their relevance as follows:

Figure 1: **The most relevant national protected area designation categories (x-axis) other than those created under the EU Birds and Habitats Directives, the Bern, Ramsar or UNSESCO conventions according to responses from 12 Member States (y-axis).**
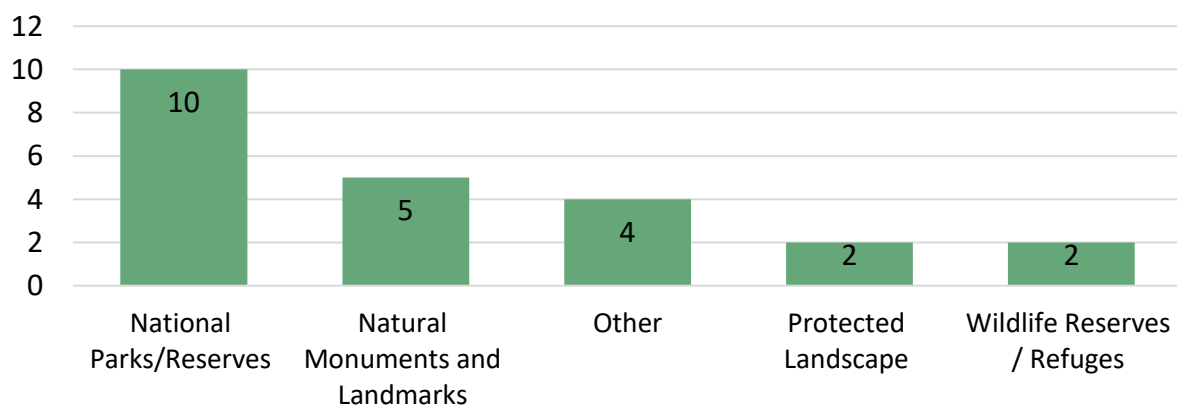
Note: Each country had the possibility to give several answers, so the maximum number of mentions does not correspond to the number of countries.

Source: Survey conducted for this study in 2021

Representatives and experts from the Member States were asked to what extent these most common national designation categories coincide with the IUCN management categories. Six Member States (55 %) indicated that they do correspond, five Member States mentioned that they only partially correspond, and one Member State indicated that they do not correspond (Figure 2).

An explanation of why these categories only partially correspond was provided by Denmark. Survey respondents from a Danish NGO cited a study which found that very few protected areas in the country fulfil the latest IUCN definition (Woollhead et al., 2020; IUCN, 2020). As for the marine realm, the study found that 198 of the 332 Danish marine protected areas (59.6 %) meet the IUCN definition for protected areas, while 134 do not. In terms of surface area, the contrast is even starker: of the total Danish marine area allocated for nature protection, only about a quarter (26.8 %) is estimated to meet the IUCN definition. Many factors may contribute to not meeting the standard, but a primary one suggested by the study is

Figure 2: Extent to which the most common national designation categories coincide with the IUCN management categories, according to responses from 12 Member States

Source: Survey conducted for this study in 2021

that the seabed is not sufficiently protected from bottom trawling and that the management of certain species or habitats is considered inadequate. As for the Netherlands, survey respondents from a large NGO indicated that national designation categories 'clearly differ from those as defined by the IUCN, even though the same labels are used'. For example, National Parks designated by the Netherlands do not meet the definition of IUCN category II. According to these respondents, they are 'not implying any legal protection but are rather used to attract visitors to a specific area'.

Survey respondents were also asked to state **why these are the most relevant protected area designation categories.** The following list contains the most frequently mentioned reasons, whereby the order follows the frequency of mentioning:

- **Degree of strictness** (regulations with prohibitions and restrictions) e.g. IUCN Cat. I or II allowing for protection of large-scale ecological processes
- **Aligned with** national and international **targets**
- **Historically grown** / rich tradition
- **Comparable** among autonomous communities and internationally, e.g. correspond with IUCN management categories for consistency and reporting reasons
- **Ecological & cultural value**, e.g. uniqueness of flora and fauna/priority for conservation, representative areas for relevant habitat types

3.1.2 National approaches to designation

Survey responses indicate that **almost equal efforts** are being made by the Member States to expand existing protected areas and to designate new sites, with somewhat less use of the latter. In some countries, only very few new sites are created and designated, for instance where there is little natural land left for additional protection and very intensive land use occurs (NL, DK).

Several responses indicate that **newly designated protected areas** are predominantly marine (DK, GR), while on land there is more often a focus on expanding existing sites (DK). By some, the Natura 2000 network is cited as the main driver for designating new sites, especially at sea. This includes, for example, the recent designation of new marine sites (DK, FR, GR), mainly because the marine Natura 2000 network is not yet as complete as the network on land. Examples of further new sites being designated on land and at sea include areas adjacent to existing sites or Privately Protected Areas. Further reasons mentioned include:

- Close gaps in the protection network, mainly associated with connectivity and ecological corridors (DE, ES, RO);
- Maintenance of ecological processes, including protection of habitats and species which are valuable, rare, or threatened by (local) pressures (DE, ES, SK, CZ);
- Habitat types and Species of Community Interest not being well-covered[5], or existing on the edge of existing boundaries (ES, GR);
- Increase the number of sites and surface of protected areas in the country (RO), as a result of international obligations e.g. to ensure 17 % or 30 % protected areas and favourable conservation status (DK).

Regarding the **expansion of existing sites**, respondents state that they are designated based on an adaptation to the context: According to survey responses, the socio-economic context plays an important role, as do factors enabling management. For example, land user and community acceptance and recognition of regional benefits are more likely to be associated with site expansion than with designation of new sites, according to some responses.

Some responses point to efforts to **increase the level of protection** and **improve the management of existing sites, including Natura 2000 areas**. This can be on land and at sea, such as through the reinforcement of core zones inside existing marine protected areas.

It is important to point out that there are **diverging opinions about the underlying reasons** behind the above-outlined approaches among the responses of different stakeholder groups. For example, **NGOs and scientists** in some countries argue that recently, the ambition to increase the size of existing areas and create new sites are occasionally diluted. These groups argue that, when designating protected areas, an unofficial approach is pursued by the authorities in which they aim to reach the relevant requirements (meeting the EU Directives) with minimal effort (doing the required minimum) or even directly preventing the expansion of existing or the designation of new protected areas. Danish scientists and NGOs, for example, testify to a lack of an effective and coherent approach and call for an overall national science-based strategy for designation practices on the size, number and connectedness of protected areas that can meet the requirements of the BDS 2030 targets as well as the (upcoming) UN CBD targets for biodiversity. There are statements to the contrary, however. Danish officials said that there is a focus on the possibilities to better protect, expand and connect existing protected areas (see Box 1 for further examples from Denmark). Portuguese officials describe

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[5] ES: Further designation is needed for birds to protect all areas currently designated as Important Bird Area

the approach to designation as 'casuistic', depending on the protection, valuing and conservation status of natural resources, species, habitats and on the continual revisitation of the geographical limits of the protected sites.

Effects of the national designation approaches reveal general trends and differences among the Member States, including accomplishments and shortcomings:

- In some Member States, a **national strategy for protected area management** is in place. In Sweden, for example, such a strategy promotes the designation of forest sites with high biodiversity values, good connectivity and long-term functionality from a landscape perspective. In others, there is a **lack of a coherent national approach,** leading to problems of overlapping competences and inconsistencies in the network of protected areas. Spain's Natura 2000 network, for example, depends on the autonomous communities: while some regions designate large protected areas, others rather designate smaller sites.

- The **number** of newly designated protected areas has recently decreased in some Member States, for example in the Netherlands and Czechia. In others, including Greece and Spain, it has increased according to the survey responses.

- There appears to be a general trend in several Member States to designate **small-sized** protected areas more often than large ones.

- The designation approach can turn protected areas into **fragmented 'islands'** for nature conservation. Reasons for this shortcoming include, for example, that sites are designated without consideration of network coherence. Moreover, in many cases, there are very few provisions in the surrounding land- or seascape of protected sites. Such increasing pressure on biodiversity outside protected areas is arguably exacerbating this phenomenon.[6]

- **Political influence and spread of competencies** complicate the coordination and give rise to compromises and difficulties to respect science-based targets.

- A **trend towards 'paper park scenario'** as many protected areas lack clearly defined conservation objectives and/or appropriate conservation measures as well as the necessary resources for their effective management. According to ministerial representatives from Spain, this is resulting in a trend that investment per hectare of protected area space (e.g. for its effective management) in the country is declining. Practice to designate new sites can lead to **many small protected areas** that are often adjacent to other sites. While this approach can favour connectivity if it is well-designed (ecologically coherent, etc.), it is often associated with trade-offs. For example, additional large-scale sites are lacking on Danish farmland due to pressures from land-use activities, according to interviewees. Respondents from the Netherlands report an increasing loss of biodiversity due to small populations and relatively large negative environmental impacts from the surroundings of small sites (edge effects). Research from the marine environment clearly shows that large protected areas deliver more benefits than smaller ones (Edgar et al., 2014). For terrestrial areas, the ecological benefits of large vs. small PAs have been the source of much scientific debate, with research suggesting that fewer and larger protected areas benefit from greater species overlap (Tjørve, 2010).

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[6] It should be noted, however, that even current conservation efforts are not sufficient to conserve certain species groups within protected areas. Recent long-term monitoring of flagship bird species inside protected areas in the Mediterranean, for example, shows a significant decline in populations (Palacín & Alonso, 2018). The authors of this study attribute this to agricultural intensification and identify conflicts between current EU agricultural policy and legislation on biodiversity conservation.

- **A strong protection** status and efforts to further increase the level of protection are the case **particularly** for **state-owned areas** (FR, DK).

- **Pressures** from **urban, sectoral developments and tourist-use** manifest incompatibilities with the conservation and recovery of natural values (ES); Designation of Natura 2000 sites has recently been based on administrative rather than scientific reasons due to land-use conflicts[7] (AT).

Box 1: **Examples to better protect and enlarge existing protected areas in Denmark**

Wheat harvest in Denmark
© Wikimedia (CC BY-SA 2.0)

Land use lobby exerts pressure on protected area designation
In Denmark, agriculture and forestry occupy approximately 75 % of the land area. NGOs argue that lobbying and the threat of potential economic losses to these sectors play a central role in the decision-making process on the designation of terrestrial protected areas and their level of protection.

Logging operation
© mazsoka, Pixabay

Few high levels of protection on private forest land
Government officials point to a slight increase in strictly protected areas on private lands through the purchase of private nature trusts and private forests set aside as 'untouched forests' under a small government scheme. However, NGOs argue that only about 140 ha of private forests are designated as pristine each year, and powerful sectors oppose the restrictions and/or demand high compensation when protection limits their commercial activities (government compensation range between EUR 3 000-20 000 kr/ha, but most projects between EUR 10 000-15 000 kr/ha). Consequently, initiatives to increase the level of protection on private lands are largely ignored.

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[7] Government agencies in Austria also pointed out that there are many protected areas in parts of the country where protection has little impact because these areas are not at risk (e.g., alpine habitat types), while endangered habitats and species occur in lowland areas where it is most difficult and expensive to establish protected areas.

Patchy protection in small marine protected areas
Similarly, in the marine environment, NGOs argue that the generally small size of the MPAs hampers effective control and enforcement of fisheries restrictions. Furthermore, ecological integrity is not a parameter for the designation of marine sites, but only the protection status of the habitats within. The Danish government conducted side-scan and multibeam mapping of the seabed in Natura 2000 sites to determine the exact location of each habitat type. Danish Natura 2000 sites now protect habitat types listed in the annexes of the Habitats Directive, but only at their exact location while their immediate periphery remains unprotected from harmful activities. In the case of reefs, a buffer zone of only 240m was implemented around the actual reef structures while any form of fishing is still allowed in the rest of the area.

Fishing Trawler © Ed Dunens (CC-BY-2.0.)

Several responses pointed towards the considerable overlap between Natura 2000 and national designations. In addition to this well-known fact, the survey yielded some key differences between the designation approaches for national designations and Natura 2000 sites, which are presented in following Table 1.

Table 1:   Key differences between nationally designated areas and Natura 2000

Nationally designated areas	Natura 2000
Broader scope can contain 'any relevant nature value', e.g. • Socio-economic, landscape/natural monuments/cultural heritage, ecological, ethnological, and territorial protection parameters (ES, DE, DK, GR) • Preservation of cultural and recreational services (e.g. tourism, sense of place); sustainable development with benefits for people and nature (e.g. renewable marine energy) • Species and habitats of national interest, including endemic species or species not listed in the Annexes (GR) • Designation is more opportunistic, but monitoring is more localised with less comprehensive scope (FR)	• Designation focuses on Annex habitats & species and their favourable conservation status (NL, PT, ES, DE, SK, DK, CZ, GR, SE) • Designation is more systematic with a biogeographical approach (FR) • National monitoring, European reporting and an objective of shared targets (FR) • Scientific criteria have a key role for Natura 2000 sites designation, but supposedly to a lesser extent for CDDAs (NL)
• Smaller but in some parts more rigorous/strict protection (AT, SE, SK, RO)	• Partially larger (AT, DK) and with focus on sustainable management (AT)
• Areas are designated by provincial authorities (NL, SE, ES) at cost of coherence: designations without national or transboundary vision (ES) • There are some bottom-up initiatives for ecological coherence in the blue/green network (FR) • There is public consultation on the proposed boundaries, zonation, restrictions, and measures (GR)	• Designation follows guidance from the EU Commission (DK) • Areas are designated by national government (NL, SE) • Consultation process only applies on the boundaries (GR)
• Historically grown (SK)	• More currently designated (SK)

In addition, some Member States have pointed to some unique differences and challenges in their designation regime:

- Federalism implies differing approaches among federal states, which are pronounced by a weak legislative frame on the national level (AT, DE).

- In Austria, Natura 2000 sites have management supervision (Schutzgebietsbetreuung) - however, with very different financial and human resources - in place, while traditional national categories such as 'protected landscape' or 'conservation area' do not. In Germany, 'Schutzgebietsbetreuung' also exists for both Natura 2000 sites and nationally protected sites.

- In Spain, autonomous communities have full competence on protected areas, which causes unique challenges due to differing approaches.

3.1.3 Priorities for future actions regarding protected areas in Europe

Survey respondents were asked to identify **priorities for the future development of protected areas in their respective countries**. Many of the responses referred to protected areas in general, and some were expressed in particular about improving the Natura 2000 network or national designations. While many responses were specific to improving the designation approach, other priorities expressed related to more general factors that are often linked to other sections of this report (e.g. connectivity, management effectiveness, etc.).

The most frequently cited priority was the development, implementation, or enhancement of a **national strategy** (including species and habitats action plans) which includes designation parameters and specification of (quantitative) conservation objectives (SE, FR, DK, AT, CZ). It was also considered a high priority to ensure **effective, science-based management** and set quality criteria for all types of protected areas (AT, ES, GR, DK, CZ, DE). Securing **long-term funding** was highlighted as key to enabling this. Examples given included the implementation of management plans and effectiveness-tracking via PAME or applying for IUCN Green List certification. According to survey respondents, the designation system should be based on **biodiversity parameters** and not on the areas with the least conflict for other stakeholders. Many interviewees argued to establish or improve **connectivity** among protected areas (incl. blue/green infrastructure steppingstones and cross-border connectivity) for species, building a coherent and resilient network. Moreover, mitigating the impacts of **climate change** on protected species, habitats and sites has been highlighted by the survey respondents. This is illustrated by a best practice example from Germany, where a biosphere reserve has been established along the Elbe River to resolve existing conflicts of interest in the areas of nature conservation, climate change and flood protection (see Box 2). Some of the consulted survey respondents called for a general **strengthening of protection** within national designations and Natura 2000 sites. For example, French and Danish experts suggested restricting the impact of trawling to marine protected areas through a strict system of protection. The creation of **larger protected areas** was also mentioned as important to increase representativeness and enable better species exchange and migration, besides other effects. The need to **focus on restoration and protection of wilderness** was emphasised by a few survey respondents, which should include the (re)establishment of natural ecological processes. An example was provided for Denmark, where there is a movement towards changing state forestry sites from traditional extractive practices to untouched or limited intervention areas. The use or **extension of buffer zones** was also brought up to reduce the impact of pressures on protected areas and their biota, while an effective zoning system should be in place beforehand, which is not the case for all sites in the Member States. Other priorities were: (i) Addressing the impacts of invasive alien species (ii) Removing negative economic and legal incentives (iii) Addressing problems caused by interactions and conflicts between wildlife and human activities, both in terms of negative impacts on species and impacts on natural capital and resources (iii) Improving communication and co-development with stakeholders.

Box 2: Elbe-Brandenburg River Landscape Biosphere Reserve, Germany

The Elbe at high water in the Elbe River Landscape Biosphere Reserve © CC BY-SA 4.0 (Creative Commons)

The **Elbe River Landscape-Brandenburg Biosphere Reserve** is a biosphere reserve in the federal state of Brandenburg and part of the transnational UNESCO Elbe River Landscape Biosphere Reserve. It has a size of 533 km².

The River Elbe landscape is one of the last remaining near-natural fluvial topographies in Central Europe. Some 400 km of the River extending across five German states along the Elbe River floodplain were designated a UNESCO Biosphere Reserve in 1998, from Torgau on the border of Saxony to south of Lauenburg.

The Brandenburg section extends over an area of 53 000 ha from the mouth of the River Havel to Dömitz and boasts one of the most prized and beautiful landscapes on the River Elbe.

Index species characteristic of the region include the white stork (*Ciconia ciconia*), Eurasian beaver (*Castor fiber*), white-tailed sea eagle (*Haliaeetus albicilla*) and fire-bellied toad (*Bombina bombina*). Biosphere Reserves are model regions for sustainable development. The main aim of the Elbe River Landscape Biosphere Reserve is to protect the centuries-old cultivated landscape with its characteristic animal and plant species with a view to encouraging sustainable use. The example of the UNESCO-Biosphere Reserve Elbe-Brandenburg River Land-scape also shows concrete fields of action concerning climate change in protected areas. It identifies sensible approaches to resolving existing conflicts of interest in the areas of nature conservation, climate change and flood protection.

Sources:
http://www.natur-schau-spiel.com/en/natur/natural-landscapes/elbe-brandenburg-river-landscape-biosphere-reserve.html
Nature-Based Flood Risk Management on Private Land
(https://library.oapen.org/bitstream/handle/20.500.12657/22861/1007300.pdf?seque#page=171)

Among the responses aimed specifically at **improving the Natura 2000** network, the most frequently cited was to **increase the representativity of habitats and species**, including e.g. national red list species and habitats (FR, PT, SE, SK, ES, DE). In general, respondents urged to **achieve the objectives of the Nature Directives**, i.e. to maintain or restore favourable conservation status of habitats and species of Community Interest. It was deemed a priority to fill coverage gaps identified in the Natura 2000 network, both terrestrial and in the marine environment. For example, Spanish interviewees attested to an underrepresentation of wetlands within Natura 2000. In Sweden, for instance, a national framework and overarching regional plans are currently being developed to fill coverage gaps of the marine Natura 2000 framework with sound connectivity. Targeted information and awareness raising regarding the benefits arising from the protection and conservation of Natura 2000 areas was further mentioned.

Regarding the **improvement of nationally designated protected areas**, improving knowledge at the national and regional level of the **conservation status** of species and habitat types through the development of compatible **monitoring schemes** was most frequently mentioned**.** An increase in the representativity of underrepresented habitats was also called for. In Spain, for example, according to NGO respondents, the network of national parks does not sufficiently cover the following areas: steppe habitats, steep escarpments and rocky shallows, pelagic areas of passage, reproduction or habitual presence of cetaceans or large migratory fish. Identified priorities further included **improving management practices and objectives** for new protected areas at the local or regional level. Ideas also entailed the introduction of **new categories of protection**. An example of this was provided by Denmark in the form of 'Nature National Parks', which are currently designated on land, while marine national parks are not expected in the near future.

3.1.4 Conservation objectives and measures

Figure 3 shows the responses of Member States surveyed to the question of the extent to which they have adopted **conservation objectives and corresponding measures**. Experts from four Member States indicated that their countries have them consistently in place, while seven countries have them only partially in place and only one does not have these consistently in place. The most frequently mentioned reasons for a (partial) lack of conservation objectives/measures are a **lack of financial resources and human capacity**. Another reason put forward is the high **need for data** to enable targeted conservation objectives and measures (e.g. data on targets, cumulative impact of threats or connectivity of sites), for which sufficient data is currently not available or not collected, as shown by the responses of several Member States. Some Member State experts pointed out that certain ecosystems have proportionately more targets and related measures than others (e.g. freshwater environments in Sweden). Another point raised was that objectives **are not always precise and often difficult to evaluate**. Federalism with different approaches between federal states (e.g. Germany and Austria) and hurdles in terms of competences and coordination between administrations (e.g. Spain) can mean that setting objectives and measures is not a priority or that they are only included in **ineffective** 'paper management plans'. This may also include a lack of assessment of deficits in some Member States. The **ambition level** of the targets has also been questioned by some survey responses, in that some countries are maintaining the current conservation status of habitats and species with no efforts to improve it. In Greece, the legal acts for setting conservation targets or measures have not yet been completed, although recent monitoring efforts and LIFE projects are beginning to address this issue (see also Box 3 below).

Figure 3: Extent to which nationally designated sites have consistently specific conservation objectives and related conservation measures in place, according to expert responses from 12 EU Member States.
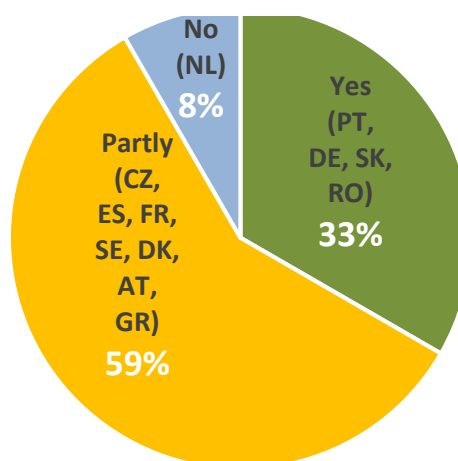
Source: Survey conducted for this study in 2021

Box 3: Designating Gyaros Marine Protected Area

Gyaros island, Cyclades, Greece © G. Stefanou/WWF Greece

Through the Life project LIFE12 NAT/GR/000688, WWF-Greece and partners launched an approach for establishing a protected area at the Natura 2000 site of Gyaros, and a former exile site, an uninhabited island in the Cyclades that hosts one of the most important breeding nuclei of the endangered MMediterranean monk seal (*Monachus monachus*) with an observed pupping rate of some ten births per year.

In the island the species has been observed with its 'original' behaviour occupying open beaches for resting and reproducing. Gyaros is estimated to have a Mediterranean monk seal population of approximately 70 individuals, excluding pups, which is approximately 12 % of the world population of the species. The approach for establishing the protected area is based on the principles of

Ecosystem Based management, Marine Spatial Planning and Co-management. A key element of the Gyaros initiative has been the active and full involvement of key national and local stakeholders in the process of the MPA design. The Gyaros Consortium of Stakeholders was established together with policy makers, local government, scientists, conservationists and local users, including fishers. Its first task was to develop a common vision for the new MPA. Following open and transparent deliberations, in which all decisions were unanimously agreed, the Consortium also managed to formulate a comprehensive ecosystem-based management plan. In addition, an innovative surveillance and patrolling system that uses a wide-range marine radar, a high definition infrared camera, and a drone, has been set up and endorsed by the relevant ministers to protect the MPA from illegal activities.

In July 2019 the Greek Ministry of the Environment adopted the proposal for the area's zoning and conservation measures, as a first step of formally designating the Gyaros MPA.

Source: https://webgate.ec.europa.eu/life/publicWebsite/project/details/3888
https://d2ouvy59p0dg6k.cloudfront.net/downloads/towards_2020_scorecard_27_nov_low.pdf

The surveyed Member States also identified the most helpful formats to tackle the above-raised issues. The most frequently expressed need was for standardised and targeted **procedures**, as well as for different information and **capacity-building formats** (e.g. training, workshops, expert meetings, lectures, online platforms) for different target groups and for sharing peer experiences. Joint **evaluation and improvement of protocols**, including guidelines and guidance documents, was also mentioned. There is a further need for simple and integrative **quality indicators for protected areas** as well as **monitoring systems** that are comparable in time and space.

Regarding the underlying **purpose and objectives of designating sites**, Figure 4 below gives an overview of the survey responses.[8] The protection of habitats and species ranks first among the responses, followed by the uniqueness of the features to be protected. The protection of species was ranked higher than that of habitats when considered individually, while cultural heritage ranks a very high fourth place and landscape value and bio-cultural heritage follow suit. It is perhaps unsurprising, and consistent with statements in other parts of the survey, that connectivity or cross-border cooperation are not key objectives in the designation of national sites. Mitigation of climate change ranked last among all responses, although, as mentioned above, it was mentioned as a future priority and is likely to have increasing and probably drastic impacts on species habitats in the coming years and decades.

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[8] If more than 50% of the surveyed experts voted for or against, this was taken as a unanimous decision. If there was a tie, the country was entered for both Yes and No; if there was no answer, the countries were omitted. Identified purposes and objectives underlying the designation process, in addition to the 12 ones predefined by the survey, include the protection of water resources (quality and quantity) and protection against flooding (natural risks), as well as public use, environmental education and tourism.

Figure 4: **Ranking of underlying purposes and objectives of protected area designation (x-axis) according to expert responses from 12 Member States (y-axis).**
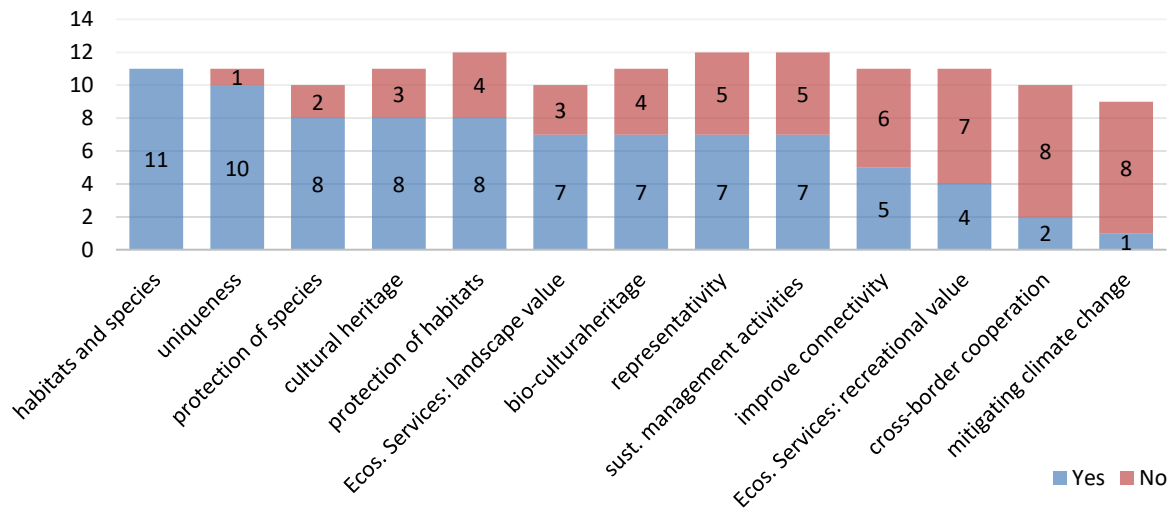
Source: Survey conducted for this study in 2021

Note: The blue bars contain the number of Member States where the majority of experts voted that these are underlying objectives while the red bars contain the number of Member States where the majority of experts voted that these are not underlying objectives.

3.1.5 Need for additional guidance from the EU

As the prior section has illustrated, there are still a number of barriers and hindering factors impeding the effective implementation of transboundary cooperation in the EU. The survey gave participants the opportunity to specify additional guidance needed from the EU to overcome at least some of the aforementioned hindrances. Respondents expressed the following needs regarding further input and support on transboundary issues. These predominantly relate to the following points:

- **Guidelines** on the following issues:

  - On **transboundary network assessment** criteria in order to check where protection is lacking (e.g. connectivity assessment) especially in the context of climate change and to enhance predictive ability to changes in needs of connectivity.
  - On how to best design and create **ecological corridors** especially without designating the corridors themselves as protected areas, but rather using management measures or incentives.
  - On **climate change adaptation**, e.g. criteria or management tools for adapting the methodological guides and recommendations to the situation of each region.
  - Further **elaboration on the conservation objectives and measures** required for protected areas to count against the targets, including examples.
  - On **how the EU BDS 2030 targets should be met**, e.g. through a 'ratcheting mechanism'[9] as the one known from the Paris Climate Agreement.
  - On the implementation of Annex III of the Habitats Directive.
  - On **'strict' protection**, including the identification of strictly protected areas (the 10 % target) in relation to e.g. area, ecological functionality, species and habitat representation, human intervention, etc.
  - On methodological aspects including best practice examples, to learn from European and larger-scale experiences.

- **Additional demand** for:
  - An online platform for the exchange of information and monitoring of procedures;
  - **Training**, e.g. to standardise regional and national approaches, e. g. compulsory inventories of biodiversity, conservation status and threats.

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[9] The so-called ratchet or ambition mechanism in the Paris Agreement is not a self-contained issue within the text but scattered throughout the deal and in essence describes how each submission of intended nationally determined contributions (INDCs) would be more ambitious than the last, namely, ratcheting up.

3.2 Connectivity

Connectivity between landscapes is vital to maintain healthy species, communities and ecosystems as large-scale ecological and evolutionary processes (such as gene flow, migration and species shifts) rely on it (UNEP-WCMC et al., 2018). The importance of connected landscapes becomes even more relevant with changing climatic conditions. A change in climate can lead to a change in species mobility or changes in species abundances, distribution and composition, among other impacts (IPBES, 2019). Currently, natural landscapes in Europe are scattered across the entire continent into disconnected fragments.

One of the most important instruments to maintain or renew connectivity across a landscape and across boundaries of European Member States are protected areas. Recent studies show that **connectivity** between protected areas **in Europe is relatively high compared to many other regions** of the world. According to the 'Protected Connected Land" (ProtConn) indicator, the EU scores higher than any of the five continents (Saura et al., 2018). Yet, **due to the high fragmentation of the landscape, European countries are also in particular need of connectivity**, while in other regions or countries (such as in Canada or many African countries) single large protected areas are not as dependent on a high degree of connectivity. Compared to other continents, European protected areas are smaller than the global average: 69 % of the terrestrial protected areas in Europe are smaller than 1 km^2 (EEA, 2020). For the marine sites, the data shows that the protected areas are larger by average with less connectivity.

The EU Biodiversity Strategy for 2030 strengthens connectivity efforts with the establishment of the Trans-European Nature Network, and additional funding for Natura 2000 and Green Infrastructure (GI) is further addressed via an EU Green Infrastructure Strategy (2013).

Science overwhelmingly shows that – compared to less connected or disconnected areas – well-connected areas are far more effective in the conservation of biodiversity, and also in adapting to climate change (IUCN, 2020). Thus, to preserve the ecological functions of the European land and seas, continuous efforts to increase its connectivity are needed.

The following section explores the current status and approaches on connectivity in the EU and its Member States, mainly based on the results of the EEA / ETC/BD survey on protected areas.

3.2.1 Understanding and implementing connectivity

Ecological connectivity is broadly understood as 'the unimpeded movement of species and the flow of natural processes that sustain life on Earth' according to the Convention of Migratory Species (CMS, 2020). As such, connectivity is very much defined by species characteristics: range, habitat choice, dispersal distance and carrying capacity (van der Sluis & Jongman, 2021). Each species has its own habitat requirements and thus requires a different type of connecting landscape features, so-called corridors. Such corridors can, for instance, consist of linear features, stepping stones, or landscape mosaics (a comprehensive and more detailed overview of the concept of connectivity is given by van der Sluis & Jongman, 2021).

According to the survey respondents, there is a large consensus among EU Member States on the definition, often understood as 'the possibility for organisms to migrate and disperse among habitat patches´ via a system of stepping stones and ecological corridors that often form part of protected areas or OECMs. While this is quite consistently established for terrestrial areas, many countries lack systematic definitions and concepts for marine areas. The survey responses further suggest that marine connectivity is not as prominently addressed as connectivity on land. It is mostly addressed by broader instruments, such as the framework of marine protected areas in Sweden, where marine connectivity is assessed via the spatial tool 'Mosaic' (ArcGIS application) and included in marine spatial planning.

Generally, the awareness of connectivity in the surveyed Member States was found to be rather high and many of these countries also address connectivity in national or regional plans and legislation (DE, FR, ES, NL, PT, SE, SK). **National strategies** that target ecological connectivity are mostly implemented via Blue and Green Infrastructure (BGI) strategies/instruments, such as in Spain, Portugal, France or Germany. Moreover, national network concepts include the Territorial System of Ecological Stability (TSES) in Slovakia and Czechia as well as the Dutch national Nature Network (see Box 4 below) or the National Fundamental Network for Nature Conservation and Biodiversity in Portugal. No national approaches could be identified for other countries (DK, GR, RO).

Box 4: Network concepts and Green Infrastructure targeting ecological connectivity

Ecological network of the Czech Republic and Slovakia – Supraregional and regional biocenters and biocorridors
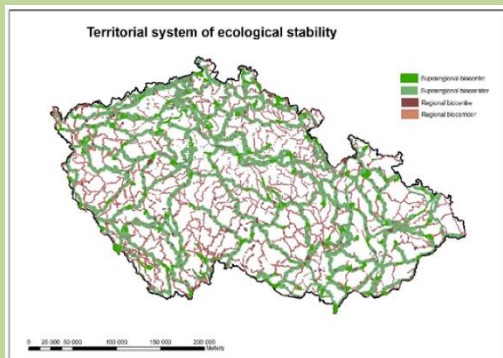
Territorial System of Ecological Stability in Czechia © ANCLP CR

In the 1970s, a concept of an ecological network was formulated in former Czechoslovakia, called the **Territorial System of Ecological Stability (TSES)**. Since then, the concept forms part of the environmental legislation and has been widely applied in the planning practice in the Czech Republic and Slovakia. It was designed as a response to large-scale natural and semi-natural habitat fragmentation and loss. The main purpose of establishing the ecological networks approach was to preserve the spatial-ecological connectivity stability of the landscape. Starting in the late 70s, TSES was a pioneering ecological network at national, regional and local levels. It was one of the first comprehensive concepts of this kind (Miklos et al., 2019). It represents a hierarchical connectivity concept of ecological core areas (biocentres) and buffer zones of different importance connected by biocorridors (Mackovčin, 2000). In Slovakia, the TSES framework consists of two basic parts: the design of the ecological network and a set of eco-stabilisation measures. The TSES is a concise method based on landscape ecological research which modified the ideas of ecological networks towards integrated management of optimum organisation and utilisation of the landscape as a whole.

Dutch National Ecological Network (NEN) and Nature Network (NNN)

To improve nature conservation and ecological connectivity, the **Dutch National Ecological Network** was established in 1990. It features core areas (protected areas) and areas that function as corridors or stepping stones. Based on this plan, the highway authority has built green bridges to reconnect areas separated by highways as part of the multi-year Programme for Defragmentation (launched in 2005). At the end of the programme, it was concluded that most measures were realised, with 72 % of the bottlenecks being removed and 23 % being partially solved. Also, some provinces are using agri-environmental schemes to ensure that protected areas are buffered by less intensive land use and that connectivity is ensured between the sites. Since 2013, the network has been called 'Natuurnetwerk Nederland´, the Dutch Nature Network (NNN) with the provincial governments as main implementing entities.

Image: Retrieved from article Turnhout (2009)

Green Infrastructure approaches in Portugal

In Portugal, Green Infrastructure (GI) is disseminated into national spatial planning through three legal instruments: National Ecological Reserve Act (REN), National Agriculture Infrastructure (RAN) and Water Public Domain (DHP). These legal instruments, together with the national protected areas and Natura 2000 areas, constitute the National Fundamental Network for Nature Conservation and Biodiversity. As one of the components of this network, the REN supports the integration of the connection between the core areas of nature conservation and biodiversity into the National Classified Areas. In the REN, various Green Infrastructure elements are planned, including protected areas, sustainable use areas and natural connectivity features. Portuguese GI has been applied focusing on the ecosystem functions and services, as an alternative to classic engineering solutions. Such GIs are well recognised and integrated into spatial planning tools.

Additionally, Portugal has recently finished the Prioritised Action Framework for the upcoming period of 2021-2027. In this context, connecting protected Natura 2000 sites with other natural and semi-natural areas is a priority of investment, mainly considering the relevance of green infrastructures to ensure reestablishing natural habitats and to keep the high level of conservation, also considering the social, economic and cultural needs.

Such national networks or strategies are often coordinated and implemented at the **regional level**. This may include the following approaches:

- Some countries integrate connectivity or BGI into **spatial planning** on regional and municipal levels (PT, DE, NL, SK).

- In Spain, all autonomous regions are developing their **regional (B)GI strategies** in line with the national one. These regional strategies highlight regional priorities and characteristics, such as the adaptation of old infrastructure assets (for example railways) to the establishment of greenways, interventions in river corridors, networks of mountains and public natural areas.

- In France, a [guidance] was produced at the national level. The administrative regions have been in charge of developing their specific method and elaborating **green and blue networks** at their scale. These were implemented in the regional and communal development planification documents, often with diverging methodologies.

- In Sweden, **GI plans** are produced by the County Administrative Boards that also include marine connectivity if relevant.

- In Slovakia and Czechia, supraregional, **regional and local ecological network territorial systems** are established via biocenters and biocorridors. In Czechia, these are based on binding documents at the level of districts (more than 70 %) or municipalities (more than 15 % of all 3000 municipalities have approved documents) (see Box 4). In Slovakia, TSES are approved at the national level and are processed legally binding documents for all regions (some are currently in the approval stage).

- In Germany, the **'biotope network'** (Biotopverbund) is anchored in the national law on nature conservation since 2002 and targets the increased connectivity of Natura 2000 areas and rivers (at least 10 % of the area in Germany). The network is implemented via landscape planning in the federal states and sectoral planning at the local level and is further strengthened by additional federal legislation.

- The provincial offices in the Netherlands can designate **ecological connection zones** that connect Natura 2000 areas, e.g. between the Veluwe and the Rijntakken.

- Other countries implement connectivity mostly via **projects** on the regional level, e.g. via INTERREG projects or activities of the Biotope Wetland Centre (EKBY) in Greece.

These results are reiterated by other studies. Van der Sluis & Jongman (2021), for instance, state that, while planning landscape connectivity and ecological networks is generally accepted in Europe, the implementation is carried out in different ways. This mainly relates to political, geographical and economic priorities. For instance, Germany, Austria, Italy and Spain are decentralised federal countries, while countries such as Denmark, the Netherlands, Portugal and the Czech Republic are more centralised.

Implementation of ecological connectivity is often perceived as most effective at site level, e.g. through targeted municipal concepts and planning (DE, NL, PT, SK), the integration into different sectors such as transport and agriculture – e.g. agri-environmental schemes (RO, DK), construction projects to improve physical connectivity through bridges or removal of dams in freshwater ecosystems (DK), urban green corridors (ES, FR, SE), or contractual nature conservation (AT, DE).

The EU Nature Directives and the Water Framework Directive (WFD) are perceived as the most important policy instruments to drive connectivity-related action in the Member States. This is mainly related to the establishment of the Natura 2000 network and the river management requirements formulated by the WFD. Though many concepts are in place, connectivity implementation in the context of protected areas (mostly associated with the Natura 2000 network) is still mainly perceived as ineffective/insufficient. Based on the feedback from the survey respondents, it can be assumed that connectivity perspectives – though potentially addressed by management objectives – mostly play no major role or are not systematically targeted in the designation and management of protected areas. However, there are some exemptions, as for instance in the Netherlands and Sweden, where guidance and mappings are available to indicate priority areas for connectivity. In Spain, 'connectivity plans with other protected areas' were recently included in Law 7/2021 on Climate Change and Energetic Transition, and the process of mapping a network to increase the connectivity of different species is nearly finalised, considering their habitats and dispersion capacity.

3.2.2 Assessment of connectivity

In order to effectively target connectivity perspectives, it is important to identify suitable or important areas or routes for species migration, as well as to identify existing gaps in protected area systems or existing barriers. This would mostly be done by means of spatial mapping.

The question of whether a monitoring system for connectivity is in place was answered rather heterogeneously – even within single countries. In most countries, however, no targeted monitoring activities seem to be in place (AT, DK, PT, RO, SK). The most concrete efforts are reportedly undertaken by the Netherlands (see Box 5 below).

Box 5:   Exemplary mapping initiatives for ecological connectivity

Mapping of species condition based on connectivity in the Netherlands

Spatial conditions for natural habitats, 2015

Percentage of target species for which the habitat is suitable

- 0 – 10
- 10 – 25
- 25 – 50
- 50 – 75
- 75 – 90
- 90 – 100

Source: Wageningen Environmental Research

WUR/juh8
www.clo.nl/en152306
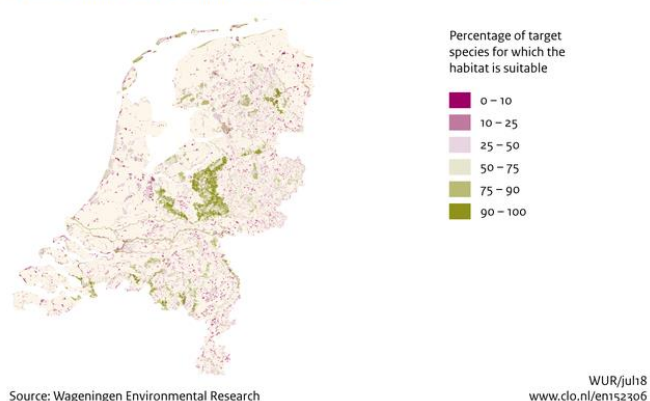
In the Netherlands, a systematic assessment of species condition in relation to their possibility to move between habitats is undertaken by Wageningen University & Research (WUR) in cooperation with the Dutch Environmental Agency. The regions are responsible for updating the spatial maps that provide insight into the current progress in the development of the Nature Network (including corridors). The system uses a model to assess current connectivity and gaps.

More information on and results of this work is available here:
https://www.clo.nl/indicatoren/nl1523-ruimtelijke-samenhang-natuurgebieden?ond=20898

Mapping of structural connectivity in Greece and beyond

While there is no centralised monitoring system in place for connectivity in Greece, one monitoring system is provided by the Greek Biotope Wetland Centre (EKBY). In the context of the WetMainAreas project of the Transnational Cooperation Program INTERREG Balkan-Mediterranean, EKBY has recently assessed and mapped the structural connectivity of areas favourable for biodiversity. Connectivity mapping layers for Greece as well as for the other Balkan Mediterranean countries, namely Albania, Bulgaria, North Macedonia and Cyprus are accessible via the project's geoportal. The connectivity assessment and mapping followed a landscape-level methodological approach using Earth Observation (EO) mapping products and EU/national geospatial datasets and applying a morphological spatial pattern analysis and GIS modelling techniques. The different protected area zoning (IUCN management categories which apply at nationally designated areas) are considered as a human/instrumental response to safeguard biodiversity and maintain natural ecosystems in good condition. The structural connectivity analysis resulted in landscape patterns of well-connected, protected or unprotected areas favourable for biodiversity.

Connectivity results for Greece showed that approximately 20 % of the Greek continental territory represents connected areas favourable for biodiversity outside the Natura 2000 network (data under publication). These areas are intact natural areas that could be integrated, as Other effective area-based conservation measures (OECMs).

More on the methodological approach can be found in the following articles:
- https://doi.org/10.3897/oneeco.4.e32704
- https://link.springer.com/chapter/10.1007%2F978-3-030-28191-5_27

Further monitoring initiatives include, inter alia:
- In Spain, a working group for habitat fragmentation from the Ministry for the Ecological Transformation and the Demographic Challenge (MITECO) was established over 20 years ago and has been exploring subjects on species migration, including the monitoring of species hit by cars (SAFE programme).
- In Sweden, work has been done to analyse and identify landscapes that have a higher concentration of habitats important for biodiversity (see report in Swedish here). Another monitoring initiative also targeted the agricultural landscape (see report in Swedish here).
- In Slovakia, the TSES is currently being updated at the regional level and an automated support system for the creation of local TSES is being prepared. https://download.sazp.sk/RUSES_II/ or https://www.sazp.sk/projekty-eu/ruses-ii.html

- The designation of the 'biotope network' in Germany follows the assessment of false-color infrared aerial photo evaluations or CORINE Landcover 2000 data for forests, and selective biotope maps for the open country.

The list of such efforts is most certainly not exhaustive and does not capture all activities related to connectivity, e.g. within projects, research initiatives or administrations on the regional or local level.

3.2.3 Challenges, solutions and success factors

Connectivity between protected areas and valuable habitats can be impeded by a multitude of different methods. Most prominently, physical barriers such as roads, dams, settlements and other infrastructures (e.g. for energy production and transmission) block the migration of species between habitats and thus prevent the spatial connectivity of the landscape. Another main factor is the intensive use of major parts of the landscape, predominantly related to agricultural or forestry management. Agriculture production alone is currently using around 40 % of the total land area, equalling over 170 million ha (Eurostat, 2021). According to the survey, agriculture is perceived as one of the main impeding factors for functional connectivity. The main reasons are, inter alia, ongoing intensification processes and declining grassland. In many cases, land ownership and the lack of cooperation between local stakeholders are mentioned as prohibiting the implementation of connectivity aspects.

Apart from direct landscape features and management, legal and administrative implementing barriers are perceived as important factors by most of the survey participants. Besides the absence of sufficient financing and human resources, the lack of ambition, prioritisation and vision was also frequently mentioned. Additionally, harmful laws and incentives on the national and EU level, such as the CAP subsidies, were mentioned.

Table 2: **Overview of main barriers and possible solutions as identified by the survey participants**

Barriers	Solutions
Legislation & Governance (11 MS)	
Lack of resources, competences and funding	Increase administrative capacities
	Better coordination, guidelines and clear regulations at the national level
Harmful laws and incentives, inconsistent sectoral policies	Develop policies to tackle problems related to connectivity through stronger EU request
Lack of ambition, focus, priority, vision, will	Promote collaboration agreements between the administrations responsible for protected areas
Land ownership and availability of land	Land reclamation projects, transfers of land to the state ownerships through land acquisition
	Provide appropriate compensation schemes
Lack of cooperation between administrations, site managers and other stakeholders	Bring stakeholders together, e.g. via an interdisciplinary governance tool or local agreement/MoU
Agriculture (7 MS)	
Ongoing intensification, high land-use intensity	More demanding regulation for agricultural activities
Harmful, inadequate incentives, CAP	Change of agricultural policy at EU level (CAP)
Agricultural management (e.g. declining grassland)	Increase in area of agri-environmental schemes, in buffer zones and between protected areas, land acquisition
Settlements / Infrastructure (6 MS)	
Roads, railways and dams, marine traffic	Build green bridges, surpasses to overcome physical barriers
Development of settlements, urbanisation	Use existing artificial structures instead of additional sealing and use them as GI (e.g. via green roofs or facades)
	Urban biotope spots and villages, e.g. gardens, parks and small urban features like roundabouts
Science & Data (5 MS)	
Lack of (publicly available) data	Increase the availability of open data, e.g. through open data policies
Lack of regional studies and changes of scenarios due to climate change impact	Monitoring with emphasis on connectivity – mapping of ecological corridors (terrestrial and marine)
Lack of understanding of research results	Increase communication skills of researchers
Forestry (4 MS)	
Forestry management	Inform and educate landowners and forestry companies
Energy & Resource extraction (4 MS)	
Renewable energies (e.g. hydropower, marine parks), telecommunication and energy infrastructures and other resource extraction (terrestrial & marine)	Conduct an adequate impact assessment of projects potentially impacting landscape permeability for species
	Develop a national plan for modern environmental terms on hydropower
Industrial fisheries	More demanding regulation for fishery activities

Furthermore, survey respondents gave examples of main success factors that are believed to systematically support ecological connectivity. Those entail:

- Creation of a **legal basis and implementation plans,**
- Designation of **robust connectivity zones,**
- Systematic identification of **high-value ecosystems** (in agriculture/grasslands and forest) to inform land users and to address planning processes,
- Establishment of wildlife crossings, bridges and banks,
- Dedicated, long-term **funding** options,
- Dialogue and communication platforms for involved stakeholders (also to mitigate conflicts).

Examples of how connectivity can be successfully implemented are presented below.

Box 6: Exemplary projects and initiatives fostering ecological connectivity

Removed Vilholt dam © Nielsen and Sivebæk

Restoration of river connectivity in Vejle County

One good example comes from the municipality of Vejle in Denmark and its systematic effort to remove barriers in rivers and streams over several decades. As one major process, the Vilholt hydropower dam impeding the free flow of the river Gudenaa – one of the largest rivers in Jutland – was removed in 2008 after two decades of stakeholder discussions. Recent studies have found that the dam removal has led to a dramatic increase in the Brown trout (*S. trutta*) population, especially in young fish. This increase was not just found upstream of the former barrier, but also downstream of the barrier, despite little habitat changes in that area (Birnie-Gauvin et al., 2017).

Dinaric-SE Alpine lynx (*Lynx lynx) ©* Pixabay

Transnational connection of fragmented lynx population

The LIFE Lynx project seeks to rescue the remaining population of the Dinaric-SE Alpine lynx (*Lynx lynx*). The species went extinct at the end of the 19th century due to hunting , habitat fragmentation and a lack of prey species. It was successfully reintroduced in the 1970s by moving animals from a Carpathian source to Slovenia. Currently, the population is small, isolated, and extremely inbred. It urgently needs reinforcement by introducing additional, healthy animals from another population. The project collaborates across all EU countries sharing this population to develop and implement a systematic approach to ensure long-term viability of the population and connectivity throughout the landscape.
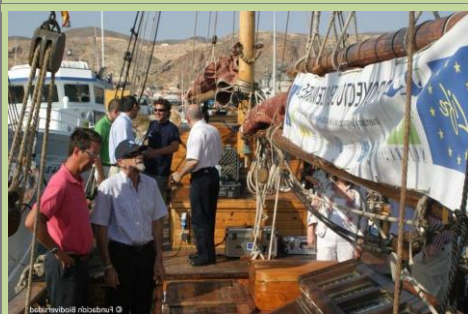
LIFE INDEMARES © Fundación Biodiversidad

Establishing a marine Natura 2000 network in Spain

As one of the European countries with the highest marine biodiversity, Spain implemented the LIFE INDEMARES project to establish a coherent marine Natura 2000 network. Over a six-year period (2009-2014), the project has contributed through the designation of new protected areas and a proposal for increasing the ecological coherence that arises from the ongoing gaps in the Network. INDEMARES is perceived as a milestone in marine conservation in Spain. With additional funding to the new LIFE INTEMARES, the project still actively works on the conservation and restoration of marine biodiversity (https://intemares.es/, see Box 10).

3.2.4 Need for additional guidance from the EU

As the prior section has illustrated, there are still a number of barriers and hindering factors impeding the effective implementation of ecological connectivity in the EU. The survey gave participants the opportunity to specify additional guidance needed from the EU to overcome at least some of the aforementioned hindrances. Respondents expressed the following needs regarding further input and support on connectivity, specifically related to:

- **Guidelines on the following issues:**

    - On a better general understanding of connectivity and barriers/success factors at the national and EU level
    - On how to create ecological networks at the international level - support for the creation of ecological networks for natural units
    - On how to ensure connectivity by design and actions that contribute to connectivity and the EU network of protected areas (e.g. through the development of sectoral planning)
    - Definition, identification and mapping of ecological corridors (diversity of approaches, methods and existing initiatives that may not always be the most appropriate or complete) – also specifically for marine areas
    - On how to link connectivity and nature restoration
    - On legal possibilities addressing authorities, NGOs and landowners
    - Guidance at species and habitat type level, but also promotion of a holistic approach with a focus on entire ecosystems

- **Best practices**, e.g. on the connectivity of Natura 2000 sites and how to enhance the connectivity of Natura 2000 sites (including possibilities for new sites or expansion of existing sites), and demonstration of methodological approaches

- Additional **support and information** regarding:
    - Additional scientific basis, e.g. on why connectivity is important
    - GIS and satellite data
    - Support for the data from the EU Science Hub

- **Training**, e.g. for the EU Science Hub (i.e. Guidos software developed by JRC, Conefor, etc.), methodological training on ecological corridors

- **Financial support**, e.g. projects financed at EU level for connectivity

3.3   Transboundary management and cooperation in the EU

The goals of establishing transboundary sites are closely linked to ecological connectivity, since habitats and species interchanges do not stop at geopolitical boundaries. Transboundary conservation thus ensures protection on both sites of the border and is seen as an important precondition for preserving valuable ecosystems to the highest possible extent (IUCN/WCPA, 1999).

Cross-border cooperation for joint conservation efforts has a long tradition in Europe. The oldest began in the early 20th century between Poland and Slovakia. Situated in the Alps, the Italian Parco nazionale dello Stelvio (130 734 km^2) and the Swiss National Park (17 032 km^2) form one of the largest connected protected areas in Europe. European transboundary connectivity and cooperation has increased throughout the years– especially in the last two decades of the 20th century (Vasilijević et al., 2015). Analyses indicate that this is strongly related to the establishment of the Natura 2000 network, as in over 75 % of two joint protected areas across borders, at least one forms part of the network. Today, there are more than 4 300 instances of adjacent protected areas across European borders and over 200 official transboundary protected areas (EEA 2020).

River ecosystems serve as a good example to illustrate the need for cross-border conservation management. Rivers cross many countries and carry their inhabitants, nutrients, sediments and contaminants along the way to the sea. To achieve the ambitious targets of the EU Water Framework Directive (reaching a 'good ecological status') and the EU Biodiversity Strategy for 2030 (restoring at least 25 000 km of EU rivers to a free-flowing state), large European rivers are managed on river basin level.

The following section captures current perspectives from the consulted Member States and intends to give a picture of how transboundary cooperation is implemented in the EU.

3.3.1 Transboundary cooperation

Transboundary cooperation is defined by IUCN as 'a process of cooperation to achieve conservation goals across one or more international boundaries' (Vasilijević et al., 2015). In practice, most EU Member States are engaged in multiple transboundary protected areas along their border. According to the survey results, transboundary perspectives are mostly addressed on a regional or local level (predominantly in border regions) and are not strategically included in any national protected area design or planning procedures.

Most commonly, transboundary sites are designed via joining existing sites (AT, NL, FR, PT, DE, SK, GR), but this also depends on the local situation. With most sites already in place, management inside and outside of sites near the border is a growing field of cooperation. In some cases, however, new transboundary sites are jointly designated (AT, ES, PT, RO, CZ). There are fewer initiatives for marine transboundary protected areas. Existing ones, however, are often larger and of high regional significance, such as the Doggerbank, the Pelagos Sanctuary or the Trinational UNESCO Wadden Sea Heritage site (see also Box 7 for the latter).

As reiterated by the survey participants, existing EU legislation, such as the Nature Directives and its Natura 2000 obligations, as well as the Water Framework Directive and the Marine Strategy Framework Directive, plays an important role in fostering transboundary conservation. For instance, conservation perspectives of rivers and seas are addressed by transnational cooperation agreements or commissions, such as the international commissions for the Danube (ICRDR) and Rhine (ICPR), the commissions targeting the protection of the North-East Atlantic (OSPAR) and the Baltic Sea (HELCOM), or the MedPAN network for Marine Protected Areas in the Mediterranean. Through European funding schemes like LIFE or INTERREG, the EU further supports the implementation of transboundary conservation. Additionally, international conventions such as the Ramsar Convention on wetland

protection support the designation of transboundary Ramsar Sites for wetlands of international importance.

Box 7:   Exemplary transboundary protected areas in Europe

Wadden Sea UNESCO World Heritage

The Wadden Sea UNESCO World Heritage site is a unique cross-border ecosystem. This is one reason why it is protected by national parks in Germany, Denmark and the Netherlands. In Denmark, areas of the Wadden Sea were declared nature reserves in 1979, while the first areas in the Netherlands were placed under nature protection a year later. In Germany, there are three corresponding protected areas, namely the national parks 'Schleswig-Holstein Wadden Sea' (established in 1985), 'Lower Saxony Wadden Sea' (established in 1986) and 'Hamburg Wadden Sea' (established in 1990). In addition, the Dutch and German Wadden Sea were declared UNESCO World Heritage Sites in 2009 and the Danish Wadden Sea in 2014.

Wadden sea in Germany, Hallig Hooge and Pellworm
© Ralf Roletschek Ralf Roletschek, Wikimedia (CC BY-SA 3.0)

The so-called Trilateral Wadden Sea Cooperation (The Netherlands, Germany and Denmark) provides a comprehensive protection and management system with additional layers of protection at the federal and regional/state level, making this area an exceptional example of transboundary protection.

The Wadden Sea is an extremely large temperate coastal wetland system containing an extensive system of tidal flats and barriers. The national parks protect critical habitats for about 2 700 marine species in the intertidal and subtidal zones and at least 5 000 semi-terrestrial and terrestrial species, mostly the flora and fauna of salt marshes and dunes on the islands. Marine mammals present in the Wadden Sea include the harbour seal, grey seal, and harbour porpoise. Worth highlighting is its international importance as a breeding, staging, moulting and wintering area for birds. The availability of food and a low level of disturbance are essential factors that contribute to this ecological function. For 43 bird species, the Wadden Sea supports more than 1 % of the entire flyway population, which is the criterion used by the Ramsar Convention for identifying wetlands of international importance.

Sources: https://www.waddensea-worldheritage.org/trilateral-wadden-sea-cooperation
https://www.mdpi.com/2071-1050/13/14/8006/html

Prespa Park transboundary initiative

Mikri Prespa from Lefkonas height © Yannis Kazoglou

The Prespa Park is the first transboundary protected area in the Balkans. It was established in February 2000 with a joint Declaration by the Prime Ministers of Greece, Albania and North Macedonia. The area is composed of a single catchment basin, which, to be effectively protected, requires a joint management policy from the three countries. This collaboration has three broad aims: to safeguard the natural and cultural values of the Prespa basin with the participation of the local communities; to promote the economic and social welfare of the residents; and to strengthen peace, friendship and collaboration amongst the three nations. A trilateral Prespa Park Coordination Committee (PPCC) was established in order to better organise and promote projects for the protection and sustainable development of the area. The committee is a ten-member body which meets twice a year in Prespa, in each of the three countries in turn.

With the passing of the years, the views of the three sides on important issues have converged and have formed a consensus on questions such as water and ecosystems management that previously would have been difficult to even discuss. Many local bodies have collaborated (and continue to collaborate) on transboundary programmes that further the aims of the Prespa Park, while international funding organisations provide substantial economic support.

Sources: https://www.spp.gr/index.php?option=com_content&view=article&id=10&Itemid=15&lang=en, https://www.spp.gr/images/PrespaNet-En.pdf

Geopark Karawanken

Mela Koschuta (Karawanken), municipality of Zell © Niki.L, Wikimedia (CC BY-SA 4.0)

The Karawanken Geopark is a cross-border Geopark in Austria and Slovenia and was included in the UNESCO Global Geoparks Network in 2013. The park was established as part of the project 'The establishment of a cross-border geopark between the Petzen and Koschuta', which was implemented in OP SI-AT 2007-2013 and co-financed with European Union funds from the European Regional Development Fund. In legal terms, the Geopark acts as a cross-border working group (ARGE), the founders of which are municipalities and associated members. The administrative boundaries of the Geopark follow the boundaries of 14 communities in which around 53 000 people live. The Geopark has an area of 1 067 km^2 and is characterised by the rich geological diversity between the Alps and the Dinarides.

The objectives are the preservation of natural resources, the economic valorisation of the Geopark, awareness-raising and cross-border cooperation and regional development. The Geopark is a prime example of cooperation between German and Slovene-speaking population groups in the border region.

Source: https://www.geopark-karawanken.at/
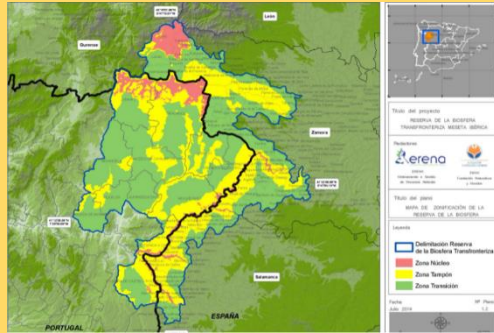
Meseta Ibérica Biosphere Reserve

Biosphere Reserves are places where innovative practices of joint management of natural values and human activities are demonstrated. In 2015, UNESCO approved the first cross-border Biosphere reserve managed by a European Group of Territorial Cooperation (EGTC). The 'Meseta Ibérica' (Iberian Plateau) is established at the North-Western border between Spain and Portugal, co-financed by the Cross-border Cooperation Programme Spain-Portugal (POCTEP). The EGTC is based in Bragança, Portugal, and its members are the associations of municipalities of Terra Fria Transmontana, Terra Quente Transmontana and Douro Superior, in addition to the provincial councils of Salamanca and Zamora, and the city of Zamora.

Map of Meseta Ibérica
Source: Red española de reservas de la Biosfera

The area contains many flagship species, some of which have been the subject of conservation projects, such as the Black stork (*Ciconia nigra*), Egyptian vulture (*Neophron pernocpterus*), Bonelli's eagle (*Aquila fasciata*), Eurasian eagle-owl (*Bubo bubo*), European otter (*Lutra lutra*), and Iberian wolf (*Canis lupus signatus*).

The area includes built heritage dating back to Roman times and the Middle Ages. The remains of forts, castles and walled enclosures in localities bear witness to frequent wars between Spanish and Portuguese kingdoms during the Middle Ages. This area also boasts a unique cultural heritage manifested in the architecture, customs, traditions and folklore.

Sources: https://portal.cor.europa.eu/egtc/news/Pages/meseta-iberica.aspx, https://www.biosfera-mesetaiberica.com/

Transboundary cooperation is highly site-specific and can differ in intensity and quality. While many adjacent protected areas are managed independently, transboundary protected areas are jointly managed by a multitude of different formats. These may include:

Formats for **close cooperation**:

- Joint nature conservation policies and/or **common management strategies/plans** for both sites (e.g. National park Thayatal (AT, CZ);
- A common **management committee** (e.g. for the Trinational Wadden Sea Heritage site, see Box 7);
- Co-managed sites with **letters or declarations of cooperation**;
- Managed by a European Group of Territorial Cooperation (e.g. the Meseta Iberica Biosphere Reserve, see Box 7);
- Partnerships of chairmen in the local advisory councils for protected areas;
- Designation as **Transboundary Biosphere Reserves** or **cross-border Geopark** (e.g. Biosphere reserves between ES and PT (Meseta Ibérica, Tejo-Tajo, Gerês) or the Geopark Karawanken (AT/SI), see Box 7);
- Common **membership at European diploma** (e.g. TransParcNet, the network of all certified EUROPARC Transboundary Parks);
- Joint **projects** that are nationally funded or funded via LIFE programme or INTERREG;
- Common **training** initiatives;
- **Annual meetings** of involved regional authorities;
- Exchange via the **Common Environmental Information System (SEIS)** in the Eastern Partnership countries;
- **Informal cooperation** (e.g. in the North Sea between NL, UK and DE).

For all Member States that also have borders with non-EU countries survey respondents state that transboundary cooperation substantially differs from cooperation within the EU. These are mostly

attributed to differences in: legislation and other administrative hurdles (AT, NL, SE, FR, ES, DE, SK, RO, GR), technical standards (AT, FR), socio-economic culture and priorities (SK, RO), or financing (FR, RO, CZ) e.g. non-EU countries are not eligible for INTERREG projects (with the exception of Norway, Switzerland and the United Kingdom). Such constraints increase the difficulty of developing transboundary protection. However, there are many successful initiatives of transboundary areas with non-EU countries (see the example of Prespa Park transboundary initiative in Box 7). As one example of a successful EU INTERREG, the cooperation between the Swedish Kosterhavet National Park and the bordering Norwegian Ytre Hvaler National Park is partly funded by EU INTERREG. It promotes, among other things, common management for these sites. The primary objective of INTERREG Sweden-Norway, however, is to jointly promote tourism and economic growth in the region. The INTERREG project ConnectGREEN is another example of five countries joining forces to increase the capacity of ecological corridors identification and management (see Box 8). In Romania, there are cooperation programmes with neighbouring non-EU countries (e.g. Moldova, Ukraine) for which they use the support of the World Bank.

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Box 8: Connectgreen INTERREG project

Through the ConnectGREEN project, partners from different countries (Romania, Serbia, Hungary, Czech Republic, Slovakia) and various fields of activity (spatial planning, research, government, biodiversity conservation) joined forces to increase the capacity of ecological corridors identification and management. Planned infrastructure developments threaten to cut through the movement corridors of large carnivores and increase the fragmentation of their habitats in the Danube-Carpathian region, which is one of Europe´s last remaining strongholds for large carnivore species: Gray wolf, Eurasian lynx and Brown bear, protected under EU law. The design of technical infrastructure often does not take green infrastructure and biota migration corridors into account. Very few spatial planners have the necessary knowledge and experience to introduce environmental requirements into planning documents and ensure the elimination of conflicts between socioeconomic development and nature conservation. These problems require a coherent transnational approach as the large carnivores frequently move across state borders in search of food, mates or other resources.

Danube-Carpathian region
© ILE

Source: http://www.interreg-danube.eu/approved-projects/connectgreen

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Despite the IUCN definition, protected areas across the inner borders of a country are often also seen as a transboundary site. The designation and management of such sites can be even more difficult than a site crossing a national border (EEA, 2020). This highly depends on the administrative structure of a country, as strong federalism might hinder cooperation and management compatibility. Representatives from Austria, for instance, assert that such sites between federal states do exist but 'the mechanisms are complicated and costly' due to diverging approaches and coordination in different regions.

3.3.2 Inventory of transboundary sites

Inventories of transboundary protected areas exist on several levels. On the global level, the most comprehensive inventory was developed by UNEP's World Conservation Monitoring Centre (WCMC) and published as the Global inventory 2007. The Ramsar Convention also regularly updates its list of transboundary Ramsar Sites. Additionally, the global database on protected areas (WPDA) contains an 'international' category, covering transboundary Ramsar Sites as well as transboundary UNESCO-MAB Biosphere Reserves and World Heritage Sites. The European inventory of nationally designated protected areas (CDDA dataset, EEA38) does currently not contain specifications on whether a site is (part of) a transboundary protected area. According to the survey respondents, most of the countries have some sort of a national inventory on existing transboundary sites (NL, FR, PT, DE, SK, RO, CZ). These, however, are mostly not identifiable or not systematically prepared. The following most comprehensive assessments could be identified:

- Identification of transboundary sites with the Fundamental Network for Nature Conservation (RFCN) in Portugal as part of national legislation[10];
- A study by Wageningen Environmental Research (WENR) for Dutch transboundary Natura 2000 areas;
- Slovakian and German representatives pointed to available lists of Ramsar Wetlands of international importance (DE and SK).

Furthermore, the EEA keeps track of potential transboundary sites. In the underlying assessment all terrestrial Natura 2000 sites which are adjacent to another Natura 2000 site across a border are counted, based on different distances (of buffer). The following Table 3 gives an overview of such existing sites in the countries that participated in the survey[11].

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[10] According to paragraph 1 of article 5 of the Legal Regime for the Conservation of Nature and Biodiversity (RJCNB) approved by Decree-Law No. 142/2008, of 24 July, the Fundamental Network for Nature Conservation (RFCN) comprises the National System of Classified Areas, which includes the following core areas for nature and biodiversity conservation: (i) Protected areas integrated into the National Network of Protected Areas; (ii) Sites from the national list of sites and special protection zones included in the Natura 2000 Network; and (iii) The other areas classified under international commitments assumed by the Portuguese State and by the continuity areas.

[11] Corresponding figures for CDDA is not yet available.

Table 3: Number of adjacent terrestrial Natura 2000 sites in selected EU Member States

Country	Buffer 100m	Buffer 500m	Buffer 1000m	Buffer 2000m	Buffer 5000m
Austria	53	54	60	71	103
Czechia	80	86	98	119	190
France	91	99	101	108	132
Denmark	9	9	9	10	11
Germany	220	247	280	320	443
Greece	28	28	28	28	30
Netherlands	36	41	45	47	54
Portugal	23	24	24	24	25
Romania	46	47	51	55	60
Slovakia	91	104	123	150	213
Spain	64	71	73	78	99
Sweden	3	6	7	11	18
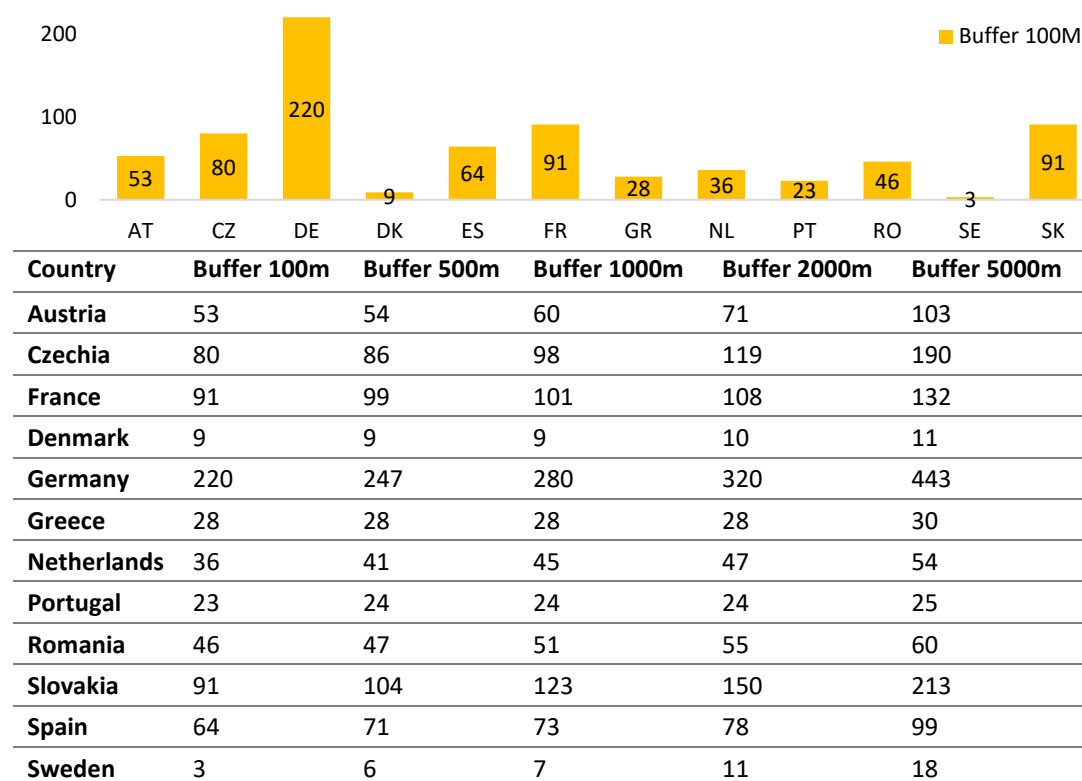
3.3.3 Challenges, solutions and success factors

While there already are many successful examples of transboundary cooperation, there are still many factors hindering such initiatives. According to survey respondents, these often relate to national differences between legal administrative systems, protection approaches and cultural perspectives or to the lack of capacity and coordination. The lack of comprehensive data is also perceived as a challenge. The following Table 4 gives a detailed overview of challenges and potential solutions detailed by survey participants.

Table 4: Overview of main challenges and possible solutions as identified by the survey participants

Challenges	Solutions
Legislation & Governance (9 MS)	
Administrative and legal differences (most common) as well as different conservation priorities & sanctioning regimes	
Bureaucratic effort, jurisdiction, different mandates	Promote international water districts
Lack of coordination of governmental entities	Increase exchange, introduce new communication channels
Capacities & Resources (4 MS)	
Lack of well-trained human resources	Increase capacity building
Lack of financial resources	Allocate more financial resources on national and EU levels to specially target transboundary conservation
Culture (4 MS)	

Challenges	Solutions
Different socio-economic conditions, traditions, interests and language barriers	Increase cultural exchange Provide language courses for site managers and other involved parties (English as common language)
Implementation at local level (3 MS)	
Differences between the levels of planning, protection and financing of protected areas	Harmonise planning and management tools
Lack of cooperation between local stakeholders	Increase exchange formats and capacity building
Science & Data (2 MS)	
Lack in exchange of data	Availability of open data policies
Lack of identification of key transboundary areas	Promote transnational research projects

Moreover, it was highlighted that the most relevant solutions to existing implementation barriers could be more systematic coordination efforts, including capacity building, joint management tools (for planning, data, etc.), or using transnational conservation options.

3.3.4 Need for additional guidance from the EU

As illustrated in the prior section, there still are a number of barriers and hindering factors impeding the effective implementation of transboundary cooperation in the EU. The survey gave participants the opportunity to specify additional guidance needed from the EU to overcome at least some of the aforementioned hindrances. Respondents expressed the following needs regarding further input and support on transboundary issues, which predominantly relate to the following points:

- Additional **guidance documents** and **best practice examples**, e.g. on:
  - general info for successful implementation of cross-border cooperation,
  - on how the differences between the Nature Directives application function across borders.
- **A comprehensive exchange platform** allowing the Member States and stakeholders to exchange information in a standardised/established format, potentially also containing relevant open data;
- **Training and workshops** on successfully establishing cross-border cooperation and transboundary protected areas;
- **Exchange programmes** to learn from practice on individual sites;
- **More information should be disseminated,** e.g. on the benefits of transboundary management (for instance marine transboundary areas could secure geostrategic interests, sovereignty and Exclusive Economic Zone (EEZ) rights).

3.4   Management effectiveness

Protected areas are a cornerstone of international and European nature protection. While protected t areas are legally designated and acknowledged, there is a strong need to enhance the quality of their management to ensure that they achieve their stated conservation objectives and overarching biodiversity targets.

For protected areas to achieve the defined conservation and other objectives, they must be managed appropriately. In the case of Natura 2000 sites, Member States are required under Art. 6.1 of the Habitats Directive to

> 'establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans, and appropriate statutory, administrative or contractual measures which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites.'

Moreover, corresponding to Art 6.2, Member States have to take 'appropriate steps to avoid the deterioration of natural habitats and significant disturbance of species for which the areas have been designated […].' Similar requirements regarding the setting of conservation objectives and corresponding measures are also necessary for other types of protected areas (such as biosphere reserves, national parks etc.).

As part of the Aichi Target 11, CBD parties committed to securing a system of 'effectively and equitably managed' protected and conserved areas. In addition, parties shall further undertake more systematic assessments of protected area management effectiveness (PAME) and their biodiversity outcomes to inform the Global Database on Protected Areas Management Effectiveness (GD-PAME). At the CBD COP 10 (2015), the parties (including the EU) also committed to assessing the management effectiveness of 60 % of their total area of protected areas (EEA 2020).

PAME (as indicator[12]) provides information on status and trends regarding the management effectiveness of protected areas. It can further be disaggregated to examine what methodology was used and the frequency with which a protected area is being assessed. The indicator records the number of assessments of management effectiveness completed by countries for each protected area in the World Database on Protected Areas (WDPA[13]). This indicator is also proposed under the draft CBD post-2020 monitoring framework. While PAME is a useful starting point, it only evaluates whether management measures are in place and whether the management of a protected area has been assessed. However, it does not provide any insights into the success and effectiveness of the protected area management. It needs to be noted that not only the management effectiveness can be measured, but also the effectiveness of a protected area itself to deliver on biodiversity objective. Reflecting on Aichi Target 11, this section seeks to provide insights into the implementation and current practices on assessing the effectiveness of protected area management.

3.4.1 Approaches and monitoring to measure effectiveness

Based on PAME assessments and the literature available, a range of methodologies are currently used by EU Member States to assess effectiveness. However, only a relatively small share of Natura 2000 sites has been assessed and Member States face several challenges in implementing a monitoring

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[12] https://www.bipindicators.net/indicators/protected-area-management-effectiveness
[13] https://www.protectedplanet.net/en/thematic-areas/wdpa?tab=WDPA

system for the effectiveness of protected area management. Such an assessment is key to allowing for adjustment and correction of conservation measures if needed. The European Commission is currently discussing with the Member States the development of a methodology to assess the management effectiveness for marine protected areas.

So far, the majority of the countries that participated in the survey have not implemented comprehensive or any monitoring to measure the effectiveness of terrestrial and marine protected areas. Except for national parks, specific species groups or selected measures in some countries (AT, DE, ES, RO, CZ), there is no nationwide monitoring. In response to this gap, some countries started developing evaluation and assessment schemes for terrestrial protected areas (AT, SE, ES, FR, GR) and marine protected areas (SE, ES, GR, FR).

One of the reasons for the lack of monitoring of the effectiveness of management measures is the lack of a standardised method for its measurement. While the Member States are obliged to report on the conservation status of species and habitats protected under the Birds and Habitats Directive, those results are not directly linked to the effectiveness of protected areas. Moreover, management plans for Natura 2000 sites are sometimes considered to be insufficient, lacking measurable and concrete conservation objectives that can be monitored. In addition, in most cases, the financial means to carry out such monitoring are lacking.

However, there is a variety of (potential) approaches to measure the effectiveness of terrestrial and marine protected areas, but those are still under consideration and/or only partially implemented. Some examples of **existing approaches targeting terrestrial protected areas** are listed below:

- **Indicators** that evaluate the effectiveness of protected areas[14], mainly for national parks in Spain addressing e.g. species protection, invasive alien species, plant health, ecosystem structure and productivity as well as socio-economic issues.

- **Quality criteria for National Parks and National Criteria of the National MAB Committee for Biosphere Reserves** are applied to monitor management effectiveness in Germany. Those reserves and parks partially overlap with the Natura 2000 network. For some of those protected areas, special and detailed monitoring of target species and identification and implementation of measures is implemented and funded by conservation agencies responsible for Natura 2000.

- In the Netherlands, the realisation of **nature targets** for nationally designated sites is evaluated, but it mainly focusses on the effects of management measures and does not address the effectiveness of protection regimes.

- **Rapid Assessment and Prioritization of Protected Area Management** (RAPPAM) was applied in a study in national parks, nature parks and biosphere reserves in Romania. This approach can identify strengths and weaknesses of protected area management. It further intents to (i) analyse the reach, severity, spread and distribution of a wide range of threats and pressures, (ii) identify areas of vulnerability and high ecological and social importance, (iii) indicate the urgency and conservation priorities for each of the protected areas, (iv) help establish and prioritise appropriate strategic interventions and (v) follow-up steps to improve the effectiveness of protected area management.[15]

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[14] https://www.miteco.gob.es/es/red-parques-nacionales/plan-seguimiento-evaluacion/seguimiento.aspx
[15] http://ananp.gov.ro/wp-content/uploads/RAPPAM.Romania.Ro_.pdf

- There is a **local monitoring scheme** in the federal state of Lower Austria to evaluate the success of management measures e.g. by assessing species inventories and abundance of **selected species groups.**

As indicated above, **terrestrial protected area assessment systems are currently being developed** in some Member States. Some of those focus in particular on Natura 2000 sites:

- In Austria, for example, the evaluation of the effectiveness of the Natura 2000 network is in development, and further preparatory works have been conducted in some regions (e.g. baseline mapping in Upper Austria) or are planned (e.g. pilot projects for an effective remapping).

- In Spain, work is underway on a common definition of and approach to nationwide monitoring. Focusing on Natura 2000 sites, the autonomous regions and the national government are working on a standardised list of measures and other tools to measure effectiveness in the Natura 20000 network (against conservation objectives). Further examples are given below.

- In Greece, the Natura 2000 Committee started developing a **national management effectiveness assessment methodology**[16] and process that is expected to be further developed in order to be more structured and readily applicable. It builds on existing literature and reports, including the IUCN guidance documents, as well as WWF, Ramsar and IIED methodologies.

Additional approaches being developed, which are not specific to Natura 2000 include:

- Coordinated by the Swedish Environmental Protection Agency and the Swedish Forest Agency, a **national strategy for the management of habitats and cultural heritage in forests** set aside for nature conservation purposes is under development. One of the main goals is to increase the effectiveness of management actions in these habitats. The main targets are protected areas, including Natura 2000 sites, but habitats on private land, i.e. OECMs, are also being considered. The project is based on cooperation and dialogue between authorities, the forestry sector and NGOs.

- A definition of objectives of the **National Strategy for Protected Areas**, as well as a new resources centre for the protected areas, are currently under development. The latter aims at providing more tools for the practitioners in order to update and extend the use of the **Guide for management planning –** which was first developed for natural reserves – and to propose training in its application.[17] Moreover, since 2019, the French Office for Biodiversity has annually called for the financing of the evaluation and the monitoring of management efficiency in Natura 2000 sites.[18]

Fewer **approaches exist for marine protected areas.** The only example where a monitoring/evaluation of the management effectiveness has been conducted was reported for the Balearic Islands in Spain, focusing on Posidonia meadows and the non-commercial Fan mussel (*Pinna nobilis*). In addition, monitoring is carried out in marine protected areas of interest for fisheries. In

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[16] https://ypen.gov.gr/wp-content/uploads/legacy/Files/Perivallon/Diaxeirisi%20Fysikoy%20Perivallontos/Epitropi%20Fysi%202000/2020Apr_EF2000_AxiologisiPAs_fin.pdf; This methodology is expected to be applied in marine protected areas, too.

[17] http://ct88.espaces-naturels.fr/guide-delaboration-des-plans-de-gestion

[18] https://ofb.gouv.fr/actualites/3eme-appel-manifestations-dinteret-evaluation-de-lefficacite-des-mesures-de-gestion

certain cases, this is done with management plans that set out specific monitoring measures and corresponding budgets. However, such cases are very rare in the Natura 2000 network in Spain. In Sweden, the Marine Protected Areas Framework is about to be introduced, which is also expected to address management effectiveness.

The UK, which was not part of the survey, has made significant efforts to develop a **target indicator to assess protected area effectiveness**, based on experience from the OSPAR Regional Sea Conventions. The proposed indicator is noted in the UK's submission to the CBD SBSTTA 24 meeting[19]. For more information see Box 9 below.

Box 9: Area effectiveness component indicator in UK (under development)

It is proposed that this new global indicator will be based on the existing approach used by **the OSPAR Regional Sea Convention**, which has been successfully applied for the past four years across all Marine Protected Areas (MPAs) in the North East Atlantic. The approach asks four simple questions (with Yes, No, Partial or unknown standard response categories) on the key life cycle stages of protected areas:

   a. Whether **management information is documented** and available in a suitable format to those that may need to understand the management in place at the site.

   b. Whether **management measures** considered important to mitigate or alleviate the threats to achieving the conservation objectives of the site **have been implemented**.

   c. Whether **monitoring systems are in place** (both compliance and ecological state) to assess if measures are working; and

   d. Using the information from questions a-c, as well as any other suitable information sources (e.g., on ecological condition) to consider **if the site is achieving its stated conservation objectives**.

In the Member States studied, **awareness about the IUCN WCPA framework and PAME guidelines[20]** is quite mixed and differs among public authorities, scientists and experts. Therefore, respondents in some Member States provided different scores for a single country. Overall, awareness of PAME guidelines is assessed as rather low and experience in applying these guidelines is very limited. These results may not reflect the actual situation due to the large variety of respondents from each Member State and the fact that site managers were not specifically targeted as part of the survey.

Figure 4:   Awareness about the IUCN WCPA framework
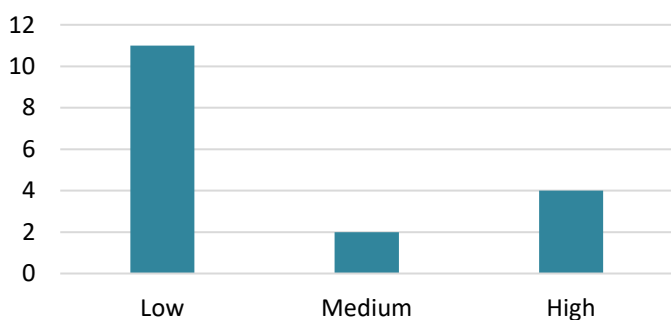
Source: Survey conducted for this study in 2021

The reasons given by the survey respondents are varied and include the guidelines not being seen as relevant or not being used, as well as the lack of political will to implement them. Moreover, there is no obligatory monitoring/assessment of the effectiveness of protected area management under national legislation and human resources are already bound to the management of Natura 2000 sites. As mentioned by respondents from Germany, the IUCN categories are not considered appropriate to assess

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[19] see https://s3.amazonaws.com/cbddocumentspublic-imagebucket-15w2zyxk3prl8/1e588e51b3c0baee3fa04d65cd2f588e

[20] Further background info: https://livereport.protectedplanet.net/chapter-6

the effectiveness of management. This aligns with the assessment above, that PAME in its current version represents a useful starting point, but does not allow to measure the effectiveness of the area management on-site.

3.4.2 Challenges, solutions and success factors

Although the importance of effective protected area management and assessment is recognised at the international and regional/national level, there are still significant gaps in implementing such monitoring and assessment approaches. Survey respondents identified several challenges. The main challenges faced by several Member States include the lack of sufficient financial and human resources and capacities as well as lacking and fragmented data, knowledge, standardised assessment methods and monitoring of the management on-site. Moreover, the absence of legally binding specific and measurable conservation objectives and related management measures as well as the absence of a clear mandate to conduct such assessments and enabling governance structures are hindering the implementation of a regular assessment and monitoring of the effectiveness of protected area management. More details on challenges and potential solutions are provided in Table 5 below.

Table 5: **Challenges and solutions of implementing approaches to assess protected area management effectiveness (number of MS represented by respondents in brackets)**

Challenges	Solutions
Capacities and Resources (10 MS)	
Lack of financial resources e.g. lacking budget associated with measures in management plans and monitoring, too little budget of conservation agencies	Proper channelling of funding to meet the objectives established in the management plans
	Establish dedicated funds for monitoring/assessment of effectiveness (for terrestrial and marine protected areas)
National and European funds are not earmarked sufficiently for the management of Natura 2000 and other protected areas	Earmarking budgets for protected area management and monitoring in respective funds and raise awareness about opportunities
Prioritized Action Framework does not materialise in the operational programmes or plans of the European Funds	Use of the Prioritized Action Framework when allocating funds
Lack of well-trained personnel who are aware of the needs of nature conservation in practice	Training, capacity building and knowledge transfer between officials at different levels of administration
Lack of staff for the management of areas managed by the national government and the regions	Develop capacity (building) standards for staff at different levels
Data and Monitoring (9 MS)	
Lack of reference data, e.g. dispersed information, lack of data on the state of biodiversity and access to information; and knowledge on management and extent of protection on-site; access to open data	Building on experience and data gained through previous biodiversity monitoring projects, set up a central (open) data information systems
	Support and cooperation with volunteers and NGOs in the monitoring
No monitoring in place	Establish a central system of regular monitoring and evaluation including a dedicated fund
Legislation & Governance (8 MS)	
Lack of legally binding specific and measurable conservation objectives and related management measures; lacking implementation of measures	Establish specific and measurable conservation objectives and corresponding management measures for each protected area and monitor its

Challenges	Solutions
Lack of national programme/ clear framework/mandate for integrated assessment and lacking political will	implementation; frequent update and revision of management plans Clear mandate/legal framework and system for protected area management assessment and responsibilities
Lack of coordination among administrations, stable governance system for protected areas, lack of working governance system Lack of clarity regarding the responsibility of the official bodies that are competent and responsible for these areas	Establish an effective and functioning governance system with appropriate resources and required competences, allowing for vertical and horizontal cooperation Clear responsibilities for assessment and monitoring among public authorities
Methodology (7 MS)	
Lack of common and harmonised methodology and indicators on the management and evaluation process used by stakeholders Focus of monitoring/evaluation relies too much on theoretical rules and doesn´t take practice into account to a sufficient degree	Develop a standardised methodology, indicators and practical tools (reflecting on on-site practices) Establish protocols to be followed by all regions and institutions so that indicators and methodology used are comparable
Lack of conservation objectives for protected areas against which to measure changes	Develop a strategy for protected areas and an action plan including adequate objectives

Complementing the solutions listed in the table above, survey respondents mentioned further enabling factors to improving the effectiveness of the management of protected areas. Experiences shared by survey respondents highlighted that e.g. a strong cooperation between public authorities and NGOs working jointly on management and assessment leads to better outcomes. In Lower Austria, the establishment of a strong protected area network consisting of the central coordinator, supervisors for several regions, and site managers has significantly contributed to fostering the exchange of knowledge and experience information for nature protection and management measures.

In addition, good knowledge of the need for management measures in protected and strictly protected areas and habitats can also be an important factor. Raising citizens' awareness of protected areas and their contribution to biodiversity conservation and human well-being, as well as increasing policy-makers' involvement in environmental issues, e.g. through site visits, can also help to improve the management effectiveness of the protected areas.

Below, two examples from the Mediterranean region can be found which emphasise the importance of strengthening stakeholder involvement, multi-level governance, transnational cooperation as well as implementing participatory stakeholder approaches to enhance management effectiveness of marine protected areas (Box 10).

Box 10:   Exemplary case studies for successful implementation of management effectiveness

Fostering coordination and enhancing management effectiveness of marine protected areas (MPAs) in Mediterranean countries

Pole-borne culture of mussels in Kavoura bay.
© Source: Lia Papadranga / Thermaikos Gulf Protected Areas Management Authority

Through the INTERREG project TUNE UP, twelve partners from seven countries (Greece, Spain, France, Italy, Albania, Slovenia and Montenegro) are brought together to maintain biodiversity and natural ecosystems through strengthening the management and networking of protected areas and by capitalising on a multi-stakeholder/multi-level governance tool based on River/Wetland Contracts experience, tested by the INTERREG MED WETNET project - the 'MPA Contract tool'.

The project intends to achieve 1) stronger, coordinated and proactive involvement of key stakeholders in MPAs management, 2) improved effectiveness of MPAs management by integrating multi-level governance tools into national and regional policy instruments and 3) more intensive transnational cooperation and networking between Mediterranean MPAs. This will be done through working on MPA pilot areas at the local level, launching participatory processes and signing a local contract among stakeholders, which will include an attached Action Plan. The Action Plan will be developed according to the objectives that emerge during the process, establishing the priority actions for management, restoration and preservation of the MPA's environmental, social and economic aspects: These plans also outline the roles and the methods for implementing the strategy, as well as the procedures to monitor its actual implementation.

The project will ensure higher coordination among stakeholders and decision-makers, limiting arising conflicts between conservation and economic issues and will enhance the goal of biodiversity protection.

Source: https://tune-up.interreg-med.eu/

Designation and management of marine Natura 2000 sites (Spain)

Participatory INTEMARES workshop © INTEMARES

The LIFE INTEMARES integrated project aimed to designate new Natura 2000 sites and laid the foundations to effectively manage the marine Natura 2000 Network and complete the work and progress promoted within the framework of the LIFE + INDEMARES project.

Social participation is one of the pillars of LIFE INTEMARES. It is the key to moving towards a **new management model for protected marine areas**, achieving an effectively managed marine Natura 2000 network with the active participation of all sectors involved and with research as the basis for decision-making.

From 2018 to 2020, different participatory workshops were carried out by this marine region. As a starting point, before conducting the participatory workshops, a baseline analysis was carried out to clarify the legislation and regulations governing the marine environment in Spain. To complete the diagnosis, case studies, interviews and online consultations were conducted with key stakeholders. Subsequently, five participatory consultation workshops were held to develop a shared vision and contribute to the definition of proposals to improve governance in the Natura 2000 marine network. Some examples are the consultations and participatory workshops held to analyse the level of coherence and adequacy of the Natura 2000 network and to develop a common vision with the aim of completing and ensuring the representativeness of the habitats and species of the Natura 2000 marine network. In order to achieve effective management, the active involvement of managers, users and stakeholders in the preparation and updating of management plans for Natura 2000 sites or in the development of the first MPA Master Plan in Spain will be considered. Moreover, the implementation of a governance strategy and pilot projects to improve marine governance in the coming years is foreseen.

Source: https://intemares.es/procesos-participativos/elaboracion-estrategia-gobernanza,
Image: https://intemares.es/sites/default/files/gobernanza_6.jpg

3.4.3 Need for additional guidance

The survey gave participants the opportunity to specify additional guidance needed from the EU to overcome at least some of the aforementioned hindrances. Respondents expressed the following needs regarding further input and support on protected area management effectiveness specifically related to:

- **Guidance on**:
    - How to assess management effectiveness of protected areas;
    - What outcomes should be measured;
    - How to assess the impacts of plans/projects on protected areas (especially in Natura 2000 sites, Art.6.3 of the Habitats Directive) as part of the licensing process;
    - Restoration and management at the local level to meet the common targets of the EU Biodiversity Strategy for 2030;
    - Financial support (EU and national funds) for the management and the development of an evaluation and monitoring scheme;
    - Incorporating monitoring/assessment/reporting of management effectiveness for protected areas in national biodiversity strategies and subsequent legislation;

- o Enabling an integrated approach/harmonisation/consolidation of the national network of protected areas with regards to Natura 2000 and with other "green" concepts, as e.g. green infrastructure, ecological networks, landscape planning, ecosystem services assessment.
- **More information on:**
  - o Minimum standards on the management of protected areas which also can be evaluated at EU-level;
  - o A set of management efficiency indicators, useful at national, regional and local levels.
- **Database of:**
  - o Habitat- and species-related management with a detailed description of positive/negative outcomes of specific measures;
  - o Best practices.
- **Workshops, platforms** to share best practices and other relevant knowledge e.g.
  - o Demonstrating the application of methodological approaches or regulation of sectoral activities;
  - o Development of projects to consider conservation objectives.

3.5   Other effective area-based conservation measures (OECMs)

Other effective area-based conservation measures (OECMs) are a new conservation approach, separate from recognised protected areas, where (effective) conservation is mainly achieved as a by-product of other management objectives. Deriving from the Global Biodiversity Framework of the CBD 10th Conference of the Parties, OECMs were later defined at the CBD 14th Conference of the Parties as:

'A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values' (CBD, 2018 or CBD 14/8).

This definition covers three main cases:

1. '**Ancillary conservation**': areas delivering *in-situ* conservation as a by-product of management, even though biodiversity conservation is not an objective (e.g. some military training grounds, protected marine war graves and freshwater protection zones)**.**
2. '**Secondary conservation**': active conservation of an area where biodiversity outcomes are only a secondary management objective (e.g. some conservation corridors).
3. **'Primary conservation'**: areas meeting the IUCN definition of a protected area, but where the governance authority (e.g. community, Indigenous peoples' group, religious group, private landowner) does not wish the area reported as a protected area.

OECMs need to be assessed on a case-by-case basis, considering the management practices in place and contribution to (effective) biodiversity conservation. As compared to protected areas and the Natura 2000 network, OECMS are rather recognised than designated. However, OECMs can also have some form of legal protection, which is not related to the protection of habitats and species (e.g. areas designated for water protection, flood prevention areas, military areas with restricted access, fisheries restriction measures), but indirectly promote the conservation of biodiversity (EC 2021, guidance).

OECMs also gained additional attention in the new EU Biodiversity Strategy for 2030. To date, the strategy specifically mentions that the Commission guidance will indicate how other effective area-based conservation measures (OECMs) could contribute to the targets.

According to the current 'Draft technical note on criteria and guidance for protected areas designations' (EC, 2021) **OECMs can be counted towards the 30 % EU target on protected areas if**:

- the area is covered by a national or international legal or administrative act or a contractual arrangement achieving long-term conservation outcomes;
- conservation objectives and measures are in place as described above; and
- effective management and monitoring of the biodiversity in the area is in place.

OECMs are also part of the first draft of the post-2020 global biodiversity framework (CBD, 2021: 6) mentioned under the 2030 action target to reduce threats to biodiversity under target 3 as follows: 'Ensure that at least 30 per cent globally of land areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and **other effective area-based conservation measures**, and integrated into the wider landscapes and seascapes.'

This section aims to provide insight into the understanding and status of OECMs in the EU and its Member States.

3.5.1 Use of OECMs at different levels and states of knowledge

OECMs are still relatively unknown in policy development and implementation in EU Member States. However, there are Member States (AT, SE, ES, DE, PT, FR, GR), where OECMs are being considered in conservation management to some extent, but lack a coherent approach.

Different types of schemes and approaches are in place to support the implementation of OECMs such as contractual nature conservation, special forest management plans under the principles of close-to-nature forestry, standards and certification (PEFC and FSC), fishery restricted zones, separated and/or integrated management plans, agro-environmental schemes or nature protection management in cooperation with citizens.

At the **national level**, OECMs are considered, for instance, in Important Bird and Biodiversity Areas (ES) or National natural heritage areas (DE), while at the **regional level** OECMs could potentially apply to protected landscapes and Biosphere Reserve areas (DE, ES), and areas outside of protected areas where marine habitats and migratory species need to recover (ES). At the **local level**, examples include NGO initiatives that secure valuable sites through purchase or lease (AT). In the case of Greece, no distinction was made between national, regional and local levels for the potential application of OECMs. Areas considered for the implementation of OECMs include high nature value farmland areas, areas of agro-environmental schemes, as well as areas representing sites with an outstanding cultural and historical value, which are under the protection of the Archaeological Law banning any construction and continuation of agricultural activities.

The potential of establishing biosphere reserves to foster OECMs is illustrated by an example from Spain in the Box 11 below.

Box 11:   Exemplary cases of OECM establishment

> **Biosphere reserves to foster OECMs in Spain**
>
>
>
> The Man and Biosphere programme (MAB) of UNESCO is strongly developed in Spain thanks to the support of administrations, which see biosphere reserves as a powerful tool for spatial planning. In addition, the biosphere reserve designation category enjoys a high level of acceptance among the population, as it allows the promotion of sustainable development in the areas through participatory management, the maintenance of traditional uses and the rational use of natural resources. All this is combined with natural areas of high biodiversity value and landscapes of great beauty and tourist value. The demand for such areas from the provinces is growing unceasingly.
>
> **Image**: https://en.unesco.org/biosphere/eu-na/monfrague (Monfragüe Biosphere Reserve, Spain)

Natural Forest Reserves (Austria)

Natural forest reserves are forest areas that are intended for the natural development of the forest ecosystem and in which any removal of wood, other forest use or anthropogenic influence is omitted, but hunting is permitted. They are a contribution to the preservation of the natural development of biological diversity.

There are currently 191 natural forest reserves with a total forest area of 8,587 ha. The size of many natural forest reserves is 5 to 20 ha, larger reserves are currently only sparsely represented. The selection of the reserves is primarily based on the occurrence of the potential natural forest communities. They are meant to represent the composition of tree species, stand structure, vegetation and especially the natural development of these or achieve these in the foreseeable future.

Overview map of Austria's natural forest reserves © BFW.
http://www.naturwaldreservate.at/images/reservate/NWRKartegro.png

The principles of the programme are contractual nature conservation on a voluntary basis, long-term design, exit options under certain conditions, annual remuneration as compensation for forest use and the involvement of the owners in the care and control of the areas.

The programme pursues the following objectives: establishment of a representative network of natural forest reserves taking into account all forest communities, research into natural forest development without management, preservation of the biodiversity typical for the forest community concerned, elaboration of recommendations for the designation and maintenance of new reserves and establishment of a network of standardised sample areas.

Source: http://www.naturwaldreservate.at/index.php/de/

Responses from the survey also reveal that the current knowledge basis and awareness of OECMs is rather low. In some Member States, knowledge is disseminated via training, workshops and booklets (SK, PT, DE), organised rather top-down on the national level (FR, ES) using project-based knowledge shared between decision-makers, practitioners and experts (AT). Respondents from Denmark revealed that there is a particular knowledge gap when it comes to OECMs in marine areas. In consequence, there is a need for further guidance and information (see 4.5.5).

3.5.2 Approaches to identifying and selecting OECMs

The definition of OECMs and their coverage, as presented above, provide the basis for identifying OECMs. To achieve the 30 % target for protected areas at the EU level, the preconditions for achieving this target set out by the European Commission can also be taken into account.

There is no internationally agreed methodology for identifying OECMs yet, but the IUCN WCPA OECM Specialist Group is currently developing a standardised site-level methodology for identifying OECMs (Marnewick et al., forthcoming). This site-level methodology consists of the three steps listed below which should be followed sequentially:

- Step one: using a **screening tool** to determine if a site is a 'potential OECM'.
- Step two: if the site is a 'potential OECM', this step allows recording the **consent** of the legitimate governance authority to assess a 'candidate OECM', seeking the agreement of land- and water-owners. This step also allows capturing **details** of the 'candidate OECM' and its

assessee/s and assessor/s.[21] The site cannot be assessed without consent from the legitimate governance authority. In cases where consent is given, the area becomes a 'candidate OECM'.

- Step three: comprises a detailed **assessment tool** that enables the evaluation of the 'candidate OECM' against the CBD criteria of an OECM (CBD, 2018; see also introduction above) to determine whether it qualifies as an OECM.

Key determinants include the state of knowledge about and condition of biodiversity in potential OECMs, whereas some of this information may be determined from existing monitoring systems tracking implementation of directives (UNEP-WCMC et al., 2021). This methodology aims to enable governance authorities, with or without external assistance, to assess their sites against the CBD criteria of an OECM.

With a view at the **national level**, there are few methodologies for identifying OECMs among the Member States studied. Only in the case of Austria, it was reported that an assessment to identify OECMs at the landscape level is in place in one federal state (see Box 12). France has started to develop a methodology building on a partnership between the Natural Areas Conservancies (NAC) and the National Museum of Natural History to use available scientific data.

> **Box 12: Identification of OECMS at local level in Austria**
> In **Upper Austria** (regional level), the following approach is being applied: For different groups of plants and animals the most important species for nature protection on regional level (taking into account the degree of endangerment, importance of the local populations in relation to neighbouring regions) are identified and the sites of occurrence are mapped and included in a database and the management of these areas inside and outside of protected areas is organised. More than 2000 of such **smaller eco-areas** are identified and its number is steadily rising. Beside this, there exist funding structures for ecological measures (hedges, ponds, measures in forests, etc.).

Each NAC is expected to have a 5-year plan to take into account the landscape and functional dimension, such as the mobility of rivers. These 5-year plans are validated both by the respective regions and the state of France.

Another approach to consider and promote OECMs was developed by a Greek-Spanish research team. It consists of an operational framework to assess the value of fisheries restricted areas (FRAs) for marine conservation (Petza et al., 2019). To this end, a tailored multi-criteria decision analysis was developed and applied to carefully assess potential OECMs on a case-by-case basis, to then rank them according to their effectiveness in terms of marine biodiversity conservation. In addition, Petza et al., (2019) suggest that the conservation target can be achieved at the eco-regional level, by adding, *inter alia,* effective Fisheries Restricted Areas[22] to the network of marine protected areas in the Aegean Sea and designating them as OECMs. This highlights the potential that OECMs building a network with protected areas can improve the conservation status of habitats and species.

Furthermore, OECM selection criteria play a crucial role in the identification of OECMs. There are different suggestions from the surveyed Member States on such criteria, focusing on biodiversity but also enabling conditions (see Table 6 below).

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[21] The details of the assessee (the site's duly authorised representative/s providing the assessment information) and assessor (person/s documenting the information).

[22] 'A Fisheries Restricted Area is a geographically-defined area in which all or certain fishing activities are temporarily or permanently banned or restricted in order to improve the exploitation and conservation of harvested living aquatic resources or the protection of marine ecosystems and conservation of specific stocks as well as of habitats and deep-sea ecosystems. (FAO 2021). The General Fisheries Commission for the Mediterranean (GFCM) has adopted several Fisheries Restricted Areas as a multi-purpose area-based management tool used to restrict fishing activities and protect essential fish habitats and deep-sea sensitive habitats. (Oceana 2021)

Table 6: **Criteria to select OECMS**

Biodiversity quality criteria	Criteria for enabling conditions
• Selected threatened species and their habitats considering the degree of endangerment, importance of the local populations in relation to the neighbouring region (AT, DE) • Presence of target/rare species and habitats, with potential for restoration (FR, DE) • Contribution to biodiversity and (cultural) landscapes (NL) • Areas requiring permanent management priorities for high-quality nature areas; existence of biodiversity values (DK) • Significant delivery of biodiversity values (DK) • Setting clear conservation objectives and measures (RO)	• Clear justifications and conservation objectives and measures in place (PT, RO, GR) • Efficiency in terms of conservation outcome and resource usage (GR) • Availability of personnel and resources for implementation (GR) • Independence from mainstream conservation actions (GR) • Compliance with conservation objectives laid down at national and regional/local level (GR)

Reference was also made to the criteria for identification criteria listed in Annex III of the Decision 14/8 by the Conference of the Parties to the Convention on Biological Diversity (CBD), adopted in Sharm El-Sheikh, Egypt on 29 November 2018 (CBD 2018 source). These criteria refer to the OECM definition mentioned above and thus include:

- Area is currently not recognised as a protected area
- Area is governed and managed
- Achieves sustained and effective contribution to in situ conservation of biodiversity
- Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values

3.5.3 Type of OECMs

To get a better picture of the type of OECMs that could be implemented in the future, survey participants were asked to identify the main areas that would potentially be recognised as OECMs in their countries. The responses offer a wide variety of habitats which are presented in Box 13 below. In addition to publicly owned areas, natural spaces belonging to private enterprises, state and collectively owned land such as land managed by churches and monasteries, were also mentioned.

Box 13:   Overview of potential main areas for OECMs listed by the survey respondents

Freshwater habitats and floodplains: river basin and reserves, water resources zones, watercourses, areas relevant to ensuring the functioning of terrestrial water cycles (river heads, riversides), natural disasters prevention areas e.g., flood areas, areas of high risk of soil erosion), springs and surface waters for drinking water (depending on local biodiversity)

Image: © Goran Safarek, https://v2.balkanrivers.net/en/key-areas/sava-river
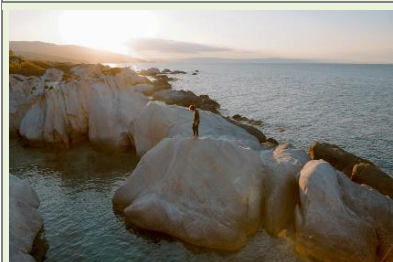
Coastal and marine habitats: coastal flood plains, coastal protection areas (e.g., beaches, sand dunes), cetaceans' corridors, marine areas that are part of seabirds' corridors, fisheries restriction areas

Image: © Toa Heftiba, Unsplash

Wetland habitats: Peatlands, small wetlands

Agricultural and grassland habitats: marginal agricultural land, areas of eco-agriculture, meadows, High Nature Value (HNV) farming systems

Image: Peatland in Torronsuo National Park, Tammela, Finland, © Tero Laakso, Flickr (CC BY 2.0)
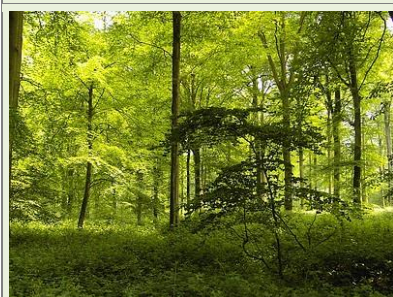
Forest habitats: Public forests, sustainably managed forests, young and old-growth forest, untouched forest

Image: Forest in Hesdin, Pas-de-Calais, France, © J Marsh, Flickr (CC BY 2.0)

Abandoned areas: Small sandy soil sites, steppe relicts, abandoned military training grounds, former gravel or coal mining pits

Image: Steppe, Vale Santo Algarve Portugal, © Mick Sway, Flickr (CC BY-ND 2.0)

Urban green areas: urban parks (with provisions for biodiversity conservation/restoration measures)

Image: Malmö, Sweden, © Maria Eklind, Flickr (CC BY-SA 2.0)

Other areas: Sacred sites, risks zones, geological zones, archaeological sites

Image: Ponta da Piedade, Portugal © Metropolitaneando, Pixabay

Corridors: Conservation corridors, aerial corridors or migratory bird species, seabirds' corridors, coastal corridors, landscape/seascape elements relevant for connectivity

Image: European Green Belt © Wikimedia (CC BY-SA 3.0)

3.5.4 Challenges, solutions and success factors

Key challenges reported by the survey respondents mainly relate to the lack of human, financial and technical capacity regarding OECMs, the limited land availability and resistance from landowners to implement OECMs, and the lack of a supportive legal framework and political will to promote the adoption of OECMs.

Table 7: Challenges and solutions of implementing OECMs

Challenges	Solutions
Capacities and Resources (4 MS)	
Lack of financial resources	Proper channelling of funding
Lack of well-trained human resources and environmental education of elected persons	Training and capacity building of officials at different levels of administration, e.g., on ecosystem conservation and effective participatory processes; what OECMS are, how they can be implemented; more engagement of elected persons/visits on-site
Implementation at local level (4 MS)	
Opposition from landowners; public perception that any restriction in land use is alarming and weak recognition of OECM values	Scientific evaluation to estimate the added value of these zones and extensive land use compared to the 'usual' situation, showing the potential of extensive land use; and to develop advantageous fiscal measures, flexible contracts; ensuring financial compensation
Land availability and conflicting land-use interests (e.g. urban development, tourism)	Cross-cutting approach to conservation; measures should include obligations in all sectoral activities to ensure biodiversity conservation
Legislation and Governance (3 MS)	
Lacking governance and coordination between different ministries and sectors	Establishing a legal & administrative framework, joint working groups to examine potential areas and application of criteria
Lack of adequate regulatory framework for implementing OECMs	Amendment of the legal framework to include OECMs - improvement of the legal framework under which OECMs operate to enhance their conservation value
No adequate planning to ensure conservation outcomes in the long-term	Incentivising long-term dedication of properties to conservation (e.g. through easements)
Lack of political will, and priority focus is on protected areas	Finalising the implementation of protected areas and including OECMs in the strategic priorities

In addition, the planning and implementation of OECMs, which are still new to many Member States, can create potential areas of conflict, which are also already partly reflected by the challenges listed. Those potential conflict areas need to be taken into account when developing concepts, methods and guidelines for OECMs.

Conflicts could arise with different types of land uses (e.g. construction of new infrastructure, fisheries, hunting and recreational fishing, exploitation of forest resources and the use of underground water) as well as land management (agricultural intensification and land abandonment), which have negative impacts on biodiversity. Implementing OECMs would require a change in management and land use towards a more extensive and biodiversity-promoting management practice, interfering with other planning priorities and also resulting in reduced yield/income, which needs to be compensated.

Moreover, conflicts of management and management objectives or the prioritisation of different species may arise. Management conflicts can emerge when, for example, the historical situation (as a guiding principle) is misunderstood and when ecologically valuable areas are significantly reduced.

3.5.5 Need for additional guidance

Survey respondents expressed the following needs regarding further guidance on OECMs:

- Need for an overview of relevant European Funds which can finance OECMs;

- Exchange on best practices throughout Europe;

- Guidance on definition, application of criteria for recognition of OECMs, examples, usefulness - what are OECMS and what are not;

- Training regarding the establishment of OECMs to ensure that conservation values are protected;

- Awareness-raising material to increase awareness on the value of OECMs for nature (e.g., acting as ecological corridors between Natura 2000 sites) and rural economies (e.g., agricultural products produced in high nature value systems);

- Technical guidance on the application of CBD/IUCN criteria, designation and recognition process, management and monitoring, etc.

3.6 EU Biodiversity Strategy for 2030

The new EU Biodiversity Strategy for 2030, a core component of the European Green Deal, commits to protecting at least 30 % of the EU's land and sea by 2030 with 10 % under "strict" protection. The strategy aims "to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people, climate and the planet" (EEA, 2021). The CBD's post-2020 Global Biodiversity Framework will most likely have a similar coverage target. In fact, there have been some substantial efforts to protect biodiversity in the EU recently, including the expansion of the world's largest network of protected areas, Natura 2000 as outlined before. This section aims to address knowledge gaps regarding challenges and solutions to reach both protected area targets.

3.6.1 Challenges and solutions to reach the 30 % target

Hence, further expansion of terrestrial protected areas will be needed to achieve the quantitative target of legally protecting a minimum of 30 % of EU land and sea. In order to achieve this goal over the next decade, there will be a need to expand the network in the EU, on land by about 4 % and in the seas by 19 %. At the national level, the degree of protected area coverage is highly diverse (EEA, 2020).

As of 2020, most countries have a terrestrial coverage of around 20 % (e.g., Hungary, Lithuania and Latvia) or 30 % (e.g. Spain, France and Malta). The country with the highest coverage is Luxembourg with over 50 %. Countries like Bulgaria, Cyprus, Croatia, Estonia, Germany, Poland, Slovakia and Slovenia have a coverage of around 40 %. In total numbers, marine protected areas show an even higher margin of different coverages between European countries with access to marine waters. France (50 %) and Germany (45 %) are countries with a particularly high share of protected marine surface, and the (small) marine area of Slovenia is even fully designated as a marine protected area. In other countries, such as Croatia, Cyprus, Finland, Greece, Italy, Ireland and Norway, the designation process for marine protected areas lacks behind (EEA, 2020).

The differences between countries can have various reasons and are highly country-specific, ranging from a simple lack of resources or knowledge to complex designation issues. One of the most important factors is that Member States use different criteria to assess habitats as protected (Swedish Environmental Protection Agency, 2021). Looking at the Scandinavian countries like Sweden and Finland, terrestrial land is only scarcely populated. As for France, the share of marine protected areas is especially high due to large protected sites in offshore territories.

To further support and advance national protected area targets on the national level, survey respondents from seven Member States indicate that **national biodiversity strategies are being developed and updated** to improve the knowledge on habitats and species and lay the foundation for effective area-based management. Reportedly, there is ongoing work of entities on the ground, developing tools that will support the achievement of targets. However, survey respondents also reported a number of important challenges related to the 30 % target. Key challenges and, where applicable, corresponding solutions identified by survey respondents to achieve the protected area targets set out in the latest EU biodiversity strategy are outlined in Table 8 below.[23]

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[23] It should be noted that many of the challenges and solutions listed in Table 8 also apply to the 10 % target

Table 8: Challenges and solutions towards reaching the protected area targets of the EU Biodiversity Strategy for 2030

Challenges	Solutions
Legislation and Governance (7 MS)	
Designating ambitious protection categories; Ease of designation valued over science and potential recovery; Currently MS have different definitions of protected areas and the activities within them	Clear and scientifically based EU definition/ minimum criteria for "protection" in protected areas Focus not only on Natura 2000 sites but also on national designations
Lack of a supportive legal framework to promote the adoption of OCEMS	Clear criteria and checking mechanism to ensure that OECMs are appropriate if added to the target
Lack of a clear process on how targets will be achieved collectively (biogeographical & EU level); uneven distribution over Member States and biogeographical regions	Fine-grained analysis of the territory by region (national level biodiversity monitoring data together with systematic conservation planning)
Implementation at local level (5 MS)	
Challenges concerning the enforcement of protection regime (e.g., fishing conflict) Designating new protected areas in conflict zones and gaining the support of local communities	Ensuring effective management and achieving consensus among regional and national administrations and economic sectors Bottom-up approaches in sites designation and generally involving all relevant stakeholders in the participatory processes to ensure effective implementation and compliance Carrying out awareness campaigns on the necessity of conserving natural resources & visible benefits for local economies; solving land-use conflicts adaptively
Fragmented land ownership Largely developed MS have no significant amount of territory viable for new protected areas	Financial support to compensate relevant stakeholders
Science and Data (4 MS)	
Achieving functional protection	Guidance on how to identify OECMs to include in the target Clear messaging from EU that the aim is recovery as well as protection
Size element and the initial state of nature; lack of data (esp. marine ecosystems)	Enhanced monitoring of conservation outcomes; channelling funding into research
Capacities and Resources (3 MS)	
High administrational burden and lack of human, financial and technical capacity	Creation of an EU land acquisition fund and finance employment of new staff and training

3.6.2 Challenges and solutions to reach the 10 % strict target

The designation of protected areas is not in itself a guarantee of biodiversity conservation. With 22.7 % of the 15 060 European species on the IUCN Red List classified as threatened by extinction (IUCN, 2017), current conservation efforts by the EU are failing to halt the ongoing loss of biodiversity. This trend is arguably one of the main reasons to increase the protection level of Europe's protected areas. Recent analyses show that many of the protected areas in Europe have **low protection levels**. For example, a recent report by the European Court of Auditors (2020) issued a serious assessment and warning that the EU has failed to halt the loss of biodiversity in European waters and bring fisheries back to sustainable levels. The report concluded that the network of more than 3 000 marine

protected areas that spans a 'wide protective net' around European seas, however, 'does not run deep' enough to curb overfishing. In the Mediterranean region, there are 'no significant signs of progress' as fishing is now at twice the sustainable level. The report's findings echo those of another recent EEA assessment, which reported that less than 1 % of European marine protected areas could be considered marine reserves with full protection (e.g. through fishing bans) (EEA, 2019).

Survey respondents were asked as to whether 'strict protection' generally is a concept that is used within the national system of the respective Member States; Figure 5 gives an overview of responses. The information in the Figure reflects responses in which the term "strict" is commonly used, e.g. in official documents that are not legislation. For example, in France, the term is included in national biodiversity strategies, but a precise list of activities that are effectively controlled does not exist at this stage. In the case of Greece, respondents indicated that the term is used, but not included or legally defined in nature conservation legislation or policy. Respondents from Sweden said that the term 'legally protected' is used rather than strict protection but implies a high level of protection. In Spain and Austria, strict protection applies to one of the zones within the National Parks. While Spain lacks a more comprehensive definition, in Austria, a national

Figure 5: Ratio in which the term "strict protection" is commonly used in the national systems of 12 EU Member States, according to survey results.

Source: Survey conducted for this study in 2021

park representative explained that strictly protected means "no use of land", which is a criterion fulfilled in the core zone of Austrian national parks and wilderness areas. Though not pointed out by survey participants, the categories of nature reserves and national parks are also generally regarded as strictly protected areas in Germany, even if this is not directly stated in legal texts (UBA, 2019). Among responses from Greece, it was mentioned that two types of protection and management zones are "very close" to the meaning of strict protection: Absolute nature reserves and Nature reserve zones.

Integrating strict protection as a concept in a dedicated piece of legislation seems to exist only in Slovakia (Act No 543/2002 Coll. on Nature and Landscape Protection). Nevertheless, it has not been possible to put stricter nature protection into practice in some areas of Slovakia and to significantly sway public opinion towards stricter nature protection. Missing analyses of the status quo before the adoption of the legally binding obligation have led to serious reconciliation problems between the Ministry of Environment and other ministries in Slovakia, as well as landowners and other stakeholder groups. Missing or inaccurate analysis of the capacity of the existing possibilities for strict protection also exists in other Member States. Answers to the question of how much of their country's area is strictly protected were sparse, and in the few cases where such were given, the quality aspect and lack of a uniform definition were cited as a problem.

A vast majority of the surveyed Member States revealed that they are **awaiting concrete guidance from the EU** on the meaning/definition of strict protection. In the absence of such a definition, a meaning for strict protection was suggested, which summarises the responses from experts of several countries (see Box 14). The latest draft from the European Commission (under consultation) on the definition of strict protection is presented in Box 14.
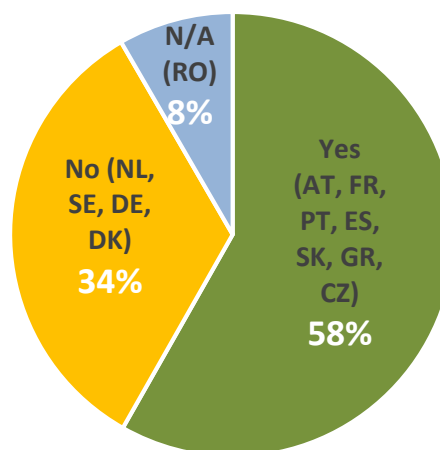
Box 14:   **Definitions for strict protection**

Definition compiled at the suggestion of survey participants

Spatially protected and protected by Law with the main aim of biodiversity conservation, where all activities not serving this purpose (having a negative impact on biodiversity, natural processes or natural dynamics) are legally prohibited. Admitted activities must have direct results for the maintenance and improvement of nature conservation, such as grazing.

Definition from the latest draft document of the European Commission

'Strictly protected areas are fully and legally protected areas designated to conserve and/or restore the integrity of biodiversity-rich natural areas with their underlying ecological structure and supporting natural environmental processes. Natural processes are therefore left essentially undisturbed from human pressures and threats to the site's overall ecological structure and functioning, independently of whether they are located inside or outside the strictly protected area' (EC, 2021)

With regard to **existing classification schemes**, 'strict protection' is indicated by several responses as corresponding to IUCN Categories Ia, Ib and II. The Austrian Biodiversity Strategy to 2030, for example, lists these in exactly this way. Only respondents from France mentioned that they would also see it corresponding to IUCN Cat. III. Respondents from Austria, Sweden and France stated that some of the protected areas currently designated in their countries meet these IUCN criteria. Interviewees from the Netherlands asserted that no protected sites currently meet the criteria set by the IUCN and that 100 % strict protection is unlikely for national parks in the country. Notably, respondents from multiple countries mentioned that the marine environment is lagging behind when it comes to high protection levels, such as No-take zones. In Spain, strict protection options have been applied on a national and regional scale for years according to conservation needs, political direction and the incorporation of conditions derived from participatory processes. That includes areas with management aimed at achieving conservation objectives and other attributes of "natural evolution" (maturity, diversity, ecological processes, etc.).

Ensuring **effective protection of sites at a high protection level** is regarded as a major challenge by many of the respondents. However, the strict target of 10 % is considered possible by some Member States if there is guidance and legally binding requirements from the EU. Natura 2000 is considered as the basis and as having a major role in achieving the objectives of the Biodiversity Strategy and particularly for the ambitious protected area targets. National designations are also seen as important, and wilderness targets in national biodiversity strategies were mentioned as an essential milestone in this regard. For example, respondents from Spain consider that the current network of national parks has deficiencies in terms of the diversity of landscapes covered and that there is potential for new national parks and stricter levels of protection. Another example comes from Germany, which is presented in Box 15 below.

Box 15: Creation of wilderness areas in Germany

Thuringian Slate Mountains - Franconian Forest, Germany © StefanX112 (CC BY-SA 3.0)

Military training area 'Jüterbog' in Brandenburg, Germany © Assenmacher (CC BY-SA 4.0)

The (expired) German National Strategy on Biological Diversity aimed to establish wilderness areas on 2 % of the German terrestrial territory by 2020. However, by 2019 the coverage measured only 0.6 % of the total land area (Brackhane et al., 2019).

In response to that, a 20 million Euro funding programme named "Promotion of Wilderness Development in Germany" (Wilderness Fund), was launched in 2019 by the Federal Environment Ministry. It supports targeted measures to increase wilderness areas in Germany applying, for example, to forests, post-mining landscapes, former military training areas, areas along watercourses or seashores, in peatlands and in the high mountains. Areas have to be large, (largely) unfragmented, use-free areas in which a course of natural processes uninfluenced by humans is permanently guaranteed. For instance, two new wilderness projects in the federal states Brandenburg (picture top left) and Thuringia (picture bottom left) have been added via this fund in 2020. The area of protected wilderness areas in Germany thus grew by almost 400 hectares.

A recent study by Brackhane et al. (2019) shows that operationalizing the wilderness concept in densely populated countries like Germany is possible. The research results reveal a potential for forest wilderness areas to cover 10.3 % of the German terrestrial territory for candidate sites.

For both Natura 2000 and national designations, survey responses urged strong political mobilisation, including from the EU, to build consensus to confronting the lack of political will to implement strict protection. It is also required to contain powerful interests (e.g. economic sectors) that are likely to lobby against such progress in the resulting discussions. Reaching 10 % of strictly protected areas is considered more difficult in the marine environment, due to the many interests involved. For example, the application of the new strict protection model is seen as potentially conflicting with territorial policies and the development of marine infrastructures in Spanish waters. These activities still do not take effective mitigation measures and development boundary setting, nor do they pursue ecosystem recovery approaches as an integrated part of the models of management and exploitation. Likewise, in Greece, the two zones within protected areas that already entail strict protection zones (as mentioned above) would suffice to offer 10 % or even more of the country's area as suggested by respondents. However, it was pointed out by Greek respondents that depending on the content of strict protection, its implementation via strict marine protected areas may be problematic especially in terms of prohibiting fishing activities.

Some respondents argue that spatial protection in itself is not sufficient to achieve the desired effects of the EU Biodiversity Strategy. The change towards a "nature-inclusive society" supported by targeted

solutions was mentioned as a prerequisite.[24] More key challenges and, where applicable corresponding solutions, reported by the survey respondents concerning the **10 % strict** target are presented in Table 9 below.

Table 9: **Challenges and solutions towards reaching specifically the 10 % strict target of the EU Biodiversity Strategy for 2030**

| Challenges	Solutions
Legislation and Governance (8 MS)	
Finding a satisfying definition for "strictly protected" - different interpretation by MS	Agree on a clear definition for strict protection at least across the EU
Implementing strict protection effectively	Provide guidance and introduce legal foundation (i.e. binding requirements) on behalf of the EU
Fairness/proportionality in respect of different prospects to achieve the targets, e.g. aggravation due to limited land availability or advantage due to the designation of protected areas in overseas territories	Decide if a target should concern national level/ 10 % of the respective habitats of every Member State or conceive a different approach
Implementation at the local level (4 MS)	
Restrictions of ownership and private interests, e.g., the low acceptance among foresters of new strict protected areas Opposition by the fishing industry	Analyse best practices and potential trade-offs
Pressure from local communities and users, e.g., violating no-take zone regulations	Carry out awareness campaigns on the benefits of no-take zones for local economies
Science and Data (2 MS)	
Missing analysis of the existing possibilities and capacities for strict protection	Evaluate which areas are already managed in a way similar to strictly protected ones
	Analyse which existing Natura 2000 areas have the highest potential to be strictly protected *(*i.e. sites that actively limit pressures and that have a potential to improve biodiversity)[25]
	Evaluate compensations for areas to be designated as strict and provide funds

Another aspect regarding strictly protected areas that has been pointed out is that, when areas are transformed to non-intervention zones, the biodiversity would require certain ecological processes, which are absent (e.g. megafauna) or suppressed (e.g. natural fires or floods). While certain species would benefit from a completely hands-off approach (particularly in forests), many other species could disappear (particularly on agricultural land), as extensive land use mimics the influence of non-existent megafauna thereby shaping the ecosystem. Activities that are meant to help ecosystems return to their original, wild state stand in contrast to efforts to maintain managed ecosystems in a current (or desired) state favouring certain species which rely on them (such as grasslands or

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[24] This statement suggests a comparison to the CBD 2050 vision for biodiversity to "living in harmony with nature" (CBD, 2018)

[25] In Greece according to survey responses, specific environmental studies, covering all the Natura 2000 sites, are currently underway and presidential decrees and management plans are expected to be issued by 2022.

heathland). Both approaches are commonly used within protected areas in Europe in compliance with strict protection. This first concept serving the purpose of aiding natural dynamics is applied, for example, in a national park in Austria as shown in Box 16. On the contrary, the latter approach is portrayed by an example from Germany in Box 16. Scientific debates are increasingly focusing on the question of the degree to which human intervention is acceptable/desirable in restoration and reintroduction efforts (Corlett et al., 2016). The concept of "rewilding" was also mentioned by respondents as an approach that should be considered with regard to strict protection. Rewilding typically attempts to minimise sustained intervention, but this approach is prone to be jeopardised by rapid environmental change. Designating more sites under strict protection with little land left for additional protected areas in some EU countries could require a careful examination of such approaches. In any case, these are important aspects to be considered when further defining the concept of strict protection.[26]

Box 16: Management of ecosystems within different protection levels and for different conservation objectives
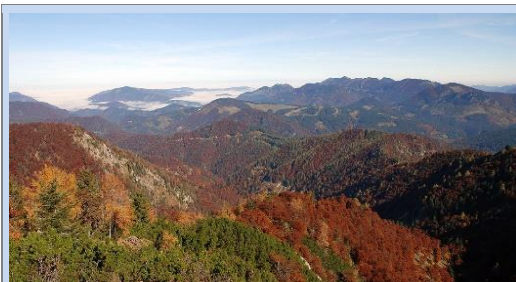
Kalkalpen National Park in Austria
© Tigerente (CC BY-SA 4.0)

In the **Austrian Limestone Alps (Kalkalpen) National Park**, , the forest is given an "initial spark" within the framework of forest management to be able to develop again as a natural forest. This independent development is called the conversion process. The initial spark can look very different depending on the area and situation: where there are too many spruces, they are thinned heavily to give other (natural) species the opportunity to regain a foothold.

Lüneburger Heide Nature Park in Germany
© Willow (CC-BY 2.5)

In Germany, the **Lüneburg Heath (Lüneburger Heide) Nature Park** is the first nationally designated area in the category of "nature park". The core area of the nature park is the nature reserve "Lüneburger Heide", which gives it its name and is designated as a "Special Protection Area" under the Birds Directive and as a "Special Area of Conservation" under the Habitats Directive thus being part of Natura 2000. It is also recognised as being of "international importance and European interest with regard to the protection of the natural heritage and the conservation of their aesthetic, cultural and/or recreational value" by the Council of Europe.

As part of the management approach, sheep are used as "landscape keepers" who enable the persistence of the heath ecosystem by grazing the vegetation, thereby benefiting biodiversity adapted to this ecosystem. However, at the same time, it also prevents the area from slowly converting back to a forest, as it has already occurred on over a third of the entire Nature Park area. In these parts, forest conversion has been permitted after the forest had been almost completely pushed back by humans until the 19th century. This example shows how different conservation objectives and protection levels can be used within a wider framework of management options for an area.

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[26] Very radical intervention approaches to conservation may include assisted migration, taxon substitution, de-extinction, and genetic modification. These practices are emerging (Corlett et al., 2016) and may also need to be reconciled in such discussions but have not been mentioned by respondents of the survey.

3.6.3 Contributions to building a truly coherent Trans-European Nature Network

The new EU Biodiversity Strategy also plans to build a truly coherent Trans-European Nature Network (TEN-N), which envisions connecting all spatial targets and efforts. The existing Natura 2000 network provides the basis for this. Survey experts were asked to identify additional challenges and solutions to the novel concept of a TEN-N:

Guidance is also required from the EU for the TEN-N implementation, as it is perceived to be completely lacking at this stage by some respondents. In the context of the upcoming TEN-N, the lack of transboundary cooperation and lacking data regarding ecological corridors and connectivity (especially for the marine environment) were mentioned as some of the main implementation barriers. This also presents a barrier to efforts for creating a coherent transnational protection network at sea. Survey respondents further pointed to the following needs and requirements to successfully implement the TEN-N network:

- More **exchange of information** (e.g. know-how sharing) is required at the national and subnational levels.

- **Additional data** to be collected should further include a comprehensive assessment of the potential of the protected parts of nature that are not officially recognised as protected areas (see chapter 4.5) to contribute to the TEN-N.

- A better **understanding of the benefits** for the EU and its Members (e.g. increasing resilience and stability to environmental changes) will need to be created to give impetus towards realising such a collective goal.

- Current resources to coordinate between reaching the 30 % and 10 % targets and, on top of this, achieving network coherence (e.g. through GI elements) are too low, several respondents argue. There is a particular need for higher **structural (mainly personnel) and financial resources** dedicated to biodiversity conservation to enable effectively carrying out the required actions.

- Using the Europarc Federation was suggested as a way of tackling the complexity in building a GI concept.

- Leveraging **regional development** aid to support nature restoration

- The potential and necessity for (**large-scale) restoration** were also proposed, where important areas providing network connectivity are currently too degraded.

3.6.4 Tools to support targets of the EU Biodiversity Strategy for 2030

National Biodiversity Strategies were most often mentioned as tools by Member States to support the targets of the EU Biodiversity Strategy for 2030. However, in some cases, these strategies were assessed as having some principal shortcomings, for example including no action plan (Austria) or being outdated and with insufficient monitoring and reporting (Germany). Slovakia mentions an Action Plan for National strategy for biodiversity protection[27] as well as an operational programme 'Quality of environment'[28]. Greece, too, is currently planning to update its national biodiversity strategy which will include a new 5-year Biodiversity Action Plan, aiming for alignment with the EU Biodiversity Strategy for 2030 and the CBD post-2020 Global Biodiversity Framework. Survey respondents from Greece also mentioned that LIFE projects promote the implementation of aspects of both national and EU Biodiversity strategies and particularly projects with a scope that extends beyond Natura 2000 sites (e.g. Life EL Bios which is in the final revision stage, Life IP 4 Natura, Forestlife, Life SAGE). In addition to the National Biodiversity Strategy for 2016 – 2025, respondents from Czechia mentioned a state programme for nature and landscape protection for 2020 – 2025. Czech interviewees also pointed to a piece of legislation (Act. No 114/1992 Coll. on the Nature and Landscape Protection) which provides tools that focus on the designation of sites where natural processes are supported and the protection of valuable parts of nature outside protected areas (i.e. OECMs), which may contribute to the Trans-European Nature Network, is ensured. In Spain, interviewees highlight three important tools towards the strategy: (i) National Strategy for Green Infrastructure and Ecological Connectivity and Restoration; (ii) National Strategy for the Restoration of Rivers; (iii) New Strategic Plan for Natural Heritage and Biodiversity (in preparation). In Sweden, a national strategy for the conservation of lakes and rivers with high natural and cultural values has just been launched (see Annex II).

In addition, there is ongoing work in Sweden to develop national strategies for the restoration of aquatic habitats and a framework for marine protected areas and connected regional plans. Moreover, within Swedish forest policy tools, voluntary set-asides and the concept of 'environmental care measure during harvesting' are promoted in all forests, which are also intended to support ecological connectivity. In France, there is currently a lot of reflection on the financing of protected areas. The country has created some tools that are accessible and is planning others: a resource centre, public and NGO instruments and the French Biodiversity Office. Having a high-level government office dealing with this important issue supports the development of common methodologies, according to the experts. In addition, the Netherlands is aiming to build a 'nature inclusive society', which will help support the achievement of the goals set out in the Biodiversity Strategy.

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[27] https://www.enviroportal.sk/environmentalne-temy/zlozky-zp/rastlinstvo-a-zivocisstvo/dokumenty/akcny-plan-pre-implementaciu-opatreni-vyplyvajucich-z-aktualizovanej-narodnej-strategie-ochrany-biodiverzity-do-roku-2020
[28] https://www.op-kzp.sk/en/

4 Conclusions

Protected areas remain a key element for the conservation of Europe's natural landscape and biodiversity. During the last decades, the coverage of protected areas has increased substantially, notably with great support from the EU Nature Directives and the Natura 2000 network as well as due to European and international biodiversity targets. The marine protected surface in particular expanded significantly in the last years. However, coverage alone does not necessarily lead to successful protection. The results of the European State of Nature Report 2020 showed that despite the increasing protected area coverage, habitats and species still overwhelmingly experience ongoing deterioration from the diverse human impacts with low margins of improvement. Thus, besides the continued extension of protected area, increased efforts are necessary to improve the effectiveness of protected area designation and management within and beyond administrative boundaries, ecological connectivity and the potential of OECMs outside of protected areas. The survey revealed specific needs and potential solutions to achieve the EU Biodiversity targets for 2030 and particularly the target to protect 30 % of the EU's land and sea area and 10 % under strict protection.

Need for appropriate governance approaches and supporting frameworks

To gain a clearer picture of the current status of protected areas and OECMs as well as associated challenges and respective needs, this study gathered information and insights from 12 Member States. In line with the findings of previous assessments (e.g. Eklund & Cabeza-Jaimejuan, 2017), the main challenges to effective and successful management of protected areas are found to relate to the lack of coordination among administrations, a stable governance system for protected areas, and clarity regarding the responsibility of the official bodies that have jurisdiction over these areas. To significantly improve the management of protected areas, effective and functioning governance systems need to be established with clear responsibilities (e.g. for planning, designation, management, monitoring), appropriate resources and required competences from the local to the national level, also allowing for vertical and horizontal cooperation. This also includes systematic cooperation across borders to achieve transboundary protection, coherent management as well as inclusive and collaborative decision-making. The lack of capacities with regard to human and financial resources is a recurring issue, raised generally for implementing the biodiversity targets and with particular emphasis for monitoring activities (e.g. for management effectiveness) and OECMs (e.g. for compensation measures). In order to enable more coherent and effective management of protected areas, clear support and a mandate from national and European policy and the respective legal frameworks are essential, including appropriate financial support. Furthermore, increased efforts are required at the transnational level, as nature protection does not stop at borders and EU policies also include joint target setting and assessment.

Improve assessment methods and harmonise national approaches

Many concepts remain insufficiently defined, unclear to Member State executives or are lacking consistent guidance and methodologies for implementation. This particularly applies to the definition of 'strict protection', management effectiveness, OECMs and the new Trans-European Nature Network. For instance, survey participants voiced a clear need to develop standardised methods for assessing the effectiveness of protected area management going beyond current indicators such as PAME. Survey respondents also pointed to a lack of ability to compare the protected area categories used in different countries and the missing link to widely recognised science-based benchmarks, such as the IUCN protected area management categories. This makes it difficult to compare and combine national and regional approaches and raises the need for harmonization to enable an EU-wide assessment of protected areas.

Specific efforts are needed to operationalise the 10 % strict protection target, while old growth forests should play a critical role as a key element for maintaining biodiversity and mitigating climate change.

As emphasised by the survey respondents and literature, the current legal framework for strict protection remains unclear and hinders the accuracy of recent efforts to provide spatially explicit data on the distribution and protection level of remaining old-growth forests in Europe (Barredo et al., 2021), and obscures opportunities to close their protection gap.

Build strategic partnerships with private, societal and key stakeholders

Tackling the biodiversity crisis is a societal effort calling for joint action by the public and private sectors and society. While public authorities play a key role in nature conservation and protected area management, they are often challenged by the lack of resources, knowledge and skills. However, there already are a variety of citizen-led bottom-up initiatives as well as networks of NGOs that actively support the protection of valuable areas of land, for instance by buying land on private and public subsidies to establish sustainably managed and/or protected areas. In addition to public instruments such as contractual nature conservation, such citizens-led initiatives can make a significant contribution to the 30 % target and the Member State pledges, e.g. in the context of OECMs and connectivity efforts. These, however, would then need to be considered in national monitoring systems and inventories and supported by public policy.[29] Moreover, a close partnership with all stakeholders, including landowners, conservation organisations, local and regional authorities and local communities, is key to achieving effective protection on all sites and particularly on sites with a high protection level (e.g. strict). This is also an important prerequisite for the development of a truly coherent Trans-European Nature Network, complemented by cross-border cooperation to enable the designation of well-placed and connected ecological corridors.

In conclusion, this study as well as other research show that reaching the targets of the EU Biodiversity Strategy for 2030 and securing effective nature conservation on the ground requires real commitment by all involved actors, from the local to the European Union level. Concerted actions are necessary to effectively protect Europe's remaining nature, such as raising ambition for comprehensive protected area management and governance, improving the availability of information and guidance, increasing EU-wide cooperation and knowledge exchange (e.g. via a central digital platform, workshops and open data) and tackling harmful activities and incentives.

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[29] In France in 2020, for example, the State included into the law , for the landowners eager to make a change, a new way to protect the land, even if and when it comes out of their property.

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Annex I: Detailed survey

See separate document: https://www.eionet.europa.eu/etcs/etc-bd/products/etc-bd-reports/etc-bd-technical-report-3-2021-protected-area-management-in-the-eu-supporting-the-advancement-of-the-trans-european-nature-network-annex-i-detailed-survey

Annex II: Case studies

See separate document: https://www.eionet.europa.eu/etcs/etc-bd/products/etc-bd-reports/etc-bd-technical-report-3-2021-protected-area-management-in-the-eu-supporting-the-advancement-of-the-trans-european-nature-network-annex-ii-case-studies

Annex III: Literature review

See separate document: https://www.eionet.europa.eu/etcs/etc-bd/products/etc-bd-reports/etc-bd-reportprotected-area-management-in-the-eu-supporting-the-advancement-of-the-trans-european-nature-network-annex-3-literature-reviews