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IMPACT ASSESSMENT

ANNEXES

Accompanying the

proposal for a Regulation of the European Parliament and of the Council

on nature restoration

{COM(2022) 304 final} - {SEC(2022) 256 final} - {SWD(2022) 168 final}

Annexes

Table of contents

LIST OF ABBREVIATIONS....121

ANNEX I: PROCEDURAL INFORMATION....122

ANNEX II: STAKEHOLDER CONSULTATION....140

ANNEX III: WHO IS AFFECTED AND HOW?....141

ANNEX IV: ANALYTICAL METHODS....159

ANNEX V: SPECIFIC TARGETS CONSIDERED FOR THE MAIN ECOSYSTEM TYPES..171

ANNEX VI: ANALYSIS BY ECOSYSTEM....175

ANNEX VII: DESCRIPTION, TRENDS AND IMPACTS OF THE MAIN OPTIONS....176

1 BASELINE....176

2. OPTION 2: OVERARCHING LEGALLY BINDING TARGET COVERING ALL OR MOST EU ECOSYSTEMS....191

3. OPTION 3 AND OPTION 4....200

4. COSTS OF ENABLING MEASURES....200

ANNEX VIII: BACKGROUND INFORMATION FOR POTENTIAL RESTORATION TARGETS....206

ANNEX IX: EVALUATION OF THE EU BIODIVERSITY STRATEGY TO 2020: SUMMARY OF KEY RELEVANT FINDINGS....207

1. THE EU BIODIVERSITY STRATEGY TO 2020....207

2. EVALUATION OF THE EU BIODIVERSITY STRATEGY TO 2020....208

3. KEY FINDINGS OF RELEVANCE TO THE EU NATURE RESTORATION TARGETS....210

4. KEY LESSONS AND THEIR RELEVANCE TO THE NATURE RESTORATION INITIATIVE....215

ANNEX X: COHERENCE WITH EU LEGISLATION AND POLICY INITIATIVES RELATED TO NATURE RESTORATION; APPROACH TO NON-DETERIORATION....217

ANNEX XI: RESTORATION FRAMEWORKS IN MEMBER STATES....242

ANNEX XII: FINANCING OPTIONS AT EU LEVEL....244

LIST OF ABBREVIATIONS

BDS2030	Biodiversity Strategy for 2030
BHD	Birds and Habitats Directives
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CFP	Common Fisheries Policy
EEA	European Environment Agency
ELD	Environmental Liability Directive
EMFAF	European Maritime Fisheries and Aquaculture Fund
HD	Habitats Directive
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
LAU	Local Administrative Unit
LULUCF	Land use, land use change and forestry
MAES	Mapping and Assessment of Ecosystems and their Services
MBIs	market-based instruments
MSFD	Marine Strategy Framework Directive
NEC Directive	National Emission reduction Commitments Directive (Directive (EU) 2016/2284)
NGO	Non-governmental organisation
NRP	National Restoration Plan
UNCCD	UN Convention to Combat Desertification
UNFCCC	UN Framework Convention on Climate Change
WFD	Water Framework Directive

Annex I: Procedural information

Lead DG, Decide Planning/CWP *references*

Lead DG: DG ENV

Decide Planning reference: PLAN/2020/8491

CWP reference:

In the **Commission Work Programme 2021**[1] 'A Union of vitality in a world of fragility' COM(2020) 690 final, this initiative is foreseen under the policy objectives for the European Green Deal, in particular under 'Biodiversity and toxic-free environment package': 'New legal framework on the restoration of healthy ecosystems (legislative, incl. impact assessment, Article 192 TFEU, Q4 2021)'.

Organisation and timing

The **Inception Impact Assessment** (**Roadmap**) was open for feedback from 4 November 2020 until 2 December 2020.

The **Open Public Consultation**[2] on the initiative was open for feedback online from 11 January 2021 until 5 April 2021.

An **Inter-Service Group** was set up in June 2018 to steer and provide input for the evaluation of the EU Biodiversity Strategy to 2020. In view of the close links, the same group provided steer on the EU's Sixth National Report to the Convention on Biological Diversity (6NR). In 2020, this group also undertook to provide steer and input to the impact assessment for the EU Nature Restoration Law.

The Inter-Service Group includes representatives from the Directorate Generals ENV; AGRI; BUDG; CLIMA; DEVCO (INTPA); ECFIN; ECHO; EMPL; ENER; ENV; ESTAT; FPI; GROW; JRC-Ispra; MARE; MOVE; NEAR; REGIO; RTD; SANTE; SJ; TRADE, SG. as well the EEAS. Relevant agencies, in particular EASME/CINEA, EEA have also been included in these consultations.

The ISG discussed the initiative on legally binding restoration targets on 04/09/2020, 21/01/2021, 16/03/2021, 30/04/2021, 11/06/2021 and 09/11/2022.

The **planned adoption date** in the Commission Work Programme for 2021 was **Q4 2021**, however, it has been postponed to **23 March 2022**, and then to **22 June 2022.**

[1] https://ec.europa.eu/info/publications/2021-commission-work-programme-key-documents_en.

[2] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12596-Protecting-biodiversity-nature-restoration-targets-under-EU-biodiversity-strategy_en.

Consultation of the Regulatory Scrutiny Board (RSB)

The draft Impact Assessment was submitted to the RSB on 17 June 2021. The RSB provided a first set of detailed comments its **Impact Assessment Quality Checklist** on 9 July 2021. The meeting with the RSB on the impact assessment took place on 14 July 2021. On 16 July 2021, the RSB issued a **negative opinion with comments**. DG ENV revised the Impact Assessment accordingly, addressing the comments of both the opinion and the Quality Checklist, and re-submitted it to the RSB on 1 October 2021. On 28 October 202, the RSB issued a **positive opinion with reservations**; the comments included in this second opinion have also been addressed in the Impact Assessment.

The tables below (at the end of this Annex I) give an overview of the comments by the RSB in its opinions and in the Impact Assessment Quality Checklist, and indicate how the Commission has addressed each of these comments in the revised Impact Assessment.

Evidence, sources and quality

References to key sources and evidence (not exhaustive):

Data and knowledge on the EU's ecosystems (state, pressures, trends etc.) has been drawn from published reports which are authored and reviewed by a experts in the field, such as:

- The **first EU-wide mapping and assessment of ecosystems and their services**[3] ('MAES report') by the European Commission's Joint Research Centre (2020);
- **State of Nature in the EU**[4] (European Environment Agency, 2020);
- **Regional Assessment Report on Biodiversity and Ecosystem Services for Europe and Central Asia** (IPBES, 2018)[5];
- Tucker et al., (2013) **Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy**[6]. Report to the European Commission. Institute for European Environmental Policy.

A wide range of specific scientific sources/publications have been used for the impact assessments of the specific ecosystem/species restoration targets. They are listed in the supporting study report[7].

[3] MAES report (2020).
[4] https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020.
[5] https://ipbes.net/assessment-reports/eca.
[6] Tucker et al., *Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy*, 2013.
[7] To be published in 2022.

Policy-related studies/reports:

- Evaluation of the Biodiversity to 2020[8];
- Eftec et al., (2017) **Technical support in relation to the promotion of ecosystem restoration in the context of the EU biodiversity strategy to 2020**[9].

Robustness and quality of data:

As mentioned in chapter 2 (Problem definition), figures and data on biodiversity and ecosystem condition come from a variety of sources, data sets and monitoring methodologies (e.g. reporting by Member States, Copernicus land monitoring etc.) and are not always directly comparable and in some cases are based on incomplete reporting. Despite these shortcomings they do provide trends, from which clear conclusions can be drawn.

External expertise: Service contract 07.0202/2019/806106/SER/ENV.D.2: "Supporting the Evaluation of the EU Biodiversity Strategy to 2020 and Follow-up" with Trinomics B.V. leading a consortium including the Institute for European Environmental Policy (IEEP), UNEP-WCMC, IUCN and ENT environment & management. Amendment N°1 of this contract expands the scope of 'phase 2' of this contract to 'the services needed for supporting the follow-up action to the EU Biodiversity Strategy to 2030', in particular to support the Commission in undertaking an impact assessment for a proposal for legally binding EU nature restoration targets in line with the Commission's Better Regulation guidelines. The contractor is asked to 'support the development of a proposal for legally binding EU restoration targets with the aim to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters'. The concrete tasks of the contractor included support to the public and stakeholder consultations and support in all steps of the impact assessment process.

[8] Trinomics B.V. (2021) Support to the evaluation of the EU Biodiversity Strategy to 2020, and follow-up: Final study report (Publications Office of the EU, 2022). For a summary of main relevant findings: see Annex IX. Commission Report on the evaluation of the EU Biodiversity Strategy to 2020 due in 2022.

[9] Eftec et al., *Technical Support in Relation to the Promotion of Ecosystem Restoration in the Context of the EU Biodiversity Strategy to 2020*, Summary Report, European Commission, Directorate General Environment, January 2017.

RSB comments	How did we address the comment?
1st RSB OPINION (16 July 2021)	
(Opinion 1.1) Given that there is already a broad set of measures (both existing and recently or soon to be adopted) that tackle the biodiversity challenge and its drivers, the report should be more explicit on the **specific gap of the problem that would remain that binding targets could help solve**.	Inserted an explanation in section 2.4 (how will the problem evolve). Inserted an explanation in section 4.2, where legally binding targets are introduced, saying that they would address the specific problem gap. Explained why gap remains in section 2.2. 'Specific policy drivers'. Better description of the baseline in section 5.5 and Annex also makes this clearer.
(Opinion 1.2) It should explain **why a better implementation of existing legislation**, as concluded by the preceding fitness check, **would not be sufficient.**	Explanation added in section 2.1.1 above Fig 2 and in section 2.1.2 above table 1. Explained why gap remains in 2.2. 'Specific policy drivers'.
(Opinion 1.3) The **baseline** should be more explicit about the **degree of passive restoration that should already happen** due to the effects of existing legislation on the drivers of biodiversity loss and ecosystem degradation.	Better described baseline in 5.1 (policy option baseline) and in the Annex. and elaborated on the expected degree of restoration under existing legislation and policy initiatives in Annex VII. Added an explanation to 6.2 to highlight the added value of the options in comparison to expected restoration under the baseline.
(Opinion 2.1) Building on a sharper problem definition, the report should be **clearer about the objectives**. It needs to explain the difference between the **overarching aspirational goal** of restoring 'all ecosystems' and what this particular initiative is meant to achieve via binding targets. There is a reference to 'at least a broad range of ecosystems', however the report does not express this objective in sufficiently specific, measurable and time-bound terms.	In section 4 on objectives better explained. General objective slightly revised to be in keeping with an article of TFEU (see also checklist 4.1,4.2,4.3). Issue if "all" and "broad range" ecosystems better explained. In 5.2.1: Policy option 4 'overarching goal' re-defined and better explained. In 6.4: adapted accordingly.
(Opinion 2.2) The objectives should clarify the **reference situation** to which ecosystems should be restored. If defining the reference situation requires judgement on a case-by-case basis, the report should clarify how it would define and enforce binding quantitative restoration targets.	Reference situation: explanation added in 4.2.

RSB comments	How did we address the comment?
(Opinion 3.1) The report should better present the **functioning of the options** and assess more thoroughly their feasibility and effectiveness.	Functioning of options 2 and 4 better explained in 5.2.1 (description of options) and 6.4 (effectiveness of option 4) Feasibility and effectiveness are more thoroughly explained in 6.1-6.4 (effectiveness of options). Feasibility is furthermore incorporated in the description of achievability in 6 (approach to IA).
(Opinion 3.2) As regards the option of having a **binding overarching goal** for ecosystem restoration it should explain how the availability of the necessary data and methodology to establish and monitor an overarching goal (presumably at EU and Member State level) would be ensured and how in practice the final (quantitative) goal would be determined.	5.2.1: Overarching target: limitations of overarching target added in Option 2. Overarching objective better defined and explained option 4.
(Opinion 3.3) Given that some ecosystems (e.g. urban, soil) are not covered by EU legislation, the report should assess more thoroughly the respect of the **subsidiarity principle** and the **proportionality** of legally binding measures.	Ch. 7 (subsidiarity and proportionality) now includes a reference to the legal basis encompassing all ecosystem types An explanation was also added in the main text on why EU level action is, in terms of subsidiarity/proportionality, warranted on ecosystem types that are partially covered by existing legislation.
(Opinion 3.4) It should clarify **whether Member States can reasonably be expected** to be able to operationalise the targets for those ecosystems and habitats where there is not already an evidence base and a clear methodology and whether such option would provide the necessary legal certainty.	Further explanation added in ch 5.2.2
(Opinion 4.1) Regarding the **specific targets** for ecosystems option, the report should clearly **identify the evidence base and methodology** supporting the proposed detailed targets by ecosystem.	Explanation on evidence base included in option 3. Methodology and evidence for the specific targets described in detail in Annex IV.
(Opinion 4.2) The **views of different stakeholder groups on individual targets** should be clearly presented.	More referencing on this throughout the text How stakeholder views were included in the methodology and evidence for the specific targets now described in Annex IV.
(Opinion 4.3) Concerning the **combination option**, the report is not clear how the two options would interact in practice and why it should overall	5.2.1: Hybrid option 4 re-defined and interaction specific targets/overarching objective better described.

RSB comments	How did we address the comment?
perform best, given the shortcomings identified above with the binding overarching goal option.	6.4 Explanation added.
(Opinion 5.1) The report should elaborate on how an **EU wide enforcement** of the targets and the achievement of the objectives will be done considering that Member States will determine the specific actions to take through national restoration plans.	New section on enforcement added as a new sub-section of ch. 8. Further details also added in ch 5.2.2.
(Opinion 5.2) It also should explain how the proposed options will ensure **Member States' ownership** of the targets.	Explained in sections as above 5.2.2 and new sub-section in ch 8.
(Opinion 5.3) It is not clear how **different the efforts to be made by Member States** will be, given that they have different ecosystems and habitats on their respective territories.	Tables of costs and benefits per Member state and per ecosystem has been added in Annex III. Section on distributional aspects of targets added.
(Opinion 6.1) The report should be more explicit about **how the costs and benefits were calculated**, what **assumptions** were made and what they are based on for all ecosystem types assessed.	This is now better explained in Annex IV. Additional explanation has also been added on the costs and benefits calculation in each thematic assessment in Annex VI.
(Opinion 6.2) It should also better explain how the **opportunity costs** were estimated including what assumptions were made and how they are justified.	This is better explained in Annex IV.
(Opinion 6.3) It should also be clear **what "ecosystem services" are included in the benefit estimates** for each ecosystem type assessed.	Thematic assessments are now clearer on this, with references.
(Opinion 7.1) The report should be clearer about the **cumulative effects of the initiative on the different actors** (fishers, farmers, etc.) and any resulting **distributional impacts**.	Impacts on stakeholders addressed in Annex III and in main text, Ch 6. Workshop held that addressed this issue.
(Opinion 7.2) It should also assess the **costs for different Member States and regions**.	A breakdown of costs and benefits per Member state and per ecosystem has been added in Annex III.
(Opinion 7.3) It should reinforce the 3 assessment of the **administrative costs**, including quantification whenever feasible.	Section 6.2 and 6.3 (impacts option 2 and 3): Added a more precise admin. costs breakdown for option 2 and 3 in the form of table. Section 6.4 (impacts option 4): expanded the costs overview with a more detailed cost breakdown for both restoration and maintenance per ecosystem type, and administrative costs. Chapter 7 (comparison efficiency): expanded the comparison on administrative costs. Chapter 6 (Intro of chapter: approach to impact assessment): added what is considered as administrative costs, and added a reference to Annex VII.

RSB comments	How did we address the comment?
(Opinion 8) The **views of different stakeholder groups** should be presented more systematically throughout the report.	More referencing on this throughout the text Stakeholder views w.r.t. options added in section 5.2.2.
IMPACT ASSESSMENT QUALITY CHECKLIST (9 July 2021)	
(Checklist 1.1) The report does not sufficiently **frame the initiative**. While the annexes contain a large amount of information, it is not always clear from the report itself **how the initiative links to other elements of the Biodiversity Strategy for 2030 and to other related initiatives.** For example, it is not immediately clear how the initiative will work together with **LULUCF** – how synergies will be ensured and under which of the two frameworks measures will be monitored and progress assessed.	Moved 6.1 (impacts baseline) to 5.1 (description baseline) and elaborated on the expected degree of restoration under existing legislation and policy initiatives. Description of baseline revised to include effects of other policies more clearly. Section 6.2: Processed the degree of restoration under current legislation into the policy coherence for option 2. Section 6.2-6.4: impacts of policy options (policy coherence): explanation added linking to other elements of the Biodiversity Strategy for 2030 and other Green Deal initiatives. Section 5.2.2. Now gives a more detailed explanation of the links in the proposed LULUCF Regulation. Chapter 9: monitoring: added a paragraph on synergies with monitoring LULUCF
(Checklist 1.2) The report does not sufficiently explain the **international dimension** of the initiative. The Biodiversity Strategy for 2030 refers to all the world's ecosystems being restored. It is unclear if this initiative is meant to contribute to that, beyond setting an example and establishing a methodology that might possibly be useful to third countries.	Added text in 1.1 on international commitment to restore ecosystems. Section added on 'International dimension' at the end of Chapter 8.
(Checklist 1.3) It is not clear what the **situation is in different Member States in terms of ecosystem condition and restoration efforts**. The charts and graphs presented in section 2 of the report refer mainly to what is covered under specific legislation (i.e. the Habitats Directive). It is difficult to understand what this means at EU level and the extent to which there are differences between Member States in terms of their efforts and progress.	Added at the end of section 2.2.1 that degradation applies across the board for all the main ecosystem types. Added in 2.1.1 that the main EU assessments (EU-Wide, EEA, and State od Nature) describe the condition of all main ecosystems and give evidence of distribution effects across the EU and MS.
(Checklist 2.1) The report starts by indicating that the various specific environmental protection pieces of legislation in place are not sufficient to address the problem of biodiversity loss. If **existing policies** are not working as intended (p. 17-18), the report	An explanation on why the option of revising existing legislation was discarded at an early stage is added to Section 5.3 (options discarded at an early stage).

RSB comments	How did we address the comment?
should **explain why they are not being revised**. If evidence, for example, shows that the majority of habitats under the Habitats and Water Framework Directives do not have good ecosystem status (p. 11), this shows that there is a problem under these legislations that needs to be tackled. In fact, some legislations are being revised (e.g. the Marine Strategy Framework Directive) and it is unclear whether the expected changes would address the problems in such a way as to ensure the related ecosystems are restored.	An explanation was added to 5.1 (description baseline) on what is expected from the MSFD revision. Section 5.1 and 2.2 (problem drivers) already explain that BHD and WFD were assessed as fit for purpose and will therefore expectedly not be revised, despite the implementation challenges.
(Checklist 2.2) Moreover, the report is unclear on the **extent to which other Green Deal initiatives** and particularly the broad range of other actions under the new 2030 Biodiversity Strategy **will tackle the problem** (e.g. gaps, implementation issues etc.) and **which part of the problem remains.** The report should indicate for which specific environmental legislation revisions will be launched (as announced in the 2030 Strategy) to tackle existing legislative gaps. It should **clearly explain the specific contribution expected from binding targets on the remaining gap of the problem.**	Inserted an explanation in 2.4 (how will the problem evolve). Inserted an explanation in 4.2, where legally binding targets are introduced, on how they would address the specific restoration gap. Moved 6.1 (impacts baseline) to 5.1 (description baseline) and elaborated on the expected degree of restoration under existing legislation and policy initiatives. Baseline revised and more explicit about contributions from other policies. Section on policy coherence of Annex VIII is moved to 6.1-6.4 (impacts of policy options) and expanded, building on 5.1. Revisions of the MSFD, Climate are addressed in 5.1, and new/revisions of other legislation/initiatives are addressed in Annex X.
(Checklist 2.3) In this framework, it is not clear **what are the key drivers of biodiversity loss and ecosystem degradation that need to be tackled** by this initiative. Most, if not all, of the presented drivers (climate change, pollution, over-exploitation, invasive species, changes in land and sea use; p. 15) are being addressed by other EU and national policies.	Explanation added in 2.2. (above 'Specific policy drivers') on how restoration addresses the drivers. Mentioned also in the box/summary at the end of section 2.2.
(Checklist 2.4) When it comes to **problem drivers**, it is not clear why the intervention logic does not also list **funding challenges and the political commitment and ownership by Member States**.	Political commitment now included in section on drivers. Intervention logic has been revised.
(Checklist 2.5) The report briefly touches on the difference between protection and restoration, clarifying that a protected ecosystem is not guaranteed to evolve by itself to good condition. It is not clear however what the magnitude of the problem is. **The report does not explain the extent**	Explanations added in section 2.1.1 and also above Fig 4 and in 2.1.2 above table 1. It is (was already) also explained in 2.2 under 'Lack of comprehensive approach.

RSB comments	How did we address the comment?
of the problem beyond what is covered by the Habitats Directive annexes.	
(Checklist 2.6) The report argues that **guidance from the Commission on ecosystem restoration** was followed by some Member States 'which suggests that it was appropriate' (p. 16). It is not clear what evidence supports this statement. Could the reason not be that some Member States are more ambitious and committed about biodiversity protection and restoration than others? Could the reasons not relate to different funding and resources priorities or a lack of capacity?	The paragraph has been rephrased in the section 2.2 'Voluntary targets have been ineffective'
(Checklist 2.7) The argument that **healthy ecosystems lead to disaster risk reduction and control** (p. 15) needs more evidence or should be nuanced. It is not obvious, for example, that having more forest will lead to less forest fires or that more natural coast lines will lead to less flooding from storms (e.g. a sizeable part of the Netherlands are below sea level).	Explanation with examples and references added in 2.1.3
(Checklist 3.1) The report should better demonstrate the **respect of the subsidiarity principle.**	Addressed under Opinion 3.3
(Checklist 3.2) For the ecosystems not yet covered by EU legislation (i.e. **non-Annex I** habitats forest area) and potentially subject to a binding target, the report needs to establish the **necessity and value added of EU action for each newly added ecosystem or area** (e.g. urban, soil).	See answer to opinion 4.1. opinion. This describes how targets proposals were arrived at. Needs for targets are also described in the thematic assessments.
(Checklist 3.3) Some ecosystems or habitats might be near **border areas** and their protection and restoration would require the concerned Member States to act together. The report is not clear whether (and if so, how) the planned initiative will address this aspect. It should be also clearer on the **magnitude of the transboundary effects** across all ecosystems as well as the **frequency of "free riding" practices.**	Examples of transboundary aspects added in 3.3. Little quantitative data available. Section on transboundary issues and how to address them included. Deleted 'free riding practices' from text since we have little actual evidence.
(Checklist 4.1) When describing the **objectives**, the report is **unclear about how the Biodiversity Strategy for 2030 goals will be reached**. The strategy aims for all EU ecosystems to be restored by 2050. While this objective seems to be reproduced as the general objective also for this initiative, the linked specific objective however limits its ambition to (at least) a 'broad range of ecosystems' and introduces priority criteria according to which these should be selected (e.g. carbon capture, natural disaster impact).	General objective slightly revised (checklist 4.3) Reference to how BDS2030 will be implemented included. Revised also the explanation of specific objective. "all" and "broad range" addressed below (checklist 4.2). There is an implementation plan for the BDS2030 details of this are beyond the scope of this IA.

RSB comments	How did we address the comment?
(Checklist 4.2) The report acknowledges (in footnote 19) that "it may not be possible to restore all ecosystems". While this transparency is welcome, it is important to be clear in the **specific objectives** on **what realistically should be achieved**. The current wording of the specific objective of a broad range of ecosystem is not sufficiently expressed in **SMART** terms. It will prevent effective progress monitoring and will likely repeat the problems identified earlier in the report (p.17). For instance, it is not clear what the **specific meaning of "restored"** is. It is also not clear whether this concerns only an **EU level** objective or whether this applies also at the **Member State level**.	Meaning of 'restored' explained in section 4.2 (just above 'Operational objective' A description has been added in 4.2 of the reference situation towards which ecosystems need to be restored. Specific ecosystem types to be covered are highlighted (bold). The additions make the objectives more SMART (more specific, measurable and achievable - they were already relevant and time-bound.) Clarified in 4.2 that the specific objective applies to Member States and EU-wide.
(Checklist 4.3) In terms of (public) expectation management and coherence, it may help to present the **general objective** rather as an **aspirational long-term objective (not for 2050),** while targeting the **specific objectives** on those ecosystems where the evidence base realistically allows imposing binding targets.	Suggestion taken on board in definition of general objective.
(Checklist 4.4) The **objectives** should clarify what is the **reference situation** to which ecosystems should be restored. The report seems to indicate that it is not about restoring lost ecosystems (e.g. Brussels used to be a swamp), but about repairing the damage to still existing ecosystems. This should be made explicit in the objectives.	Reference situation explained in section 4.2
(Checklist 4.5) The report highlights the need for urgent action. **Is the 2030 horizon a realistic timeframe** considering the long time needed for concerned measures to have effect?	4.2: Explanation inserted on 'restoration' versus 'recovery'.
(Checklist 5.1) The **baseline scenario** is the one against which all options are compared. As such, section 6.1 should be integrated into 5.1 and into the narrative of the sections 6.2 through 6.4. The description of the baseline could then be more complete and useful for understanding the current situation and its likely development in the near future.	See response to Opinion 1.
(Checklist 5.2) The **baseline** should sufficiently reflect the **other Green Deal initiatives**, in particular the 'Fit for 55' package and broad set of measures announced in the new 2030 Biodiversity Strategy. It should clarify how it relates to the MIX scenario informing the initiatives of the 'Fit for 55' package. It should illustrate the evolution of the part of the problem that would be not tackled if binding target measures were not part of the new policy response.	See response to Opinion 1. Section 5.1 (description baseline) is expanded to cover the Climate Law, Fit for 55's LULUCF and RED revision, and BDS2030 measures. See also revised baseline in Annex VII.

RSB comments	How did we address the comment?
(Checklist 5.3) Given the broad set of related (legislative) measures under the Green Deal and the 2030 Strategy, the report should **avoid giving the impression that the effective delivery of the 2030 Strategy depends only on binding targets**. Similarly, the report seems to **underestimate the expected contribution of all the other measures** (as indicated in section 5.1) when claiming that "in the absence of binding restoration targets the problem … risks to be further aggravated" (p.20). The **baseline should also not assume that measures under the Green Deal will not be fully implemented** (p.20).	More precision as regards existing measures is now given and how exactly the targets can contribute. It should be understood that the binding targets would only be a component of delivery of the BDS2030, I.e to deliver on the pillar 2 on restoration. Following agreement at the upstream meeting, the baseline is continued to be estimated as the implementation of all the contributions of the existing initiatives deriving from the Green Deal, that is **realistic and as based on experience,** and does not assume their full implementation.
(Checklist 5.4) While some details are included in the annexes, the report does not sufficiently present the issue of achievability of options and of '**realistic' implementation of existing measures by Member States**.	Included in 6.4 (effectiveness option 4) and 7 (comparison) why option 4 scores higher on achievability than option 3. Realistic implementation of existing EU legislation is covered in the revised 5.1 (description baseline). Annex XI outlines restoration frameworks in a number of MS but national measures are not mapped in detail due to the voluntary nature and limited reporting.
(Checklist 5.5) The **options** are not sufficiently clear on what they aim to achieve: **Policy Option 2** aims that "by 2050, ecosystems in the EU are restored to and maintained in good status" in principle covering "a broad range of ecosystem". It is **not clear what success would look like** (e.g. how many restored ecosystems and how are "restored" and "good" defined?) and **who would be responsible** for achieving it (EU, Member States, joint responsibility?). It is also not clear how "a broad range of ecosystem" goal is easy to communicate (p.34)	Explanation added in 5.2.1 (Policy Option 2) that it applies to EU- and MS-level, that 'success' is difficult to establish. Explanation of reference situation to which ecosystems should be restored (good ecosystem status) and the meaning of 'restoration' has been added in section 4.2. What success would look like is now described in section 5.2.2.
(Checklist 5.6) Policy Option 2 envisages a "binding overarching goal" in absence of a sufficiently developed evidence base for ecosystems not yet covered by EU legislation (this would be left to the Member States). **It is not clear how sufficient legal certainty on what needs to be achieved will be provided** and **how effective delivery could be ensured**. The respective responsibilities at EU and Member State level are not sufficiently clear.	Section 5.2.1. Policy option 2 has been revised to better describe these aspects.

RSB comments	How did we address the comment?
(Checklist 5.7) More generally, the report should **better explain why option 2 is a valid one to consider**. Would changing the nature of a target (binding as opposed to the previously voluntary one) be sufficient to solve the problems identified until now? Will the flexibility it includes for Member States not risk that the objectives cannot be reached? How will it address the issues of insufficient funding and insufficient integration with other policies referred to in section 2.2?	Option 2 changed from 'goal' into 'target'. 5.2.1. Policy option 2 has been revised to better describe validitiy.
(Checklist 5.8) Given the questions that option 2 raises, the report is not sufficiently clear in **option 4** what adding this (diluted) overarching goal would bring. The report clearly states that option 2 'by itself it would most likely fail to restore biodiversity at a level required to meet EU-wide and international biodiversity objectives'(p.35).	Option 4 is redefined and better explained to distinguish from option 2. Adapted wording in 6.4.
(Checklist 5.9) For option 3, the report mentions some sub-options (e.g. different target timelines) without providing any details. Without making the report too long, the description of the option should at least briefly explain what aspects the sub-options considered.	Text has been added to explain the sub-options (different target timelines).
(Checklist 5.10) In option 3, there are very detailed targets by ecosystem (in annex V). It is mostly not clear **what is the evidence basis for these detailed targets**. The report also does not specify the opinions of different stakeholder groups on these individual targets. Without this information, it is not clear on what basis policy makers should take decisions on setting these targets.	As answered in opinion 4.1
(Checklist 5.11) As an example of the lack of evidence, it is not clear whether the proposed targets to increase green areas and tree coverage in **urban areas** would be suitable. Reducing the built surface in cities can be achieved by extending the overall surface of the city, reducing the living space by person, or replacing housing by high-rise buildings. None of these solutions seems obviously desirable.	The impact assessment on urban ecosystems has been revised and improved.
(Checklist 5.12) It is also not clear whether the "**range of ecosystems**" under options 2 and 3 would be the same or whether there is a difference in terms of ambition.	Better explained in options section.
(Checklist 5.13) For all options, it is not clear how effective **enforcement** of the binding targets would be ensured.	As answered in opinion 5.1
(Checklist 5.14) The report should be clearer about the **methodology** that would be used to **monitor and measure progress** towards the achievement of the targets. It should explain whether this is already	As answered in opinion Opinion 3.4.

RSB comments	How did we address the comment?
being developed (p. 55 seems to indicate that efforts are ongoing), whether it would apply in all options, the extent to which it would imply new requirements in addition to existing legislation ones.	
(Checklist 5.15) The report should explain how effective **ownership** for eco-system restoration will be ensured for eco-systems where **effective cooperation of third countries** (e.g. Russia, UK, Turkey, Norway) will be essential.	Section on transboundary effects included.
(Checklist 6.1) The report should better explain its **evidence base and methodology** – as it stands it is difficult to form a view about the robustness and credibility of the analysis. **Annexes III, IV and VI do not include sufficient detail.**	As answered under opinion 4.1, I.e. in Annex IV and as addressed in each revised ecosystem assessment (Annex VI). Detail on impacts has been added to Annex III.
(Checklist 6.2) For many ecosystem types, **Annex VI** does not explain how the **projected costs** were estimated, what assumptions were made and what they are based on. Although Annex IV explains that the unit costs were based on a review of "EU wide evidence" on ecosystem management costs including the "study of the costs of implementing Target 2 of the EU Biodiversity Strategy (Tucker, et al, 2013)" (Annex IV, p. 17), there are **no references to the Tucker study or systematic references to other studies in Annex VI.**	More detailed explanations and references have been provided in Annex VI. See also further details and references on the methodology in Annex IV.
(Checklist 6.3) On the benefit side, Annex IV explains that the **benefit estimates** are based on the values from studies estimating carbon sequestration and storage benefits and multiple ecosystem services. For many ecosystem types assessed, they are not referenced or the **references are incomplete in Annex VI.**	As in opinion 6: references and explanations have been added in Annex VI.
(Checklist 6.4) **Annex VI** should include explanations **how the costs and benefits were calculated**, what assumptions were made and what they are based on for all ecosystem types assessed. It should also better explain **how the opportunity costs were estimated** including what exact assumptions were made and how they are justified. It should also be clear what "ecosystem services" are included in the benefit estimates for each ecosystem type assessed.	As in opinion 6: more detailed explanations have been added in Annex VI.
(Checklist 6.5) The report should clarify to what extent the **estimates and underlying assumptions** have been cross-checked with **stakeholders**.	As in opinion 6.1 and opinion 7.
(Checklist 6.6) The **benefit cost ratios** for some of the ecosystems are very low when only the carbon benefits are taken into account but they increase, in some cases dramatically, when the ecosystem	As in opinions 6. Box on robustness of data added in Section 6.3, in option 3, conclusions. It

RSB comments	How did we address the comment?
service benefits are included. In view of significant differences between the benefit cost ratios with and without the ecosystem service benefits, the report should **explain the risks of the ecosystem service benefits being lower than expected**.	refers to annex IV ('analytical methods'))
(Checklist 6.7) The report provides some indication of **how different actors (fishers, farmers, etc) would be affected** by targets on specific ecosystems or habitats. It is not clear what the cumulative effects of the initiative would be on them. It is also not clear on the distributional impacts between the different affected groups.	As in opinion 7.
(Checklist 6.8) The report should assess (and quantify if significant) the **administrative costs** for business (farmers, fishers etc.) and citizens.	As in opinion 7.
(Checklist 6.9) It is not clear how **different the efforts to be made by Member States** will be, given that they have different ecosystems and habitats on their respective territories.	Breakdown of costs per Member State and per ecosystem has been added in Annex III
(Checklist 6.10) It is also not sufficiently clear on how the **impact on equality and non-discrimination have been considered**. Would a transparency obligation and access to justice provisions be sufficient to ensure those? How big an issue is it in this case?	Text slightly revised, not likely to be a big issue for restoration.
(Checklist 7.1) The assessment of effectiveness, coherence and subsidiarity is too important to leave entirely to the annexes. If an option will not be effective (see box 5 questions about option 2), then its efficiency or lack thereof may be of less importance. Moreover, coherence is a crucial element; thus without providing information on how options compare in terms of coherence it is difficult to arrive at a meaningful conclusion on how the options compare. For instance, how will the initiative work together with LULUCF? Will it overlap or reinforce or change the scope/measures of any of the existing environmental protection pieces of legislation? How will the different options interact with the future CAP?	As in opinion 1.3. Moved the assessment on effectiveness and coherence from Annex VIII to Chapter 6. Integrated the assessment of subsidiarity and proportionality from Annex VIII into Chapter 7. Expanded the assessment of coherence in Chapter 6.
(Checklist 7.2) It is not clear **why the report argues in favour of option 4** by stating that 'having an overarching goal makes the objectives more achievable'. As mentioned above option 2 *de facto* also concerns (only) a broad range of ecosystems and it is difficult to understand how this will help in terms of communication or gaining more support as stakeholders will notice that the Commission is not going at this stage (step 1) for binding targets covering *all* ecosystems. It is not clear from the	See reply opinion 3.1. Explanation added in section 5.2.1 Option 4. Alex: Included in section 6.4 why option 4 scores higher on achievability than option 3.

RSB comments	How did we address the comment?
analysis whether option 4 will lead to any ecosystem covered by a binding target not already included in option 3.	
(Checklist 7.3) **The choice of preferred option** should be better explained, including by better reflection the **shortcomings of option 2**. Why would option 3 not be sufficient to achieve the goals of the initiative? In terms of performance there seems to be no significant difference. As said above, the higher performance on achievability seems very much debatable, and could be argued less positive, also in view of the additional complexity (and confusion) it may introduce. It is not clear why policy options 4 performs better than option 3 in terms of proportionality.	See reply opinion 3.1. Weaknesses/shortcomings of option 2 explained in section 5.2.1. and 6.2. Why policy option 4 performs better, is now better explained in 6.4. and in 5.2.1 (Policy option 4)
(Checklist 7.4) The report should provide further elements to support the claim that a **Regulation would be better than a Directive** as it would 'enable coherent action across the EU and is the most effective way to ensure rapid action'. The implementation under all options is still left to Member States through national plans and will still rely on a methodology to be developed for the monitoring and measuring of progress. How then would the choice of instrument make a difference in this setup?	Additional explanation added at the end of Chapter 8 (under 'Legal form').
(Checklist 8.1) The report should be explicit about when an **evaluation** would be carried out.	Periodic review of progress is expanded in 5.5.5
(Checklist 8.2) The report is not sufficiently clear about how the **overarching target** would be set/calculated and how it would be **monitored**. Section 9 should be more explicit about whether existing legislation requirements would be sufficient and if not what gaps would need to be addressed.	Addressed in Opinion 3.2
(Checklist 9.1) **Stakeholder views** are not sufficiently integrated throughout the report but rather are gathered together in a single section. Section 5.4 does not provide absolute numbers, only percentages, making it difficult to understand the support behind the views presented. It is also not clear what other groups besides the citizens that were mobilised by NGOs think. It would in particular be useful to understand the views of those that will be most affected by the initiative (Member States, land owners, forest managers, farmers, fishers, industry, etc). The different views of stakeholder groups should be presented throughout the report.	As in Opinion 8.
(Checklist 9.2) It is not clear how **implementation challenges** will be addressed with this initiative when it is clearly such a crucial element. Without	See reply opinion 5.1, 5.2

RSB comments	How did we address the comment?
ownership, political commitment and adequate funding, the targets will not be reached. The report should explain this aspect more clearly.	Alex: An explanation on the use of state aid for restoration is added to Annex XII.
(Checklist 9.3) As mentioned in box 6, the report should better explain to what extent the **figures and cost-benefit analyses** it presents are **robust** and what **assumptions or estimates were included.** It should clarify to what extent the estimates and underlying assumptions have been cross-checked with stakeholders, given the 2050/70 timeline.	As in option 6.
(Checklist 9.4) It would be helpful to briefly explain in the report (rather than in the annexes) **how the specific targets were developed**. The impacts on different actors and the distributional effects across Member States should be better explained.	See answer Opinion 4.1
(Checklist 10.1) The report should **provide the main elements to enable the understanding of the situation, the context, the problem, objectives and options**. However, many of the key elements are only in the annexes making it sometimes difficult to understand the robustness of the analysis. Without making the report too long, it would be useful for instance to present an example of **how the targets for a specific ecosystem or habitat have been arrived at.**	See responses Opinion 4.1 Annex IV now includes section on how targets were arrived at.
(Checklist 10.2) The report should provide more explanations to help non-expert readers (e.g. brief explanation on MAES, Aichi Target 15, etc.). The report does not sufficiently explain the various types of actions that would be covered in terms of restoration – when is passive restoration enough? Can it only be applied in specific situations?	Explanation added on Aichi target in 1.1 (in text and footnote). Explanation added on MAES (text box) in 2.1.1
(Checklist 10.3) The section on the upstream support meeting with the RSB and the reproduced meeting minutes should be deleted. Only the recommendations of the Board opinion(s) and how the DG has responded to them need to be reported in Annex 1.	Annex I: Info of upstream RSB meeting and related follow-up table of comments deleted. New follow-up table included.
(Checklist 10.4) The report should be more systematic in presenting the sources when providing figures and findings (section 6.3 may rely on annexes and in turn on the study but it should still show sources for figures it presents). For instance, on page 14 it states that 'costs of inaction are high and are anticipated to increase' – a footnote would be better than a hyperlink as this is a rather important aspect. More generally, the report should use a unique system to reference evidence and studies. In many cases, this is done through hyperlinks, in other cases in footnotes. As	Done across the board as much as possible.

RSB comments	How did we address the comment?
not everyone consults documents in electronic format, the use of footnotes seems preferable.	
(Checklist 10.5) Acronyms should be spelled out at first use.	Done
(Checklist 10.6) The line spacing should be harmonised to the standard 1.15, as foreseen in the impact assessment template.	Done
(Checklist 10.7) In Figure 3 (p.11), it is not clear why the Baltic Sea ecosystem is presented twice, with different assessments of its status.	Fig 3 is replaced by a corrected version (one instance of 'Baltic Sea' corrected into 'Black Sea')
(RSB meeting) Is there evidence that ecosystems beyond the HD are degraded and in need of urgent restoration?	MAES, IPBES, Dasgupta and other reports showed we have big problems beyond Annex I. These are now referenced upfront.

RSB comments in its 2nd Opinion (28 October 2021)	How did we address the comment?
Overall opinion :	
The report is not sufficiently clear on the justification, functioning and performance of some options.	Addressed as detailed below.
The report is not sufficiently specific on some costs and benefits estimates and underlying assumptions.	Addressed as detailed below.
What to improve:	
1. The report should better explain how the overarching legally binding EU target option would be implemented in practice, in particular how effective monitoring, reporting and enforcement would be ensured.	Explanation provided on implementation in practice, including monitoring, reporting and enforcement.
2. The report should explain why it uses the contribution to climate change as a selection criterion for including ecosystems in this initiative. It seems that the EU has already sufficient actions to reach its climate change goals, independently of an additional contribution from this initiative. In particular, the report should better justify why it excludes sparsely vegetated land (which could have high biodiversity potential) into the list of covered ecosystems, while it includes urban ecosystems (which would seem to have 2 limited biodiversity potential).	Climate change: importance and contribution of ecosystem restoration to climate adaptation further elaborated on. In addition, it was already addressed in section 2.1.3 on p18-19 Sparsely vegetated land is no longer excluded from the assessement. As it was added late, only a partial cost-benefit analysis could be included.
3. The report should be clearer when it comes to the reference condition that ecosystems would need to be restored to. It is unclear who would decide on the conversion of various habitats and ecosystems and how this decision would be made. It should explain how trade-offs between (green) policy objectives (e.g. climate adaptation flood prevention measures vs restoration) will be managed.	Explanation inserted, in section 4.2 where reference condition is defined and in section 5.2.2 (on NRPs) on re-establishment.
4. The report should better justify why it considers the option that combines legally binding ecosystem-specific targets with an overarching objective to be	Explanations provided as to why option 4 is clearly more effective and also more proportionate.

clearly more effective than the specific target option only, given that the quantitative comparison scores differ only marginally and that the 2030 Biodiversity Strategy has already set an overarching aspirational objective. It should also better justify why the combination option performs significantly better in terms of proportionality.	
5. The report should be more specific on some costs and benefits estimates and underlying assumptions. On benefits, it should be explicit about precisely what is meant by 'ecosystem services' and the timescales for benefits occurring in the medium and long term. In view of significant differences between the benefit-to-cost ratios with and without the ecosystem service benefits, the report should be clear on the risk that these benefits will not materialise. On costs, the report should clarify the magnitude of the cost increase when referring to delayed action on restoration leading to a requirement for costlier measures. It should be more explicit to what extent it takes into account costs to surrounding ecosystems (e.g. effects of re-wetting peatland on neighbouring agricultural land).	The **method of estimating benefits** of ecosystem services is explained in section 6.3. The **types of benefits** identified are listed per ecosystem. The **risks that these benefits will not be realised** are also explained. An explanation on possible **impacts of restoration on surrounding (agricultural) land** has been included at the end of section 6.4 and annex IV.
6. While the report assumes a 'realistic' level of implementation for the measures included in the baseline, it is not clear whether the same implementation assumption has been made when estimating the costs and benefits of the options. The report has added some useful information on the cost implications at Member State level in the annex. It should briefly explain in the main text how large the difference in effort between Member States would be.	The implications of **less-than-full implementation** are explained and a costs and benefits have been calculated for alternative scenarios of 90%, 80% and 70% implementation. **Cost of implementation at Member State level**: analysis and explanation included at the end of section 6.4.
7. The report should not only report on stakeholder views but also show how the input received has been taken into account. The Board notes the estimated costs and benefits of the preferred option in this initiative, as summarised in the attached quantification tables.	In each of the boxes on stakeholder views, explanation has been added on how this feedback has been taken into account.

Annex II: Stakeholder consultation

Due to its size, the stakeholder consultation synopsis report is provided as a separate document.

Annex III: Who is affected and how?

Practical implications of the initiative

Restoration of ecosystems has been shown to be cost-effective, but **requires investment** that incurs financial and opportunity costs for managers of land and natural resources, who may be compensated through incentives provided by governments and buyers of ecosystem services. Restoration programmes will provide employment and incomes for ecosystem managers and local communities, restoration and remediation businesses, and benefit society and the economy as a whole and sectors which rely on particular ecosystem services.

Social benefits to citizens/society as a whole include **new opportunities for jobs and skills**[10], positive effects on **physical and mental health**[11], enhanced **natural and cultural heritage and identity**[12], enhanced quality and security of **food and water**[13], and **enhanced resilience of communities to climate change and natural hazards**[14].

A failure to act to address the poor and declining state of ecosystems and their services will impact negatively on businesses and citizens across Europe and worldwide, while jeopardising the achievement of climate and wider environmental policy goals.

Who will be affected (see also table III-5):

- The proposed initiative addresses Member States and thus affects primarily authorities at national, regional and local level which play a role in mapping and assessment of ecosystems and their services, and in planning, funding, implementing and monitoring restoration programmes. Likely affected public institutions include environmental, agricultural and climate authorities, statistical offices and research institutes, and agencies dealing with zoning and territorial planning. Impacts differ between EU Member States and mainly depend on the extent of ecosystems on their territories, the levels of degradation and associated magnitude of restoration required, and different levels of costs associated with restoring different types of ecosystems. An overview of total estimated combined costs of implementing the combined proposed restoration targets for Annex I habitats (forests, grasslands, inland and coastal wetlands, rivers & lakes and heaths & scrubs) for each EU Member State is provided in Table III-4 below. The estimated benefits per Member State widely exceed the costs and are presented in Table III-3. The more detailed assessment of costs and benefits per ecosystem are provided in Annex VI. Analytical methods in general are explained in Annex IV.

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[10] *The EU biodiversity objectives and the labour market: benefits and identification of skill gaps in the current workforce*, European Commission, 2012.

[11] *The Health and Social Benefits of Nature and Biodiversity Protection*, IEEP, 2012.

[12] Natura 2000 Cultural heritage.

[13] See footnote 3.

[14] *Ecosystem resilience for mitigation of natural disasters*, Nordic Council of Ministers, August 2017.

- Land managers – including farmers, foresters and nature conservationists – are responsible for the management and restoration of terrestrial ecosystems. The impacts on them can be expected to be both one-off and recurrent, with land managers expected to be impacted by one-off costs (as shown in Table III-5 below) relating to potential, initial changes in land use management practices. Furthermore, the scale of impacts on land managers varies considerably between ecosystems and habitats, and between biogeographic regions. For example for forests, approximately 40 % of the forest area in the EU is publicly owned, and public ownership dominates in most of the Eastern and South-Eastern Member States. As such, incentives to stimulate both private and public actors to implement restorative actions within contrasting Member States will also vary. To incentivise restorative actions by land managers throughout the ecosystems analysed within this Impact Assessment, costs such as those involved in restoration actions, opportunity costs relating possible changes in land use (such as agricultural land impacted by freshwater barrier removals), and changes in the costs related to marketable goods and services all need to be considered (see methodology in Annex IV).

- A range of sectors using and harvesting natural resources – such as fisheries, the water sector and the extractive industries play an important role in sustainable management and restoration. For most of the ecosystems outlined in Table III-5, it can be expected that significant one-off and recurrent costs will be imposed on these stakeholders. In ecosystems which are more intensely managed for resource extraction (such as forests), changes towards 'nature-based' or 'climate smart' management would to some degree depend on the willingness, know-how and adaptability of the sectors. However, extractive industries can also be expected to benefit from restoration actions, such as reduced costs to water purification from reduced water pollution (due to agro-ecosystem and freshwater ecosystem enhanced conditions), enhanced recreation-related revenues, and improved resilience against climate-related impacts.

- Sectors responsible for emissions and discharges to land and water – such as the manufacturing, energy, transport, agriculture and waste treatment sectors – play an important role in enhancing the condition of ecosystems through reduced point source and diffuse pollution. Across all ecosystems, these sectors can be expected to be impacted by restoration needs and actions, to abide to the Polluter Pays Principle. However, as outlined in the bullet below, the costs of complying with environmental regulation can be balanced by a multitude of benefits derived from restoration actions.

- A wide range of sectors and stakeholders benefit from enhancements in ecosystem services. For example, the agri-food sector benefits from an improved condition of soils, water resources and conservation of pollinators; fisheries benefit from enhanced fish stocks and more sustainable marine and freshwater management; water companies benefit from enhanced water purification; property owners, insurers as well as inhabitants benefit from reductions in floods and natural hazards; and the tourism sector benefits from enhanced landscape and biodiversity. Cost-efficiencies can be garnered by such sectors through investing in restoration and nature-based solutions to

comply with environmental legislation whilst also lowering medium-long term operating costs. For example, through investing in improving freshwater condition, the availability of resources extracted from such ecosystems (such as clean water for industrial processes) can be enhanced which can lower operating costs and reduce the likelihood of resource scarcity in the future.

- Society as a whole benefits from increased climate change mitigation and adaptation and from improved disaster risk management.
- The financial sector can contribute to restoration and is also subject to the risks posed to the economy by biodiversity loss and ecosystem degradation, as its investments can be highly dependent on ecosystem services.

Finally, it should be noted that a plethora of tools are currently in place for stakeholders to utilise to achieve the outlined restoration targets in the coming years. In particular, to support the transition to enhanced ecosystem condition and to compensate the stakeholders noted above who may experience foregone income, incentive payments and opportunity costs can be compensated through EU, national, regional, local and private funds. For example, existing payments under the CAP already link payments related to environmental conditions. Such payments can be expected to further increase in their scope and scale due to the enhanced budget under the Multiannual Financial Framework (MFF) towards climate and biodiversity issues. Besides the agreement to invest at least 25% of the EU's expenditure in measures that contribute to climate action, by 2024 7.5% of MFF annual spending is to be directed towards biodiversity objectives - and 10% as from 2026, which will alleviate the costs of transition required by stakeholders to achieve restoration targets. Implementing EU restoration targets would provide a direct contribution to both mainstreaming targets.

Summary of costs and benefits

Table III-1: Overview of benefits of the preferred option – until 2070

Overview of benefits for the preferred option – until 2070 (Present Value)					
	Scenario A (15-40-100% targets for 2030-2040-2050)		Scenario B (30-60-100% targets for 2030-2040-2050)		
Restoration of ecosystem type	**Carbon benefits in EUR million**	**Benefits from all ecosystem services (including carbon) in EUR million**	**Carbon benefits in EUR million**	**Benefits from all ecosystem services (including carbon) in EUR million**	**Beneficiaries and further comments**
Peatlands	10 629	38 702	13 042	47 488	- Entire population and economy through carbon benefits; - Companies and consumers, and the tourism sector.
Marshlands	(na)	6 388	(na)	7 838	
Coastal wetlands	1 091	181 614	1 339	222 842	- EU inhabitants, especially 55.7 million people who are estimated to live in coastal zones by 2060; - Fishers and farmers as well as related value chains.
Forests	3 832	203 564	4 701	249 775	- The economy, including tourism/ recreation sectors, and conservation organisations, especially in rural economies.
Agro-ecosystems	17 073	229 589	18 624	250 451	- Farmers and the agricultural sector benefit from improved soils quality, reduced soil erosion and soil compaction, greater abundance of pollinators, etc.
Steppe, heath and scrub	3 971	24 191	4 722	28 768	- Tourism sector, farmers. - Society and the economy, through the delivery of enhanced ecosystem services
Rivers, lakes and alluvial habitats	(na)	862 349	(na)	1 053 042	- Local populations through increased safety and house prices due to decreased flood risk potential - Water suppliers and consumers through overall reduced water pollution and increased availability - Recreational users of freshwater ecosystems through greater access to previously restricted areas (due to barrier removal) and enhanced aesthetic values - Society at large through enhanced ecosystem services.

Overview of benefits for the preferred option – until 2070 (Present Value)					
	Scenario A (15-40-100% targets for 2030-2040-2050)		**Scenario B (30-60-100% targets for 2030-2040-2050)**		
Sub-total	***36 596***	***1 546 397***	***42 428***	***1 860 204***	This excludes benefits for non-Annex I habitats as well as marine, urban, soils and pollinators.
Marine	(na)	(na)	(na)	(na)	No monetary estimates available. However, EU citizens and economic sectors (e.g. fishing/ aquaculture/ tourism/ energy) benefit in terms of climate change mitigation as well as improved biodiversity, water quality and land and seascapes.
Urban	(na)	(na)	(na)	(na)	No monetary estimates available. However, urban dwellers would experience benefits in terms of flood prevention, biodiversity, human health, property values, air and water pollution as well as climate (e.g. heat control)
Soils	(na)	(na)	(na)	(na)	No monetary estimates available. However, citizens and farmers would experience benefits in terms of climate change mitigation, biodiversity, flood risk mitigation, water quality control, sustainable use of rewetted land, erosion control, increased crop yields and productivity, soil organic carbon, and soil fertility
Pollinators	(na)	(na)	(na)	(na)	No monetary estimates available. However, EU citizens, farmers and related supply chains as well as beekeepers would experience benefits in terms of crop and plant pollination, natural biological control, decomposition of organic matter, tourism, and culture and aesthetics.

Notes:

- The general method for assessing the benefits is described in Annex IV. Details of the calculations for the individual ecosystem types are provided in Annex VI.
- Benefits until 2070 are given to take into account the benefits from restoration measures undertaken up to 2050, especially in the final years, of which benefits would only be visible beyond 2050. The figures presented are the sum of the present value of annual benefits flows, applying a social discount rate of 4%.

- The overview includes monetary estimates for benefits for many of the ecosystem services, depending on the availability of monetary data. Estimates are mostly only possible for HD Annex I habitats, because of the difficulty of quantifying the extent of ecosystem restoration needed for other ecosystems. This means that the benefits for targets that extend beyond Annex I are not included, among which, marine, urban, soils and pollinators.
- Moreover, some benefits of ecosystem services are difficult, if not impossible, to be captured in monetary terms for all the ecosystem categories, such as the intrinsic value of nature and species, moral, aesthetic, spiritual and socio-cultural benefits and relational values with nature.[15] These can be important and sometimes decisive in decision making and need to be considered in addition to the monetary benefits.
- Annex VI provides for some ecosystem types a range of minimum and maximum monetary benefits; in such instances the overview above includes the average.
- Although the 2050 target aims to restore 100 % of the habitat, the estimation of costs and benefits is for 90 % restoration as this is the maximum percentage that can be expected in practice for most ecosystems.

Table III-2: Overview of costs of the preferred option – until 2070 (Present Value)

Overview of costs for the preferred option – until 2070					
Action	**One-off costs in EUR million**	**Annual costs in EUR million**	**Total in EUR million for scenario A**	**Total in EUR million for scenario B**	**Comments**
Costs for restoration and maintenance per ecosystem type for both Member States and businesses					
Peatlands			4 779	5 125	These restoration and maintenance costs include re-creation costs and foregone income losses for businesses for Annex I habitats. The sub-total excludes non-Annex I habitats as well as marine, urban, soils and pollinators.
Marshlands			3 643	3 721	
Coastal wetlands			5 141	5 852	
Forests			50 082	53 850	
Agro-ecosystems			26 559	27 732	
Steppe, heath and scrub			3 051	3 111	
Rivers, lakes and alluvial habitats			35 232	40 211	
Sub-total			***128 487***	***139 602***	

[15] See the following resources for more information: Valuing nature's contributions to people: the IPBES approach - ScienceDirect; EUNCA_SynthReport_4_2_CSERGE_Year2_190115_sent.pdf (europa.eu); The IPBES Preliminary Guide on Multiple Values of Nature (aboutvalues.net)

Overview of costs for the preferred option – until 2070					
Action	**One-off costs in EUR million**	**Annual costs in EUR million**	**Total in EUR million for scenario A**	**Total in EUR million for scenario B**	**Comments**
Marine, urban, soils, pollinators			(na)	(na)	Quantitative cost estimates are not available
Costs for enabling measures for Member States					
Surveys of ecosystems	1 099				
Development of national restoration plans	12.8				
Development of methodologies and indicators (5 ecosystems)	6.6				
Administration of restoration measures		438.3			
Monitoring of restored ecosystems		20.6			
Reporting progress against restoration targets		0.1			
Sub-total	***1 118.4***	***459***			
Costs from 2022 to 2050	***1 118.4***	***12 854***	***13 972.4***	***13 972.4***	
Total costs: restoration, maintenance and enabling measures					
Total			***142 459.4***	***153 574.4***	This excludes restoration and maintenance costs for non-Annex I habitats, and marine, urban, soils and pollinators, as well as opportunity costs of potential land use changes (e.g. turning grassland into an industrial site).

Notes:

- The general method for assessing the costs is described in Annex IV. Details of the calculations for the individual ecosystem types are provided in Annex VI and for the enabling measures/administrative impacts in Annex VII section 4.

- All cost 'actions' are foreseen to be undertaken up to 2050, except for maintenance costs, which extend to 2070. The figures presented represent the sum of the present value of annual costs, applying a 4% annual social discount rate.
- Monetary figures can mostly only be estimated for HD Annex I habitats, because of the difficulty of quantifying the extent of action required for other ecosystems, which means that the costs for targets that extend beyond Annex I are not included, among which, costs for and marine, urban, soils and pollinators.
- Costs for enabling measures are given only for scenario A but are foreseen to be virtually the same for scenario B; under scenario B most of these costs would be borne in earlier years whereas under scenario A more costs would be borne later. In Annex XII the average of both scenario A and B is taken to arrive at a total estimate of costs, which means that the total cost figures may differ slightly from figures in this table.
- More precise cost figures for each ecosystem can be found in Annex VI. Annex VI provides for some ecosystem types a range of minimum and maximum costs; in such instances the overview above includes the average.
- A qualitative assessment of costs for different stakeholder groups is provided in table III-5.

Table III-3: Estimated annual benefits of Ecosystem Restoration and Maintenance, by Member State, 2022-2050 (€m)

The table presents estimates of annual benefits of ecosystem restoration and maintenance over the 2022-2050 period, for those ecosystems for which full benefits assessments have been made, and for which data on the extent and condition of ecosystems in each Member State are available. The benefits estimates presented are those under the option to restore 15% of ecosystems by 2030, 40% by 2040 and 90% by 2050. The benefits are greater under the 30%, 60% and 90% option, because earlier restoration of ecosystems delivers larger aggregate benefits over the 2022-2050 period. The benefits estimate breakdowns are based on data provided by the European Environment Agency on the extent of each ecosystem in each Member State.

The figures exclude estimates for Romania, owing to uncertainties regarding the true extent and condition of ecosystems in that Member State.

The benefits estimates relate to the increase in total ecosystem services for each ecosystem. As they are expressed as annual averages to 2050, they give slightly different benefit cost ratios than obtained by comparing the present value of benefits and costs to 2070.

The aggregate benefits across these seven ecosystem types average €64 billion per annum for the EU27. The largest benefits are enjoyed by France (€14.6bn), Finland (€9.7bn) and Spain (€7.9bn) the Member States with the largest areas of these ecosystems. The distribution of benefits differs slightly from costs, as the benefit cost ratios for some ecosystems (e.g. coastal wetlands and freshwaters) are higher than for others (e.g. forests), so Member States with the largest area of those high benefit ecosystems benefit disproportionately.

There are significant variations in the costs for different ecosystems across Member States, with the distribution of benefits mirroring that for costs, as discussed in Table III-4 below.

Factors affecting the overall benefit estimates by Member States are:

- The extent of each ecosystem in each Member State, particularly for ecosystems with high benefit cost ratios such as coastal wetlands and freshwaters;
- The condition of each ecosystem in each Member State. Some Member States (e.g. Austria, Germany, Greece, Italy, Sweden) have relatively large areas of some ecosystems but also record a relatively small proportion to be in not-good condition, such that benefits of restoration and maintenance are relatively low compared to ecosystem area.

	Coastal wetlands	Freshwaters	Forests	Grasslands	Heath, steppe & scrub	Peatlands	Total
AT	7	690	47	27	1	1	774
BE	16	494	84	35	-	2	631
BG	17	306	0	288	18	0	630
CY	1	17	17	1	2	-	38
CZ	0	242	44	74	-	1	361
DE	731	1,594	89	166	1	13	2,595
DK	2,271	761	49	79	-	10	3,171
EE	6	380	23	25	-	15	449
ES	426	1,932	2,209	2,851	515	6	7,939
FI	381	7,327	613	5	272	1,094	9,694
FR	854	7,517	3,350	2,752	93	52	14,618
GR	352	154	18	14	3	-	541
HR	0	352	1	269	-	0	622
HU	300	785	136	170	0	1	1,392
IE	437	1,259	1	144	4	76	1,922
IT	87	1,626	236	437	33	5	2,424
LT	-	1,001	25	41	-	15	1,081
LU	-	3	0	29	-	-	32
LV	15	471	27	82	-	17	611
MT	0	0	-	1	1	-	2
NL	894	123	6	30	-	2	1,056
PL	496	4,124	316	1,020	1	24	5,981
PT	3	43	26	766	67	11	915
RO	-	-	-	-	-	-	-
SE	228	4,191	802	400	-	260	5,881
SI	0	226	116	73	1	0	415
SK	0	97	195	179	2	0	473

EU 27	**7,522**	**35,715**	**8,431**	**9,963**	**1,015**	**1,603**	**64,249**

Table III-4: Estimated annual costs of Ecosystem Restoration and Maintenance, by Member State, 2022-2050 (€m)

The table presents estimates of annual costs of ecosystem restoration and maintenance over the 2022-2050 period, for those ecosystems for which full cost estimates have been made, and for which data on the extent and condition of ecosystems in each Member State are available. The cost estimates presented are those under the option to restore 15% of ecosystems by 2030, 40% by 2040 and 90% by 2050. The average annual costs for the 30%, 60% and 90% option are similar, but they are more evenly phased over the period. The cost breakdowns are based on data provided by the European Environment Agency on the extent of each ecosystem in each Member State.

The figures exclude estimates for Romania, owing to uncertainties regarding the true extent and condition of ecosystems in that Member State.

The aggregate costs across these seven ecosystem types average €7.4 billion per annum for the EU27. The largest costs are incurred in France (€2.1bn), Spain (€1.5bn) and Finland (€0.9bn), the Member States with the largest areas of these ecosystems.

There are significant variations in the costs for different ecosystems across Member States. For example, the largest costs for each ecosystem are, in order of magnitude, as follows:

- Coastal wetlands - Denmark, the Netherlands, France and Germany;
- Fresh waters – France and Finland;
- Forests – France and Spain;
- Grasslands – Spain and France;
- Heath, steppe and scrub – Spain and Finland;
- Peatlands – Finland and Sweden.

Factors affecting the overall cost estimates by Member States are:

- The extent of each ecosystem in each Member State;

- The condition of each ecosystem in each Member State. Some Member States (e.g. Austria, Germany, Greece, Italy, Sweden) have relatively large areas of some ecosystems but also record a relatively small proportion to be in not-good condition, such that costs of restoration and maintenance are relatively low compared to ecosystem area.

	Coastal wetlands	Freshwaters	Forests	Grasslands	Heath, steppe & scrub	Peatlands	Total
AT	0.3	44.0	15.5	4.1	0.4	0.2	64.5
BE	0.7	31.5	27.5	5.2	-	0.3	65.3
BG	0.7	19.5	0.0	43.5	5.6	0.0	69.4
CY	0.1	1.1	5.4	0.2	0.6	-	7.3
CZ	0.0	15.4	14.2	11.2	-	0.1	41.0
DE	31.6	101.6	29.1	25.0	0.4	1.9	189.6
DK	98.2	48.5	16.0	11.9	-	1.5	176.2
EE	0.2	24.2	7.4	3.8	-	2.2	38.0
ES	18.4	123.1	720.6	430.3	157.6	0.9	1 450.9
FI	16.5	467.0	200.1	0.8	83.3	163.5	931.2
FR	36.9	479.1	1 092.7	415.4	28.5	7.7	2 060.3
GR	15.2	9.8	5.8	2.2	1.0	-	34.0
HR	0.0	22.4	0.3	40.6	-	0.0	63.4
HU	13.0	50.0	44.5	25.7	0.1	0.2	133.4
IE	18.9	80.2	0.5	21.8	1.2	11.3	134.0
IT	3.7	103.7	76.9	65.9	10.2	0.7	261.1
LT	-	63.8	8.1	6.3	-	2.2	80.3
LU	-	0.2	0.0	4.3	-	-	4.5
LV	0.6	30.0	8.9	12.4	-	2.5	54.4
MT	0.0	0.0	-	0.2	0.2	-	0.4
NL	38.7	7.8	2.0	4.6	-	0.3	53.4
PL	21.4	262.8	103.1	154.0	0.3	3.6	545.3
PT	0.1	2.7	8.4	115.7	20.4	1.6	148.9
RO	-	-	-	-	-	-	-

SE	9.9	267.1	261.5	60.4	-	38.8	637.6
SI	0.0	14.4	37.7	11.0	0.2	0.1	63.3
SK	0.0	6.2	63.6	27.0	0.6	0.1	97.5
EU 27	**325.2**	**2 276.3**	**2 749.8**	**1 503.6**	**310.5**	**239.6**	**7 405.0**

Table III-5: Costs for different stakeholders

Darker blue indicates higher costs: significant-, moderate- and some impact (non-monetary costs/impacts are also taken into account).

		Public Authorities		**Farming/forestry sectors**		**Fishing sector**		**Nature Managers**	
		One-off	Recurrent	One-off	Recurrent	One-off	Recurrent	One-Off	Recurrent
Inland wetlands and peatlands	Re-wetting at least 25 % of HD Annex I peatland habitat area degraded due to drainage								
	Restore all HD Annex I peatland habitat area to good condition								
	Re-create the area necessary to achieve Favourable Conservation Status of HD Annex I peatlands								
	Restore and re-create area to improve status of EU-protected species associated with inland wetlands and peatlands								

	Peatland converted to cropland- Reduce by 15 % the area of managed or drained organic soils that are losing carbon								
Forests	Restore all HD Annex I forest habitat area to good condition								
	Restore and re-create area to achieve FCS of EU protected species associated with forests								
	Restore degraded non-Annex 1 habitats forest area to a good condition								
Steppe, heath and scrub	Restore all HD Annex I steppe, heath and scrub habitats to good condition								
	Re-create habitat area required to achieve FCS of HD Annex I steppe, heath and scrub habitats								
	Maintain, restore and re-create steppe, heath and scrub habitats as necessary to achieve FCS of EU protected species associated with steppe, heath and scrub								
Agro-ecosystems	Restore all HD Annex I agricultural habitats to good condition								

	Re-create additional habitat area required to achieve FCS of HD Annex I agricultural habitats								
	Restore and recreate agro-ecosystems as necessary to increase the populations of common farmland birds as measured by the common farmland bird indicator								
	Restore and recreate agro-ecosystems as necessary to achieve the secure status of birds that are predominantly associated with agro-ecosystems								
	Maintain, restore and re-create agro-ecosystems as necessary to achieve FCS of EU protected species associated with agro-ecosystems								
	Restore or recreate semi-modified and seminatural grassland								
	Restore or recreate unploughed / untilled grassland to replace historic losses								
Rivers, lakes and alluvial habitats	Restore all HD Annex I freshwater and alluvial habitat area to good condition								

	Re-create area as necessary to achieve FCS of HD Annex I rivers, lakes, and alluvial habitats								
	Develop an inventory of barriers to longitudinal and lateral connectivity of rivers and a detailed plan of which barriers will be removed, to achieve free-flowing status where possible and necessary to restore the habitats depending on such connectivity								
	Mapping out of small water units, identify their restoration and recreation potential and assess their contribution to improve connectivity between habitats as part of high diversity landscape features, contributing to the restoration of habitats and species.								
Marine	Restore EU marine habitats, prioritizing Annex I habitats.								
Coastal wetlands	Restore all HD Annex I wetland habitat to good condition								
	Re-create area as necessary to achieve FCS of Annex I wetland habitats								

	Restore and re-create the area to enhance the conservation status of EU protected species associated with coastal wetlands								
Urban	No net loss of green urban space, including tree canopy cover, by 2030, compared to 2021, within each LAU containing cities, towns and suburbs; A national average increase in the area represented by green urban space, including tree canopy cover, across LAUs containing cities, towns and suburbs, of at least 3% of the total area of these LAUs by 2040 and at least 5% of the total area of these LAUs by 2050, compared to 2021**.**								
	A minimum of 10% tree canopy cover in each LAU containing cities, towns and suburbs by 2050.								
Soils	Package of measures to conserve and increase SOC in organic soils under agricultural use								
	Package of measures focused on improving SOC on forest soil								

Pollinators	Target to restore 30-60-90 % of Annex I habitats to good condition in grasslands, heaths and scrub, wetlands, and forests categories, with no additional actions specifically targeted at pollinator conservation								
	Target to reverse trends in pollinators listed in the EU Habitats Directive								
	All necessary restoration and re-creation actions taken to restore pollinator populations by 2030, including through the following intermediate actions:								

Annex IV: Analytical methods

For many ecosystems there are data gaps and it can be difficult to specify all aspects of an ecosystem to a high degree of accuracy – rather, it is possible to make key observations, identify salient features, predict trends, estimate risks and costs and benefits, based on a range of sources. This can be in contrast to other policy areas where more information is readily available in numerical, monetary form, or where extensive simulation models exist, in areas such as climate change. This underlines the need to anchor work on the best available data sources. These include information resulting from the reporting requirements the Birds- and Habitats Directives (BHD), Water Framework Directive (WFD), and the Marine Strategy Framework Directive (MSFD), as well as the work on the Mapping and Assessment of Ecosystem Services (MAES), and others.

It is for these reasons that this impact assessment is based on a balance of qualitative and quantitative approaches and estimates, both in the development of the baseline and trends, as well as the costs and benefits of specific options. This is in keeping with many reports on the state and evolution of nature or ecosystems. Moreover, when it comes to making estimates of costs and benefits, as outlined in chapter 6 and annexes VI and XII, this can only partially be based on numerical values and numerical monetary estimates. This is not only due to the lack of data of certain costs and benefits, but also because some of the values of nature may not be reducible to monetary terms alone.

Evidence base and methodology to develop the specific targets:

The following describes how the evidence base and methodology used to develop the specific targets, and how stakeholder views were integrated in the process:

1. A first workshop with EU Member State experts in December 2020 provided evidence of the need and support for both an overarching target/objective, as well as specific targets focussing on specific ecosystems or species groups.
2. To develop specific targets that would address practically all ecosystems in a systematic manner, it was decided to use a categorisation of main ecosystem types in the EU. This was based on extensive work of MAES (Mapping and Assessment of Ecosystems and their Services), which categorises the main ecosystem types in the EU and reviews their state, trends, services and the pressures they are exposed to.
3. Some proposals for specific targets had already been developed and were described in the Biodiversity Strategy for 2030, for example on reversing the decline of pollinators, or that fee flowing rivers should be restored.
4. A stakeholder workshop was held in February 2021 to explore initial ideas for targets for each of the main ecosystem types, based on the requirement defined in

the Biodiversity Strategy to 2030. At the workshop only some initial concepts for further targets emerged; however, there was confirmation that targets for specific ecosystem types were needed, and that these, if possible, should be based on areas to be restored. Some stakeholder groups had developed more detailed ideas for topics for specific targets in background papers, in particular by environmental NGOs (e.g. WWF, the EEB and Birdlife International).

5. Building on the above, a number of meetings were held to discuss the specific targets making use of extensive in-house DG Environment expertise, for all ecosystem types. This helped develop further concepts for targets such as on free-flowing rivers, marine ecosystems, wetlands, forests, heathland and scrub, soils, urban and others. Targets relating to Annex I habits tended to fall into one group with similar characteristics, and non-Annex one related targets into another. This was because extensive data is available for Annex I related targets, and less so for the other group.
6. Meetings were also held with the EEA and the JRC on suggestions across the range of potential specific targets.
7. DG Environment then made an analysis and listing of the various targets proposed. Subsequently, requests were made to the EEA and the JRC to further assist with the descriptions and definitions of these. For example, requests for the EEA to develop fiches on Annex I related targets estimating area potential percentage based on MS data. The JRC also contributed to developing fiches for targets for other ecosystems such as for soils and urban ecosystems. Based on this a list and detailed description of targets to be impact assessed was developed and forwarded to the contractor for further analysis.
8. Some adjustments and fine-tuning to all these targets were also made with the contractors as part of the impact assessment study. As part of the study, an analysis fiche was developed for each main ecosystem type and for all targets proposed therein.
9. A second stakeholder workshop held in April further explored views on definitions and the need for an overarching target.
10. To gain further feedback on the targets from stakeholders, the specific targets were presented to stakeholders at a third stakeholder workshop in May 2021. At this workshop, no objections were raised to the targets proposed, however several questions remained on their detailed form and their foreseen implementation. Therefore a fourth stakeholder workshop in September 2021 provided for an overall presentation or all the targets and more detailed feedback on the specific targets proposed.

Approach to thematic assessments:

Given the significant differences in the characteristics of broad ecosystem types, their condition and restoration needs, and required measures to meet them, at the start of the impact assessment process the assessment was subdivided in ten thematic areas. For each

of them a targeted impact assessment was undertaken in line with guidance on impact assessments in the EU better regulation toolbox. The selection of these areas was based on the 12 broad ecosystem types under the MAES typology, with some slight modifications: Grassland and cropland were merged in a single assessment for agro-ecosystems, and wetlands were split into two separate assessments for inland wetlands (marshland and peatland) and coastal wetlands (in which marine inlets and transitional waters were included). For (deeper) coastal, marine shelf and open ocean ecosystems a single marine assessment was undertaken. Sparsely-vegetated lands were excluded from the assessment for their relatively low relevance for the objectives of the legally-binding initiative. In addition, two more cross-cutting thematic assessments were added for soil ecosystems and pollinators given their particular importance in supporting healthy ecosystems.

In close cooperation between experts from the European Commission (including the JRC), EEA and the contractor preparing the impact assessment study, for each ecosystem type the current extent, condition, and high-impact pressures and threats were identified through desktop study (seen Annex VI and VIII). For the baseline assessment, informed assumptions were then made on their likely future development including through modelling trends of the last 10-20 years towards 2030 in line with the EU Ecosystem Assessment. Where necessary these were further underpinned by detailed reporting data especially from the State of Nature Reporting (Art 12 Birds Directive & Art 17 Habitats Directive), reporting under the WFD (in the case of rivers & lakes and coastal wetlands) and MSFD (in the case of the marine assessment) as well as other sources such as other EU-wide environmental indicators on relevant pressures and threats such as climate change effects, water- and air pollution. In addition, baseline assessments for each ecosystem type included an evaluation of realistic levels of restoration action to be expected towards 2030 (and in more general terms 2040 and 2050) for example in the framework of the above-mentioned EU Directives. This information was obtained from extensive evidence on progress made in restoration in the evaluation of the EU Biodiversity Strategy to 2020, implementation reports, recent fitness checks of EU nature- and water legislation, findings from implementing the EU Action Plan for Nature, People and the Economy, recent impact assessment studies of related initiatives such as the EU climate law and -adaptation strategy, evaluation reports of key cross-cutting policies such as the EU's Common Agricultural- and Fisheries policies, recent evidence on nature and green infrastructure investment plans of Member Status outlined in the Prioritised Action Frameworks for Natura 2000, foresight studies on the development of key socio-economic trends such as urbanisation and rural depopulation as well as on key economic sectors such as agriculture and forestry, and expert judgement on the impact of recent EU decisions for example on the EU's Multi-annual Financial Framework (MFF).

Given the large diversity of restoration needs and -challenges within each broad ecosystem type, and possible target options to address them, a screening exercise was undertaken to identify the most suitable ones. This screening involved a first assessment on the relevance to the three core objectives of the legally-binding initiative: Biodiversity (primary) and climate change mitigation- and adaptation (secondary), as well as the enforceability of target options (e.g. is a target based on existing legal commitment) and a preliminary cost-

benefit analysis. Based on this assessment, target options were screened in or out. Where possible, targets were considered that could build on existing EU-wide legal commitments and the monitoring & reporting systems underpinning them, especially under the Nature Directives, the MSFD and WFD. For screened-in targets, a second assessment was made if the target could be introduced immediately ('Step 1' target) or whether it would require more preparatory work e.g. on definitions, indicators, monitoring & evaluation, baseline etc. ('Step 2'). On target options shortlisted for 'Step 1', a detailed impact assessment was undertaken. After the short-listing of viable options, a selection was made of combinations of target options that were as much as possible complementary and mutually exclusive, to avoid overlap in assessment of impacts as much as possible in case of combined targets.

In the thematic assessments, the costs and benefits of meeting each short-listed target for Step 1 were then quantified in monetary terms as far as possible. The estimation of costs and benefits for the different restoration targets is based on available evidence in scientific literature on the key costs and benefits of the different measures that can or must be taken to achieve the restoration target. References to these sources of evidence are provided in the supporting thematic assessments. The analysis is thus not based on any particular simulation or predictive model.

Quantitative Assessment: The cost analysis involved estimating the areas of each ecosystem requiring restoration, re-creation and maintenance, taking into account a baseline assessment of pressures, planned environmental actions and other drivers of change to 2030. The areas requiring restoration, re-creation and maintenance were then multiplied by an appropriate unit cost per hectare. The unit costs employed were based on a review of EU wide evidence on ecosystem management costs. The most comprehensive source of data was the study of the costs of implementing Target 2 of the EU Biodiversity Strategy (Tucker, et al, 2013)[16] which formed the basis of the costings for many of the targets. The costings assumed that all degraded ecosystems would require annual maintenance from 2022, to prevent further degradation, and that restoration and re-creation action would be phased over the period 2022-2050 in line with the targets for 2030, 2040 and 2050.

All costs were expressed in EURO at 2020 prices. Opportunity costs relating to land management practices are included where the per hectare costs include payments for income forgone (e.g. reduced agricultural yields from meeting ecosystem restoration objectives). However, the opportunity costs of potential development/land use change are not included. Administrative costs are estimated separately under the enabling measures.

The benefits assessment valued the benefits of ecosystem restoration by estimating the cumulative area of each ecosystem restored/ re-created and applying a best estimate of the

[16] Tucker, Graham; Underwood, Evelyn; Farmer, Andrew; Scalera, Riccardo; Dickie, Ian; McConville, Andrew; van Vliet, Wilbert. (2013) Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy. Report to the European Commission. Institute for European Environmental Policy, London. https://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/Fin%20Target%202.pdf

value of benefits per hectare. The unit benefits estimates were derived from a wide-ranging evidence review of the benefits of ecosystem restoration for each ecosystem type. This selected representative estimates of the value of ecosystem service benefits resulting from ecosystem restoration. For most ecosystems it was possible to identify two unit values, one for the value of carbon storage/sequestration benefits and one for increases in total ecosystem service values. In each case the analysis used the median value per hectare from the range of estimates available, converted where necessary to EURO and updated to 2020 prices.

Some caution is needed in interpreting these benefits estimates, particularly for those ecosystems (such as coastal wetlands) where values vary widely by location, and the range of available benefits estimates is large. The use of median values gives more conservative estimates than mean values. In general, estimates of carbon benefits are less variable and more certain than those of wider ecosystem service values, because they vary less by geography. For example, the flood management benefits of restoring a wetland vary widely according to its location relative to people and property, while the carbon benefits are more even. For most ecosystems, there are large differences between carbon values and total ecosystem service values, because of the high values of other ecosystem services (e.g. flood management, water purification, recreation and other cultural services) as well as the value of biodiversity itself. In many studies these are combined in overall estimates of the public's willingness to pay for ecosystem restoration and related services. This is especially true of coastal wetlands and freshwaters. Benefit values for carbon alone, where available, provide a conservative estimate of the benefits of ecosystem restoration.

The comparison of benefits and costs estimated the time profile of annual costs and benefits over the period 2022-2070, recognising that restoration and re-creation would take place up to 2050 but that benefits would continue to accrue after 2050. Maintenance costs were estimated for the whole 2022-2070 period. The present value of costs and benefits was calculated by discounting annual values using a social discount rate of 4%. The net present value of benefits (sum of discounted benefits – sum of discounted costs) and benefit/cost ratio (sum of discounted benefits/sum of discounted costs) was calculated in each case.

Ecosystem services and -benefits

Based on an extensive review of literature of the value of benefits of restoration (see summary table below), benefits estimates for each broad ecosystem type were made which identified changes in the values (per hectare) of ecosystem services for restored versus degraded ecosystems. Median values per hectare were taken from per hectare estimates given in different relevant literature sources for carbon storage and sequestration and total ecosystem service values (so including carbon benefits). This provided per hectare benefits estimates for each ecosystem type.

A broad scope was taken to the estimation of total benefits, while avoiding overlaps, to obtain as full a picture of total benefits as possible. The types of benefits accounted for are similar between ecosystems, with some differences mostly caused by differences in services provided between different ecosystems and the scope of available studies on

which median estimates were based. However due to the significant number of studies consulted, differences between studies will have levelled out in the final estimates. The table below provides an overview of benefits identified beyond biodiversity and carbon benefits which were assessed for all ecosystem types, as well as the number of studies consulted to obtain a per hectare benefits estimate.

The benefits estimates per hectare were then applied to the area of ecosystem restored to give annual estimates of total benefits. Annual costs and benefits were estimated over the period 2022 -2070, recognising that, while restoration takes place to 2050, further maintenance costs continue beyond that date, while restored ecosystems continue to provide benefits into the future. Annual cost and benefit estimates were discounted, applying a 4% social discount rate, and summed to calculate their total present value. This enabled total net present value (benefits – costs) and benefit: cost ratios to be calculated.

Types of key benefits identified and number of studies used to estimate per hectare benefits

Note: The list of benefits is non-exhaustive and excludes biodiversity conservation and carbon sequestration & storage benefits which were identified and assessed for each ecosystem type.

Ecosystem type/target	Types of benefits identified	Number of studies used to estimate per ha benefits
Inland wetlands	Flood alleviation; water quality improvements; recreation- and other cultural services.	22
Coastal and other saline wetlands	Storm surge mitigation; protection against coastal erosion; water filtration; fish stock restoration; recreation and other cultural services.	13
Forests	Timber products and non-timber forest products, water- and soil quality, flood prevention, increased resilience against natural disturbances (droughts, fires, pests, and diseases); recreation- and other cultural services.	Meta-analysis by De Groot et al (2013), which was based on 58 source studies
Agro-ecosystems	Food and fibre; water quality; flood management; pollination; soil quality; erosion control; climate regulation; cultural services (recreation, landscape, aesthetic values).	>50
Steppe, heath and scrubland	Erosion control; water quality; flood management; fire prevention; food and fibre; cultural services (recreation, landscape and existence values).	15
Rivers, lakes and alluvial habitats	Fresh water; fisheries; genetic resources; waste treatment; water quality; flood management; soil quality; cultural services (landscape, aesthetic, inspirational and recreational).	>30 Total ecosystem service benefits of river and lake restoration from de Groot et al (2020). Bankside ecosystems based on analyses for grassland and forest ecosystems.
Marine ecosystems	Flood mitigation, erosion control, water quality, food and fibre (including indirectly through fish stock regeneration), recreational services.	No full quantified benefits estimate could be made because of data gaps, but the assessment identified monetised benefits for 3 out of 8 key habitat types

		in focus (seagrass beds, kelp & macro-algal forests, and shellfish beds).
Urban ecosystems	Health and wellbeing; cooling and insulation (e.g. against urban heat island effect); recreation; food- and fibre; flood risk reduction; water quality; air quality, noise reduction, property value.	No full quantified benefits estimate could be made because of data gaps and large contextual differences. However the assessment identified a range of qualitative benefits and positive cost-benefit ratios from EU-wide and regional/local studies on urban tree and -green spaces limiting on a narrow set of benefits only (e.g. urban heat island effect).
Soil ecosystems	Water quality; flood risk mitigation; drought risk mitigation; pest control; reduced input costs; soil subsistence and -degradation prevention (and herewith resilience of food- and fibre).	No full quantified benefits estimate could be made because of data gaps, but the assessment identified and described qualitatively a wide range of benefits and various examples of positive cost-benefit ratios.
Pollinators	Sustainable provision of animal-pollinated crops and associated benefits; healthy ecosystems dependent on the diversity of wild animal-pollinated plants (and wide-range of regulating ecosystems based on them); cultural, aesthetic, wellbeing.	No full quantified benefits estimate could be made because of data gaps, but the assessment identified and described qualitatively a range of benefits to stakeholders.

Risks that potentially limit the benefits of ecosystem restoration

There are a range of risks that the estimated benefits will not be realized. These risks are listed in the table below.

Type of risk	**Consequence**	**Mitigation**
Implementation risk – targets are not implemented as specified	Failure to implement the targets will mean that full benefits of restoration will not be realised. Costs will also be reduced, so benefit cost ratios should still be favourable.	Accompanying measures – communications, guidance, incentives – will be required to support implementation. Legal enforcement measures can be applied if necessary. The B:C analysis assumes that only 90% of ecosystems will in practice be restored by 2050.
Technical risk – restoration actions fail to achieve target condition, because of scientific uncertainties; failure to undertake appropriate actions; adverse effects of climate, pollution, invasive species etc.	Failure to restore ecosystem to good condition will mean that anticipated benefits for biodiversity and ecosystems are not realised. Costs will still be incurred, and may exceed benefits.	Knowledge sharing, provision of advice, guidance and technical support, monitoring and adaptive actions can help to reduce risk
Ecosystem service risk – even if ecosystems are restored to good condition, they may not deliver anticipated benefits to people – e.g. because benefits occur in places remote from people and property	Locational factors may mean that the value of benefits may be less than anticipated – e.g. few recreational visitors are attracted, water is purified in places where it is not consumed, flooding is reduced in areas of low population; biodiversity and	Locational variations in benefits need to be understood. Benefits assessment has applied median values, which is more conservative than applying mean or maximum values.

	global climate benefits may still be realised.	
Temporal risks – risk that delays in achieving good ecosystem condition and associated enhancements in ecosystem services will reduce the overall value of benefits delivered.	Costs are normally incurred before benefits are realised. Time preference means that delays in securing benefits will reduce the present value of benefits, and may cause them to be outweighed by costs.	Linked to mitigation of technical risks, as above. Prioritising restoration of ecosystems that take longest to recover (e.g. woodland and species rich grasslands) increases the probability of benefits being delivered within a specified timescale.
Financial risks – even if benefits are fully realised, additional costs of restoration may impact B:C ratios	Higher than anticipated costs could mean benefits exceed costs in some locations	Linked to mitigation of technical risks, as above. Understanding variations in costs and benefits, and reflecting this in restoration plans, is important.

Overall, these risks are significant, particularly because of the range of scientific uncertainties, locational variations and environmental factors that influence the effectiveness of ecosystem restoration and its benefits and costs. However, they can be mitigated through application and sharing of best available evidence; a robust approach to restoration planning; guidance, technical support and skills development; and monitoring and adaptive management. **The high benefit:cost ratios estimated for each ecosystem type, with benefit:cost ratios ranging from 4:1 to 38:1, leave a sufficient margin to ensure that ecosystem restoration will be efficient even if benefits are less than anticipated.**

Although in theory the EU should aim to restore all degraded ecosystems by 2050, and targets should align with this goal, **in practice complete implementation is unlikely to be achievable.** Some sites may be inaccessible, face insurmountable technical barriers to restoration, be adversely affected by external pressures such as pollution, be earmarked for changes in land use, or be subject to disputes between land owners, managers and the authorities. If full implementation is not achieved, there will be a reduction in costs as well as benefits, such that benefit:cost ratios will still be favourable. The analysis for the impact assessment assumed that **restoring 90% of degraded ecosystems could be regarded as a realistic level of full implementation.** The benefit: cost analyses are therefore based on a 90% restoration target by 2050.

A failure to restore 90% of the area of degraded ecosystems by 2050 would reduce both the benefits and costs of ecosystem restoration. The table below estimates the present value of the benefits and costs of restoration of different ecosystem types, based on achievement of 90% restoration by 2050, and if lower (70% or 80%) rates of restoration are achieved.

Benefits and costs of achieving different levels of restoration by 2050, Scenario A (Present Value, EUR million)

	90% restoration by 2050			80% restoration by 2050			70% restoration by 2050		
Restoration of ecosystem type	**Benefits**	**Costs**	**Net Benefits**	**Benefits**	**Costs**	**Net Benefits**	**Benefits**	**Costs**	**Net Benefits**
Peatlands	38 702	4 779	**33 923**	34 402	4 248	**30 154**	30 102	3 717	**26 385**
Marshlands	6 388	3 643	**2 745**	5 678	3 238	**2 440**	4 968	2 833	**2 135**
Coastal wetlands	181 614	5 141	**176 473**	161 435	4 570	**156 865**	141 255	3 999	**137 257**
Forests	203 564	50 082	**153 482**	180 946	44 518	**136 428**	158 328	38 953	**119 375**
Agro-ecosystems	229 589	26 559	**203 030**	204 079	23 608	**180 471**	178 569	20 657	**157 912**
Steppe, heath and scrub	32 658	9 198	23 460	29 029	8 176	20 853	25 401	7 154	**18 247**
Rivers, lakes and alluvial habitats	862 349	35 232	**827 117**	766 532	31 317	**735 215**	670 716	27 403	**643 313**
Subtotal	**1 554 864**	**134 634**	**1 420 230**	**1 382 101**	**119 675**	**1 262 426**	**1 209 339**	**104 716**	**1 104 623**

The present value of the quantified net benefits is estimated to total €1,418 billion if 90% of these ecosystems are restored by 2050, but would fall to €1,260 billion if only 80% of ecosystem area were restored, or €1,102 billion if only 70% ecosystem restoration were achieved.

The costs of ecosystem restoration are incurred immediately, while the benefits for biodiversity and ecosystem services are realised only when restored ecosystems reach good condition. Evidence indicates that **the time profile of benefits is non-linear and varies between ecosystems**, with some habitats being easier and quicker to restore than others. For example a review by Maskell et al (2014)[17] found that some freshwater wetlands can be effectively restored within five years, but may take longer to regain their full biodiversity. Other habitats such as calcareous grasslands and some woodlands may take more than 100 years to be restored to their full biodiversity value. Within each habitat, some aspects of ecosystem functioning and services are likely to return before others. For example, restoration of blanket bog may achieve improvements in hydrology, carbon storage and even recolonization of vegetation within three years, but may take 20-50 years to restore full vegetation communities. It follows that some ecosystem services may be enhanced immediately while others will take longer to recover. The benefits analysis for this impact assessment estimates the present value of future flows of benefits; however, this is inevitably subject to a range of uncertainties.

Impacts on areas surrounded by ecosystems in which restoration measures are taken

[17] Maskell L, Jarvis S, Jones L, Garbutt A and Dickie I (2014) Restoration of natural capital: review of evidence. Report to the Natural Capital Committee, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/517024/ncc-research-restoration-natural-capital-review.pdf

The assessment did not quantify indirect costs of restoration measures that could be occurred in areas outside of ecosystem areas in which measures would be taken. The reason for this was that such 'external' negative impacts of measures identified would likely be relatively limited.

One possibly more significant indirect impact identified was that of rewetting of inland wetlands on neighbouring areas under intensive arable- or grazing agriculture. These impacts would be similar as those assessed for inland Annex I habitats, and would require different management practices by private landowners and land managers, in return for incentive payments which include compensation for opportunity costs relating directly to land management (e.g. income forgone through reduced yield or grazing). As explained in Annex III, such practices and incentive schemes are in place, as well as public budgets to support their increased uptake.

The rewetting of inland wetlands could locally present significant indirect opportunity costs for agriculture in some areas, especially in small wetland sites surrounded by intensive agriculture where mitigation measures to avoid seepage are not in place. However their inclusion in the cost-benefit analysis would unlikely have made a significant difference on the overall cost estimate. This is because they represent only a small share of the total area of inland wetland ecosystem considered in the assessment.

Considering the very positive benefit to cost ratios of nature restoration across the different ecosystem types, even if external costs excluded would nonetheless significant, they would likely still be (far) outweighed by larger benefits and would not have changed the overall findings of the assessment. Inland wetland rewetting for example could also have positive impacts on water availability for agriculture during droughts likely to increase with climate change in most regions.

Opportunity costs: Opportunity costs of implementing the nature restoration targets were considered for all thematic assessments and included in calculations to some extent. Any effort to restore nature comes with an opportunity cost to certain alternative development pathways, particularly at local level. However, because of the many potential alternatives it is impossible to provide a full and systematic assessment, taking account of overall effects, especially as one would also need to consider the opportunity cost of not restoring ecosystems. Instead, the assessments focussed only on the most significant costs of restoration measures in the field that would be required by economic operators such as farmers, foresters and fishermen.

Ecosystem restoration that requires voluntary action will not be achieved unless adequate compensation for opportunity costs is provided since economic operators will not restore ecosystems if the payments to do so do not compensate them for opportunity costs of reduced production. Where the costs of ecosystem restoration are met through incentive payments to land managers, the latter are compensated for opportunity costs (payment for income forgone). Under EU agricultural policy, these incentives are already in place in the

form of agri-environment-climate schemes and -investments, which could be made more attractive to farmers with supplementary eco-schemes. Therefore, the additional opportunity costs of new nature restoration targets will largely be accounted for if available budgets and tools are used effectively. Opportunity costs of land use change due to re-creation were not included in the cost calculations, since a large share of habitat can be re-created on land that already has a nature function and this would mainly require a higher restoration effort compared to habitat that still meets Annex I standards. Where land would change owner and/or function, this is nearly in all cases the result of voluntary selling or abandoning of land and was therefore not regarded as an opportunity cost to operations.

The cost estimates in the thematic ecosystem assessments therefore include direct opportunity costs resulting from changes in land management practices, and reflected in incentive payments to land managers. Examples include income forgone from reduced grazing intensity on heathland, wetland and grassland ecosystems; creation of new habitats such as wetlands, heathlands, forests and grasslands through conversion of cropland and pasture land; reduced timber harvest from forests; and restrictions on fishing activity in coastal wetlands. In each case these are incorporated in per hectare unit costs of ecosystem restoration, re-creation and maintenance.

Only in a few thematic impact assessments uncompensated opportunity costs were identified in cases where nature restoration would be mandated through bans rather than incentives. These mainly include rules limiting fishing effort and rules preventing soil sealing in cities. Estimating these costs is difficult since rules lead to adaptive management and often deliver more efficient solutions in the longer term. For example, evidence shows how partial restrictions in fishing efforts in marine protected areas have triggered more efficient fisheries management and enhanced longer-term yields and overall ecosystem health around these areas. Under the EMFAF, the structural fund; that supports the implementation of the CFP, resources are available to compensate for short-term losses due to reduced catches and support investments in e.g. adaptive and more selective fishing gears and techniques or scientifc research. For the restoration of estuaries and mud- & sandflats, nonetheless specific costs were included to phase out the most harmful (shell)fishing practices from Annex I habitats, based on experiences in the Wadden Sea.

Uncompensated opportunity costs were also identified in the urban thematic assessment and for target options to prevent soil sealing and increase urban tree cover. Implementing these targets would require very different choices in land use in urban areas, with potentially very high costs (and benefits) depending on the location and alternative land use. These costs and benefits can be expected to vary very widely across urban areas in the EU, given the wide variations in the scale, density, format and design of urban areas between countries and regions, as well as differences in land prices and development patterns. Assessing the overall costs and benefits of land use change across the entire urban environment is too complex and impossible with the current evidence base, and therefore not quantified in the assessment.

Qualitative assessment: For the thematic assessments for marine-, urban- and soil ecosystems and pollinators, full monetary assessments could be not developed at the same

level as for assessments underpinned by detailed data on the extent and condition of Annex I habitats. Nonetheless the assessments could make informed qualitative assessments based on extensive meta- and case study evidence describing costs and benefits both on biodiversity as well as range of ecosystem services including climate action. Some of this evidence included quantified cost-benefit data too. For example, in the marine environment the relatively limited number of available studies on restoration cost-benefit-analysis suggested that restoring marine habitats record an average benefit-cost ratio of 10, comparable to ratios found in the more detailed assessments for terrestrial habitats. Similarly, while little quantified evidence was available to assess the additional benefits of restoration action for soils and pollinator populations, even conservative estimates of total benefits are so high that even a relatively limited improvement in condition would compare favourably against the estimated cost of restoration measures to implement the target options. In the urban environment, available monetised evidence of benefits of restoration e.g. by tree cover reducing heat island effects is arguably the most extensive and overwhelming, even though biodiversity and climate mitigation benefits would be more limited. In summary, the absence of aggregated monetary cost and benefit calculations for four of the thematic assessments has a methodological reason and should not be misinterpreted as meaning that target options assessed in them would therefore stand out less positively in terms of their net benefit to EU policy objectives.

Annex V: Specific targets considered for the main ecosystem types

For targets in step 1 marked with (*) it is likely that finalising the measurement methodology and establishing a baseline would be ready by 2023. Given that negotiations with Parliament and Council on the proposal would last until at least mid-2023, these could be in principle included in the legislative proposal.

Targets in step 2 are indicative. Further targets, not listed here may also be considered for step 2.

POTENTIAL TARGETS AND OBLIGATIONS	
STEP 1	**STEP 2**
WETLANDS (incl. Peatlands, marshlands & coastal wetlands)	
• Restore all HD Annex I wetland habitat area to good condition, with all necessary restoration measures completed on 30 % (or 15 %) of degraded areas by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050[18]. • Recreate 30 % (or 15 %) of additional habitat area required to achieve favorable conservation status of HD Annex I wetland habitats by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds associated with wetlands in view of achieving their favourable conservation status by 2050, with at least 30 % achieved by 2030 and at least 60 % by 2040[19].	
Target option discarded as a result of the Impact Assessment (explanation in annex VI): • General habitat restoration and re-creation of marshlands • Recreate salt marshes (excluded as specific targets as largely covered under HD Annex I target). • Phasing out bottom-disturbing (shell-)fishing in Natura 2000 sites.	
FORESTS	
• Restore all HD Annex I forest habitat area to good condition, with all necessary restoration measures completed on 30 % (or 15 %) of degraded areas by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Recreate 30 % (or 15 %) of additional habitat area required to achieve favorable conservation status of HD Annex I forest habitats by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds associated with forests in view of achieving their favourable conservation status by 2050, with at least 30 % achieved by 2030 and at least 60 % by 2040. • Achieve a continuously improving trend of each of the following indicators, until satisfactory levels are achieved or until new	Restore degraded non-HD Annex I **forest** habitat areas.

[18] The percentages between brackets represent an alternative (slower) rate of restoration. See explanation in section 6.3.

[19] As peatland species are well covered as regards their habitat, this target focuses particularly on species of marshlands and coastal wetlands.

POTENTIAL TARGETS AND OBLIGATIONS	
STEP 1	**STEP 2**
targets are in place: deadwood, age structure, forest connectivity, tree cover density, abundance of common forest birds, soil organic carbon in forest land.	
AGRO-ECOSYSTEMS AND GRASSLANDS	
• Restore all HD Annex I agricultural habitat area to good condition, with all necessary restoration measures completed on 30 % (or 15 %) of degraded areas by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Recreate 30 % (or 15 %) of additional habitat area required to achieve favorable conservation status of HD Annex I agricultural habitats by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • To increase the populations of farmland birds as measured by the common farmland bird index re-set at 100 at year X [one year after the entry into force of this Regulation] to: o 110 by 2030, 120 by 2040 and 130 by 2050, for Member States with historically depleted populations of farmland birds; o 105 by 2030, 110 by 2040 and 115 by 2050, for Member States that do not have historically depleted populations of farmland birds. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds associated with agro-habitats and grassland in view of achieving their favourable conservation status by 2050, with at least 15 %/30 % of all necessary actions carried out by 2030 and 40 %/60 % by 2040 and 100 % 2050. • For drained peatlands under agricultural use, to put in place restoration measures, including rewetting, on at least: o 30% of such areas by 2030 of which at least a quarter is rewetted; o 50% of such areas by 2040 of which at least half is rewetted, and o 70% of such areas by 2050 of which at least half is rewetted. • Achieve a continuously improving trend of each of the following indicators: o grassland butterfly index; o organic carbon content in cropland mineral soils; until satisfactory levels are achieved or until the new targets are in place; and o share of agricultural land with high-diversity landscape features until 2030, with the view to achieving the EU commitment to bring back at least 10% of agricultural area under high-diversity landscape features by 2030; o percentage of species and habitats of Union interest related to agriculture with stable or increasing trends until 100% is reached at the latest by 2050.	• Restore and recreate **semi-modified and semi-natural grasslands.** • Restore and recreate **unploughed / untilled grasslands.**
Target option discarded as a result of the Impact Assessment (explanation in annex VI): • Increasing landscape features in the farming landscape to a minimum coverage of 10 %.	
STEPPE, HEATHLANDS & SCRUB, DUNES AND ROCKY HABITATS	
• Restore all HD Annex I steppe, heath and scrub, dunes and rocky habitat area to good condition, with all necessary restoration measures completed on 30 % (or 15 %) of degraded areas by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Recreate 30 % (or 15 %) of additional habitat area required to achieve favorable conservation status of HD Annex I steppe, heath	

POTENTIAL TARGETS AND OBLIGATIONS	
STEP 1	**STEP 2**
and scrub, dunes and rocky habitats by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds and associated with steppe, heath and scrub, dunes and rocky habitats in view of achieving their favourable conservation status by 2050, with at least 30 % (or 15 %) of all necessary actions carried out by 2030 and 60 % (or 40 %) by 2040 and 100 % by 2050.	
FRESHWATER: RIVERS, LAKES AND ALLUVIAL HABITATS	
• Restore all HD Annex I rivers, lakes and alluvial habitat area to good condition, with all necessary restoration measures completed on 30 % (or 15 %) of degraded areas by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Recreate 30 % (or 15 %) of additional habitat area required to achieve favourable conservation status of HD Annex I rivers, lakes and alluvial habitats by 2030, 60 % (or 40 %) by 2040 and 100 % by 2050. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds associated with rivers, lakes and alluvial habitats in view of achieving their favourable conservation status by 2050, with at least 15 % achieved by 2030 and at least 40 % by 2040. • Develop an inventory of barriers to longitudinal and lateral connectivity of rivers and a detailed plan of which barriers will be removed, with a view to achieving free-flowing status where possible and necessary to restore the habitats depending on such connectivity. • Mapping out of small water units, with a view to identify their restoration and recreation potential and assess their contribution to improve connectivity between habitats as part of high diversity landscape features, contributing to the restoration of habitats and species.	• Numerical target on the restoration of free flowing rivers.[20] • Restoration of small water units.
Target option discarded as a result of the Impact Assessment (explanation in annex VI): • Implement standardised ecological flow assessments.	
MARINE ECOSYSTEMS	
• • To put in place the necessary restoration measures to improve all areas that are not in good condition to good condition in specified marine habitat types, with measures put in place on at least 30 % of such areas by 2030, on at least 60 % of such areas by 2040, and on at least 90 % of such areas by 2050[21]: a. HD Annex I marine habitats (sub-types of Annex I habitat types, such as seagrass beds, macro-algal forests, sponge, coral and coralligenous beds, maerl beds, shellfish beds, vents and seeps);	• Target on **specific marine animal species**.

[20] This is related to the target in step 1 which requires Member States to develop inventories of barriers to longitudinal and lateral connectivity of rivers and a detailed plan of which barriers will be removed, with a view to achieving free-flowing status where possible and necessary to restore the habitats depending on such connectivity. This will contribute to achieving the voluntary target of the BDS2030 of 25 000 km of free flowing rivers. As part of step 2, a more exact approach to setting a numerical target on free-flowing rivers, including lateral and longitudinal aspects, would be developed.

[21] It is important to bear in mind the long time periods to restore certain marine ecosystems, thus this proposed target is based on putting necessary measures into place by 2030 and with the aim of arriving at good condition beyond 2030.

POTENTIAL TARGETS AND OBLIGATIONS	
STEP 1	**STEP 2**
b. Marine habitats outside HD Annex I (such as marine shelf sediments). • To put in place the restoration measures necessary to re-establish those habitat types on at least 30 % of the additional area needed to reach the favourable reference area of each group of habitat types by 2030, at least 60 % of such areas by 2040, and 100 % of such areas by 2050; • To put in place restoration measures for the habitats of marine species listed in Annexes II, IV and V of the HD and Annex I to Regulation 2019/1241 and of wild birds covered under Birds Directive, that are needed to improve the quality of those habitats, re-establish those habitats and create sufficient connectivity among those habitats corresponding to the ecological requirements of those species.	
Targets discarded as a result of the Impact Assessment (explanation in Annex VI): • To restore habitats in order to maximise the delivery of key ecosystem services. • Restore and re-create the area as necessary to enhance the conservation status of species listed in Annex II, IV and V of the Habitats Directive as well as wild birds associated with marine ecosystems in view of achieving their favourable conservation status by 2050, with at least x % achieved by 2030 and at least y % by 2040.	
URBAN ECOSYSTEMS	
• To ensure that there is no net loss of urban green space, and urban tree canopy cover by 2030, compared to 2021, within all cities and towns and suburbs; • To ensure that there is an increase in the total national area of urban green space in cities and towns and suburbs of at least 3 % of the total area of cities and towns and suburbs in 2021, by 2040, and at least 5 % by 2050. In addition Member States shall ensure: i. a minimum of 10 % urban tree canopy cover in all cities and towns and suburbs by 2050; and ii. a net gain of urban green space that is integrated into existing and new buildings and infrastructure developments, including through renovations and renewals, in all cities and towns and suburbs.	
Targets discarded as a result of the Impact Assessment (explanation in Annex VI): • No net soil sealing in Functional Urban Areas by 2030.	
POLLINATORS	
• **Reverse the decline of pollinators (*):** This target relates in particular to the following ecosystems: agro-habitats and grasslands, wetlands, forests and heathlands & scrub.	
Targets discarded as a result of the Impact Assessment (explanation in Annex VI): • To achieve good condition of pollinator species protected by the EU Habitats Directive. • To achieve good condition of pollinator habitats protected by the EU Habitats Directive.	
An EU wide methodology for assessing the condition of ecosystems would be established.	

Annex VI: Analysis by ecosystem

This (large) annex is provided as a separate file. It provides input to Chapter 6 on policy option 3.

Annex VII: Description, trends and impacts of the main options

This annex mainly serves as input for Chapter 6 on policy options 1 (baseline) and 2 (overarching goal).

1 BASELINE

This chapter describes, based on monitoring evidence on the state of ecosystems, previous experience in restoration governance and expert judgement, the likely evolution of ecosystems' condition and nature restoration developments in the EU towards 2030 (and to some extent 2040 and 2050) *in the absence of legally binding EU nature restoration targets*. To forecast the likely evolution and impacts of this baseline scenario is necessary so that these can be compared against the impacts of the different additional policy options (including targets) considered in Chapter 5.

The EU had set itself a voluntary nature restoration target between 2011 and 2020 and is implementing several pieces of environmental legislation that contribute to nature restoration as part of meeting specific ecological objectives; in particular these include the implementation of the EU Birds and Habitats Directives, the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) and existing climate laws. In addition, some EU Member States have additional national policies and strategies requiring nature restoration. Lastly, the EU Green Deal and initiatives such as the EU Biodiversity Strategy to 2030 include a series of new commitments that would also contribute to nature restoration, in a direct or in an indirect manner. Reporting data and recent evaluations of the state of implementation of these activities to date provide a key source for this baseline assessment. It is important to underline that in the baseline scenario, "implementation" of relevant policies, voluntary commitments and legislation is interpreted as "realistic", i.e. as based on expected implementation by Member States and based on experience to date. This therefore does not interpret this as the full and complete implementation of these policies. This chapter then describes the likely predicted evolution of the baseline scenario for the next decade(s) considering realistic estimates of policy implementation, as well as the likely evolution of biophysical developments, such as for example, based on the predicted effects of climate change.

1.1 EU nature restoration under Business as Usual

1.1.1 Implementation EU Nature Directives, WFD and MSFD

Nature restoration in the EU stems from both voluntary and mandatory commitments, but is mostly driven by EU and national legislation that sets concrete ecological objectives. At EU level, four Directives set such objectives: The EU Birds- and Habitats Directives, the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD). As mentioned in Chapter 3, progress in implementing these four key EU laws in the future contributes to determining the level of additional action required on nature restoration in the EU.

There is good ground to argue that in the period towards 2030 the **Nature Directives** will see enhanced implementation compared to 2010-2020: firstly, the designation of the Natura 2000 network is nearing completion on land, which could free up resources in national and regional administrations towards the management of the sites. Secondly, as mentioned in section 3.1.1, the Nature Directives include specific requirements that Member States should take the necessary conservation measures to ultimately achieve and maintain Favourable Conservation Status of protected habitats and species, which in many cases will include ecological restoration especially in Natura 2000 sites. In recent years significant efforts on developing site-specific objectives- and measures including restoration measures have been made, which is an important prerequisite for the effectiveness of their implementation22. The better articulation of needs in management planning has also supported investment planning, and EU Member States in their Prioritised Action Frameworks for Natura 2000[23] and beyond have communicated much more comprehensively the full investment needs to achieve objectives. This in turn will support the justification for providing such funding under the CAP or Regional Development. However, experience has shown the challenges of providing funding, even in EU Member States in which such needs were clearly articulated[24].

However, as the Nature Directives lack legal deadlines for the achievement of their objectives, an important defining factor in the pace of implementation will be the political ambition to achieve sooner rather than later the Directives' objective to reach Favourable Conservation Status and, obviously, the funding available for the necessary action, including in relation to the necessary investments for strengthening knowledge and administrative capacity.

With the absence of legal deadlines, there would continue to be a weak driver for action to achieve the objectives of the Nature Directives. Furthermore, concerning the Habitats Directive, for Annex I habitats and habitats of Annex II species outside Natura 2000, there is no specific provision on restoration, albeit the achievement of the directive's objective would require this to happen. The same goes for species listed in Annex IV and V of the directive, for which no specific restoration provisions are set, despite the objective to maintain or restore them, at favourable conservation status. The same goes for the Birds Directive which includes some provisions on restoration mainly related to bird species for which Member States are to classify, protect and conserve Special Protection Areas (part of the Natura 2000 network) (species listed in Annex I of the directive as well as regularly occurring migratory species not listed in Annex I). The vast amount of land and sea covered by habitat types and habitats of species of EU importance, including birds, makes it difficult to achieve restoration objectives without explicit legal requirements in areas outside protected areas.

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[22] See for example: EEA (2020) Management effectiveness in the EU's Natura 2000 network of protected areas. Available at: https://www.eea.europa.eu/publications/management-effectiveness-in-the-eus

[23] European Commission webpage on financing Natura 2000: https://ec.europa.eu/environment/nature/natura2000/financing/index_en.htm

[24] See for example Olmeda C. et al for the European Commission (2016) Integration of Natura 2000 and biodiversity into EU funding. Available at: https://ec.europa.eu/environment/nature/natura2000/financing/docs/Natura2000_integration_into_EU %20funds.pdf

For the **Water Framework Directive**, there is some reason to believe that implementation may increase compared to progress between 2010 and 2020. Firstly, in 2027 the Directive's final deadline for extending the achievement of good status of water bodies will be reached, after which it becomes legally more challenging for Member States to push implementation action into the future[25]. Secondly, the Fitness Check of EU Water Legislation has reconfirmed the WFD's added value, uncovered important priorities for improved implementation action, and has provided more legal certainty for the years to come[26]. Nonetheless, early reviews of draft management plans for the WFD's 3rd cycle (2021-2027) suggest that despite some exceptions, foreseen progress on restoration -and towards the WFD's objectives more general- will remain slow due to numerous exemptions and insufficient integration and -investment[27]. While WFD implementation would bring further active passive restoration benefits, they would likely be largely insufficient to restore the structure and function of relevant freshwater, coastal and marine ecosystems required to meet the objectives of the EU Biodiversity Strategy to 2030.

For the **Marine Strategy Framework Directive** implementation may improve towards 2030, however since the Directive has only existed since 2008 it is more challenging to forecast the extent of future improvements. The implementation report on the first management cycle highlighted numerous implementation challenges, and the European Commission has announced a review[28]. Evidence suggests that unless there will be a significant increase in investments, there is little likelihood that implementation will see a very different trajectory than in recent years.

In 2017 the European Commission commissioned a study which included a quantitative assessment of the amount of restoration undertaken in the then EU28 between 2010 and 2017 (Eftec et al)[29] which is currently the best indication available of baseline restoration extent under a situation of a voluntary EU-wide restoration target. The study provided estimates of average **annual EU area** on which restoration action had been taken based on both binding and voluntary commitments and for different ecosystem types. By projecting into the future, the annual area on which restoration action has taken place as estimated by Eftec et al, it is

[25] European Commission (2019) COM(2019) 95 final on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC). Second River Basin Management Plans and First Flood Risk Management Plans. Available at: https://ec.europa.eu/environment/water/water-framework/impl_reports.htm

[26] European Commission (2019) SWD(2019) 439 final on the Fitness Check of the Fitness Check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive. Available at: https://ec.europa.eu/environment/water/fitness_check_of_the_eu_water_legislation/index_en.htm

[27] E.g. Schmidt G. & Rogger M. for Living Rivers Europe (2021) The final sprint for Europe's rivers. Available at: https://wwfeu.awsassets.panda.org/downloads/wwf_the_final_sprint_for_rivers_full_report_june_2021_1.pdf

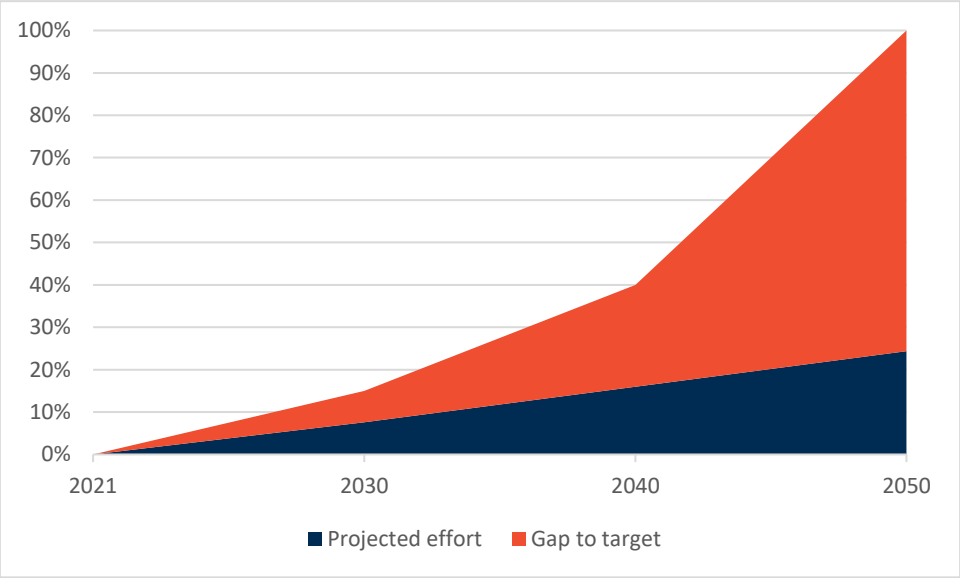
[28] European Commission press release of 25 June 2020 'More protection for our seas and oceans is needed, report finds'. Available at: https://ec.europa.eu/environment/news/more-protection-our-seas-and-oceans-needed-report-finds-2020-06-25_en

[29] eftec et al., (2017) Technical support in relation to the promotion of ecosystem restoration in the context of the EU Biodiversity Strategy to 2020. Available at: https://ec.europa.eu/environment/nature/pdf/promotion_of_ecosystem_restoration_in_the_context_of_the_EU_biodiversity_strategy_report%20.zip

possible to extrapolate the extent of ecosystems that – at the same pace and the same relative effort per ecosystem – would see restoration action in the future. **This extrapolation shows that restoration measures would only reach a fraction of total ecosystem extent, or 0,71% by 2030, 1,50% by 2040 and 2,30% by 2050.** When only **considering only the binding share** of restoration action extent found by Eftec et al, which are the ones most likely to actually deliver on biodiversity conservation objectives, **these shares are only 0,31%, 066% and 1,01%** respectively. When comparing the binding restoration extent against the best estimate of degraded area of Annex I habitat, action would cover less than 2% by 2030, 4% by 2040 and 6% by 2050. As Figure VII-1 shows, even if assuming the Eftec study had only identified 25% of the actual restoration action undertaken and all real action would have been fully targeted to Annex I habitats, there would still be a significant remaining effort gap of more than 75% by 2050. The ecosystem-specific Impact Assessments supporting this overall assessment provide more detailed baseline information per ecosystem (see executive summaries in Annex VI).

Figure VII-1: Projected restoration effort (extent) based on Eftec et al and remaining gap to 15-40-100% HD Annex I targets

Note: This figure assumes that Eftec et all only identified 25% of actual restoration action in the then EU28, and the total effort towards the targets reflects the best-estimate total area of degraded Annex I habitats in the EU27 based on the last conservation status reporting under the EU Habitats Directive (Art 17 reporting)[30].



1.2. Socio-economic developments

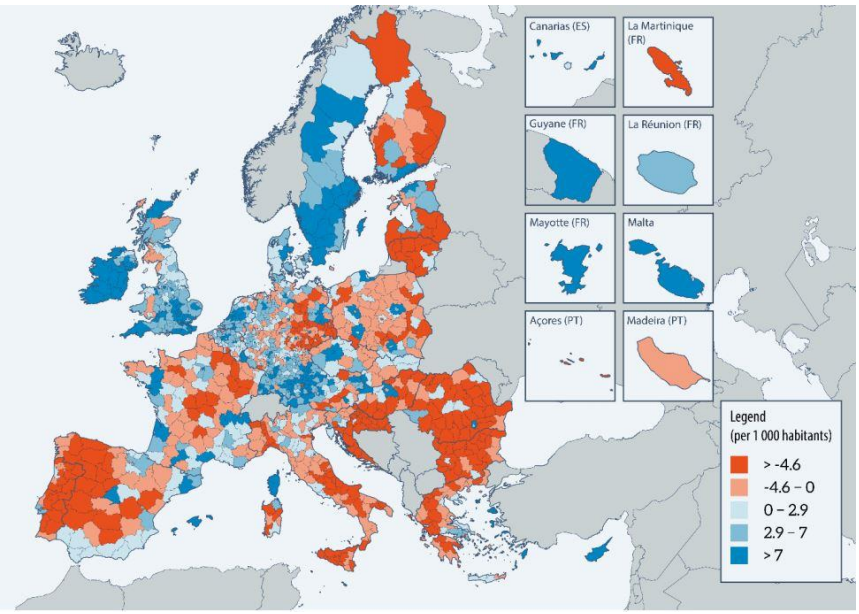
1.2.1. Demographic trends

For the period to 2030 no major changes in demographic trends are foreseen compared to today. Population growth is slowing, but the EU population is still expected to grow to 2030 and likely to 2050, after which it will gradually shrink. Further ageing and depopulation will continue to

[30] Available at: https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/explore-nature-reporting-data

impact on rural areas across the EU, while urban areas are expected to continue to see new population growth. Both urban and rural areas offer different opportunities and challenges for nature restoration depending on the regional context. The ongoing rural exodus will further increase pressure in many regions on the conservation of high-nature value farmland as traditional land management practices disappear. In other regions, land abandonment will offer opportunities for natural vegetation to recover with limited 're-wilding' management. The share of population living in cities will continue to grow from approximately 75 % today to nearly 84 % by 2050[31].

Figure VII-2: Crude rate of total population change in NUTS 3 regions, 2018



Source: Eurostat

1.2.2. Post-COVID recovery

The impacts of the COVID crisis on the EU economy should not be underestimated and may depress the priority given by EU Member States to environmental policy objectives as happened after the European sovereign debt crisis. However, based on expert evidence available when writing this study[32][33], thanks to more decisive public policy and -fiscal measures, the economic outlook is slightly more optimistic than previously envisioned, and growth and employment are expected to recover to pre-crisis levels in 2022. However, these predictions come with significant uncertainties as well as differences between different EU Member States and regions.

[31] UN Department of Economic and Social Affairs (2018) 2018 Revision of World Urbanization Prospects. Available at: https://population.un.org/wup/

[32] European Commission Spring 2021 Economic Forecast: https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/spring-2021-economic-forecast_en

[33] OECD (2021) EA and EU Economic Snapshot - Economic Forecast Summary (May 2021). Part of OECD Global Economic Outlook. Available at: https://www.oecd.org/economy/euro-area-and-european-union-economic-snapshot/

1.3. Expected trends in ecosystem extent and condition

1.3.1. Ecosystem extent

Based on trends over the last decade and foreseen trends in key land use defining indicators[34], we do not expect major changes in ecosystem extent in comparison to the current situation. We therefore did not make any adjustments in our baseline scenario in changes of extent.

1.3.2. Cross-cutting pressures & threats

As explained in section 2.2, because of the diversity in ecosystem types in the EU and differences in what constitutes their good condition, an ecosystem-specific approach was taken to assessing impacts for this study. This included in depth evaluation of key pressures and threats preventing recovery today and into the future as well as their drivers, which are at the root of ongoing ecosystem degradation and risk undermining future restoration efforts. The outcomes of these detailed analyses can be found in the ecosystem-specific technical supplements. Brief summaries of these analyses are included in Annex VI. An important source of EU-wide information on pressures on ecosystems is the reporting under the EU Habitats and Birds Directives. Under the latest reporting round, Member States reported over 67 000 individual pressures in over 200 different pressure categories. The results show that agriculture remains the most common pressure and threat on species and habitats, followed by urbanisation, forestry and the modification of water regimes.

The impacts of climate change on ecosystems are rising, are increasingly understood and reported. The EU Ecosystem Assessment[35] succinctly describes the known estimated potential impacts, which are mainly driven through changing temperature and precipitation patterns. In most parts of Europe, drought frequency will increase (Figure VII-3), heavy precipitation events will increase in winter across Europe and in northern Europe in summers too (Figure VII-4). Longer fire seasons and periods of precipitation shortages will significantly increase the risk of forest fires, also in regions where it has not been a nature feature of local forest ecosystems (Figure VII-5). While these changes in trends are increasing at a relatively slow pace compared to some other more direct anthropogenic pressures, recent evidence shows they are accelerating and will be an important factor in restoration success towards 2030 and certainly 2040 and 2050.

[34] For example, in relation to food and farming, see: European Commission (2021) EU agricultural outlook for markets, income and environment. Available at: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agricultural-outlook-2020-report_en.pdf

[35] Section 4.1 of the chapter on cross-cutting ecosystem assessments deals specifically with climate change. Maes, J et al (2020) Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment. Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC120383

Figure VII-3: Projected change in meteorological drought frequency between the present (1981-2010) and the mid-century 21st century (2041-2070) in Europe, under two emissions scenarios (RCP4.5 and RCP8.5) Source: EEA, 2019[36]

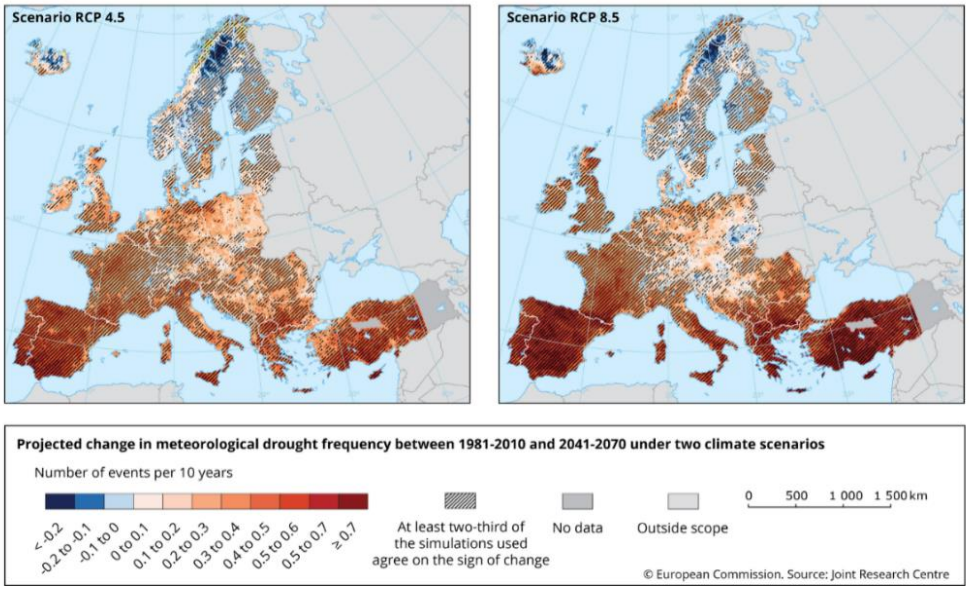
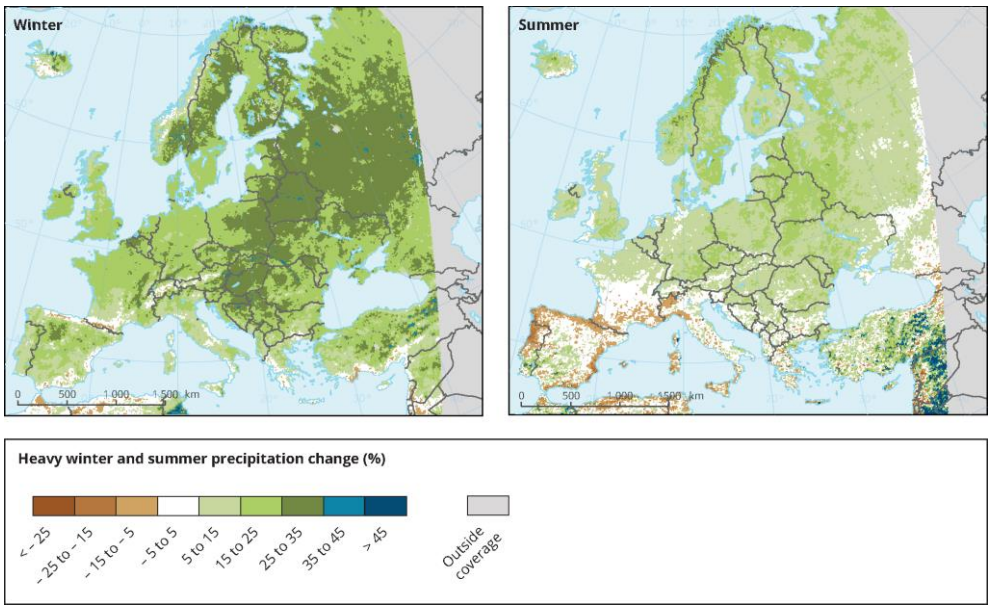


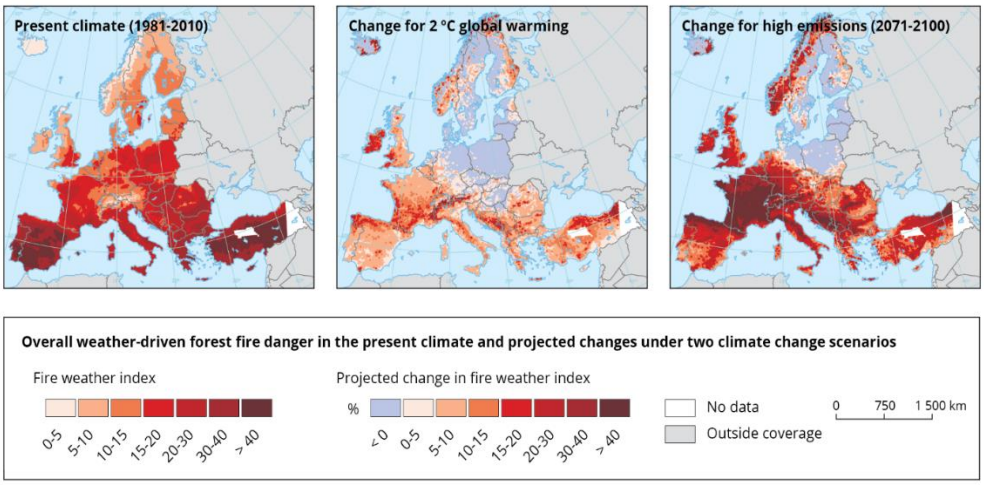
Figure VII-4: Projected changes in heavy precipitation in winter and summer. Projected changes in heavy precipitation (in %) in winter and summer from 1971-2000 to 2071–2100 for the RCP8.5 scenario based on the ensemble mean of different regional climate models (RCMs) nested in different general circulation models (GCMs). Source: EEA, 2019[37]



[36] EEA (2019a) 'Heavy precipitation in Europe. Available at: https://www.eea.europa.eu/data-and-maps/indicators/precipitation-extremes-in-europe-3/assessment-1. Accessed: 29 April 2021.

[37] EEA (2019b) Meteorological and hydrological droughts in Europe. Available at: https://www.eea.europa.eu/data-and-maps/indicators/river-flow-drought-3/assessment

Figure VII-5: Forest fire danger in the present climate and projected changes under two climate change scenarios, one reaching 2°C of warming and another high emissions scenario. Source: EEA, 2019

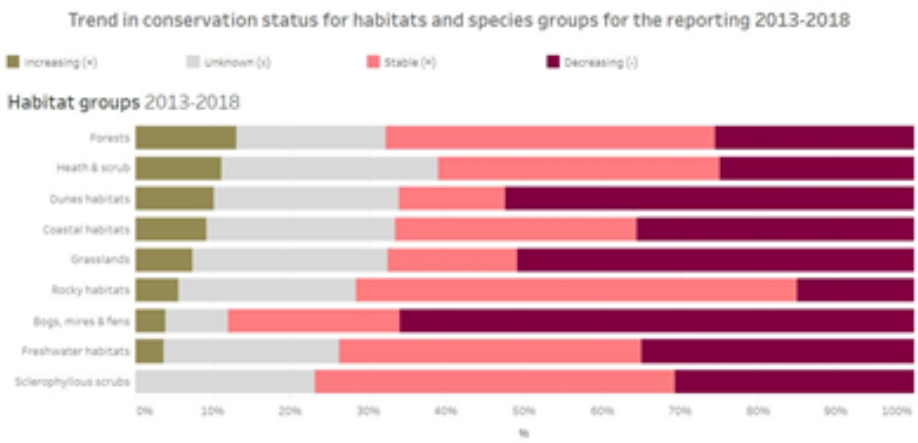


1.3.3. Trends in ecosystem condition

In chapter 2.1 the situation of the state of biodiversity and ecosystems is described but in the context of the baseline it is important to point to the strong and continuing negative trends in the status of protected habitats and species that are reported by Member States every 6 years under the Habitats and Birds Directives and last reported in 2019. Aggregated on EU level it can be said that the that the number of habitats which are reported as deteriorating is much higher than the one of habitats improving in spite of the measures taken under current legislation. This pattern looks very similar for the conservation status trends of protected species under the Habitats Directive: the negative trends outweigh by far the positive ones. **This points to the assumption taken that even with some improvements in the implementation of legislation and new voluntary targets set in the Biodiversity Strategy to 2030 this relationship is unlikely to dramatically change in future.**

Figure VII-6: Trends in conservation status of Habitats Directive Annex I habitats grouped by to ecosystem for the reporting period 2013-2018

Source: State of Nature report, 2020



1.4.Recent legislative developments

1.4.1. International policy

The expectation is that at the CBD COP15 an ambitious new global strategic policy framework will be adopted with different goals and action targets which will require additional nature restoration efforts to be achieved by CBD parties[38]. The EU and all its 27 Member States are Parties to the CBD. However, based on previous experience, in the field of biodiversity policy, international agreements provide the context for EU action rather than being a driver of EU action in itself. International policy strengthens the imperative for EU to act - including to set an example for other countries to follow - but will not drive change by itself and therefore will not have a significant impact on the magnitude of nature restoration in the EU towards 2030 (without additional action). For this reason, international policy is not further discussed here.

1.4.2. European Green Deal

With the European Green Deal (EGD) biodiversity has become a political priority at the highest political level in the EU. The EGD sets out a strategy for a wide range of initiatives which have the potential to contribute to addressing some of the biggest drivers in ecosystems degradation. The most important initiatives, and their likely impact on biodiversity trends and nature restoration, are briefly outlined in this section. The ecosystem-specific sections and annexes to this report contain more in-depth analysis of impacts of these initiatives.

Potentially the most far-reaching initiative for the period up to 2050 is the **European Climate Law** which legally commits all EU MS to achieve climate neutrality by 2050. This has spurred a range of initiatives to integrate this new ambition in existing and new laws and policies[39]. The Impact Assessment accompanying the Communication of the Commission on Stepping up Europe's 2030 climate ambition[40], included modelling of the impacts of reducing Europe's greenhouse gas (GHG) emissions with 50 or 55% relative to 1990 levels by 2030 in line with the new political ambition under the EGD. The "MIX" scenario, leading to a 55% reduction in GHG emissions, adopted a combination of increased ambition for regulatory-based measures and expanded carbon pricing, compared to a baseline scenario. Under this scenario, forest area is expected to expand by 20,000 km^2 per decade, which equates to around 1.5% of forest area based on 2018 Corine land cover. Importantly however, some of this afforestation is for future supply of woody biomass and there is also a limited increase in the proportion of forest under intensive management. Therefore the likely restoration benefits for forest ecosystems will likely be limited without stronger safeguards for biodiversity. In addition, there may be net negative benefits from a biodiversity perspective if high nature value non-forest ecosystems such as (semi-)natural grasslands or wetlands are converted to plantation forest.

[38] UN CBD (2020) Updated zero draft of the post-2020 Global Biodiversity Framework: https://www.cbd.int/article/zero-draft-update-august-2020

[39] Legislative train schedule for the 'Fit for 55 Package under the European Green Deal': https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/package-fit-for-55

[40] European Commission (2020) SWD(2020) 176 final with the Impact Assessment accompanying the Communication on Stepping up Europe's 2030 climate ambition. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020SC0176

Perhaps the more important feature in the climate targets modelling is the increased production of energy crops for sustainable advanced biofuels and other types of bioenergy after 2030, using land currently occupied by croplands, non-productive grasslands, agriculture land set aside, fallowed or abandoned. This suggests that rather than driving widespread restoration of ecosystems, there is rather the potential for expansion of bioenergy production which if managed unsustainably could undermine restoration objectives of converted ecosystem types: the conversion of large areas of land could lead to loss of extent and deterioration in the ecological condition of agro-ecosystems, wetland, steppe, heath and shrub habitats and possibly other ecosystem types.

Arguably the most relevant element of EU climate policy for nature restoration is the review of the **EU regulation on land use, land use change and forestry (LULUCF)** with the aim of increasing this sector's efforts to reduce emissions and maintain and enhance carbon removals[41]. The impact assessment accompanying the legal proposal to amend the LULUCF regulation[42] refers specifically to the announced proposal for a legally binding instrument for nature restoration under the Biodiversity Strategy to 2030 and makes clear that nature restoration makes a significant contribution to climate action. A wide range of land-based mitigation options including protection and restoration of natural ecosystems, sustainable land management practices (including agroecology), agroforestry, crop rotation with leguminous crops, fire management, soil management, sustainable forest management, reduced erosion and increasing soil organic matter do not increase competition for land. However, afforestation for intensive bioenergy production, including monocultures replacing natural forests and high nature value farmlands, could increase the demand for land conversion, with potentially negative ecological consequences. These trade-offs and synergies between woody biomass for energy production and biodiversity in the EU were the subject of a recent analysis by the JRC[43] which identified as win-win forest management options the removal of slash (fine, woody debris) below thresholds defined according to local conditions, and afforestation of former arable land with mixed forest or naturally regenerating forests. It also cautioned against lose-lose pathways for biodiversity and climate including the removal of coarse woody debris, removal of low stumps, and conversion of primary or natural forests into plantations. As the report rightly concluded, which measures are dis- or encouraged in different EU MS is a political one. Which trajectory MS will take, and how their combined action will add up towards impact on EU-wide nature restoration outcomes is hard to forecast. What is clear that the potential of positive win-wins is very significant, but that without explicit articulation of such win-wins in national/regional policy and land/forest management practice, and in the

[41] European Commission Better Regulation initiative 'Land use, land use change & forestry – review of EU rules': https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12657-Land-use-land-use-change-&-forestry-review-of-EU-rules_en

[42] European Commission (2021) 609 final with the Impact Assessment report accompanying the proposal to amend Regulations (EU) 2018/841 as regards the scope, simplifying the compliance rules, setting out the targets of the Member States for 2030 and committing to the collective achievement of climate neutrality by 2035 in the land use, forestry and agriculture sector, and (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review. Available at: https://ec.europa.eu/info/sites/default/files/revision-regulation-ghg-land-use-forestry_with-annex_en.pdf

[43] Camia et al. (2021), "The use of woody biomass for energy production in the EU"

absence clear biodiversity safeguards, the net benefits to biodiversity objectives may in practice be only limited.

Another review which may impact on restoration action towards 2030 is a foreseen revision of the **Renewable Energy Directive (RED)** which intends to minimise the use of crop- and wood-based biofuels, which could reduce pressures on forest and agro-ecosystems by setting higher minimum environmental standards which has the potential to contribute to the recovery of these ecosystems. In summary, although these climate polices will overall help reduce pressures on ecosystems, and may to a certain degree contribute to **passive restoration**, it must be borne in mind that their primary purpose is to reduce carbon emissions, and not explicitly the improvement of ecosystem health nor halting biodiversity loss. Thus, on their own climate policies will contribute to alleviate pressures on ecosystems, but on their own will be greatly insufficient to restore ecosystems to good condition.

Besides the intention to set legally binding targets for nature restoration (which this study supports), the **EU Biodiversity Strategy for 2030**[44] also contains other proposed objectives and initiatives which -if implemented- have the potential to contribute to the recovery of ecosystems. Firstly, the three protected areas targets to increase the share of protected areas to 30 % on land and at sea, to strictly-protect 10 % of protected areas and to effectively manage them is likely to result in important passive restoration action. The increase in protected area would be particularly ground-breaking in the marine environment, in which protected area would more than double (+173 %). Stricter protection could bring important benefits to certain ecosystems, for example in remaining old-growth forests as well as marine ecosystems, which mainly rely on protection measures to recover (passive restoration). Furthermore, the largest positive impact of the three targets in terms of nature restoration across ecosystems would most likely be a concerted effort on management effectiveness, if it is supported with adequate resources to fill existing knowledge and capacity gaps in implementing authorities, as well as with sufficient funding for the implementation of conservation measures. The new **EU Forest Strategy** announced in the EU Biodiversity Strategy and published in July 2021 reiterates its objectives on EU forests, and includes a specific priority of protecting, restoring and enlarging them. These are supported by a range of announced measures, such as protecting old growth and primary forsts and planting 3 billion trees which can contribute to meeting the EU nature restoration. However, as most of these are voluntary, the contribution will likely be relatively limited. The **Regulation on deforestation and forest degradation** proposed by the Commission in November 2021 can be expected to reduce deforestation and forest degradation, but it does not include objectives on ecosystem restoration.

The **Farm to Fork Strategy**[45] was published on the same day as the EU Biodiversity Strategy and shares some of its commitments, e.g. in relation to reducing pesticide- and nutrient pollution. Unlike the EU Biodiversity Strategy, it does not include targets on active protection or restoration of landscape features over 10 % of the land, such as hedgerows and fallow land on farmland. However, it does include a series of targets that could provide important

[44] European Commission web page on the Biodiversity strategy for 2030: https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en

[45] European Commission web page on the Farm to Fork Strategy: https://ec.europa.eu/food/farm2fork_en

contributions to improving environmental conditions in conventionally managed farmland e.g., reducing the overall use of and risk of chemical pesticides and the use of more hazardous pesticides by 50 % by 2030, reducing nutrient losses into the environment and increasing the coverage of organic farming to 25 % of the EU's agricultural land by 2030. If the Farm to Fork Strategy's targets will be met, the reduced pollution pressures resulting from meeting these targets will improve basic environmental conditions in agro-ecosystems and have further positive passive restoration benefits on other ecosystem types. Nonetheless the targets do not reverse other key drivers of degradation of agro-ecosystems such as the loss of (semi-) natural grassland and high-biodiversity habitat in and around cropland. In addition the targets set in the Farm to Fork Strategy are currently not binding. Therefore the Strategy's overall positive impact on nature restoration objectives will likely be modest, in particular if targets are not operationalised and met in national/regional agricultural policy and- practice.

Other Green Deal initiatives relevant for nature restoration are the **Zero Pollution Action Plan**[46], which includes a specific commitment to reduce by 25% the EU ecosystems where air pollution threatens biodiversity by 2030. By reducing pollution pressures this is likely to contribute to some degree of passive restoration, but not enough to restore ecosystem condition to the degrees required. The **EU Strategy on Adaptation to Climate Change**[47] which includes a priority of promoting nature-based solutions for adaptation develop their financial case and continue to encourage and support Member States to roll them out in different ways such as guidance and EU funding. However, given that these actions will be voluntary, these contributions are likely to be small.

1.4.3. EU Agricultural, Fisheries and Maritime Policies

Given the large share of ecosystems in Europe that are under agricultural management, the implementation of EU agricultural policy will continue to significantly shape the trajectory of biodiversity trends in the EU in the years to come. It is not possible to predict exactly how the changes in the new CAP compared to the previous CAP may affect the trend in (agro-) ecosystems. They have the potential to do so if they, for example, lead to larger areas of grassland being protected from ploughing, a reduction in inputs such as pesticides, herbicides and excess nutrients, and an increase in the area of semi-natural habitats that are subject tailored and targeted agri-environment climate interventions. A Member State with strong environmental ambitions could use the new measures to achieve a great deal of progress. However, all Member States face competing priorities, and the 2014-20 experience of greening measures is that they have made a limited contribution to improving the environmental performance of farming. The experience so far has revealed limitations in the extent of agriculture funding (EAGF, EAFRD) effectively dedicated to nature restoration. Unless serious

[46] European Commission (2021) COM(2021) 400 final - Pathway to a Healthy Planet for All. EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'. Available at: https://ec.europa.eu/environment/strategy/zero-pollution-action-plan

[47] European Commission (2021) COM(2021) 82 final - Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_663

efforts are put into improving the use of these funds, it is expected that they would not be changing the currently observed negative trends in ecosystems condition.

Despite some progress towards sustainable fisheries in the EU found in the evaluation of the EU Biodiversity Strategy to 2020 following the adoption of the new **Common Fisheries Policy** in 2013[48], the evaluation also found that certain fish stocks remain overfished and/or are outside safe biological limits and fisheries impacts on biodiversity remains high, for example on benthic habitats through bottom trawling and on slowly maturing but keystone species such as rays and sharks. As a result, the impact of fisheries and fishing practises on ecosystems remained a key concern in the EU Biodiversity Strategy (BDS) for 2030. The EU Nature Restoration Plan in the Strategy includes a specific commitment to "substantially reduce the negative impacts on sensitive *species and habitats, including on the seabed through fishing … activities, to achieve good environmental status".* The Strategy aims to achieve this through application of an ecosystem-based management approach under relevant EU legislation (MSFD, CFP, MSP) and mentions specifically the national marine spatial plans under the MSP Directive in which Member States should formalise Marine Protected Areas and other area-based conservation measures. Furthermore, by summer 2022, a new action plan to conserve fisheries resources and protect marine ecosystems will point out where action is needed to address the by-catch of sensitive species and adverse impacts on sensitive habitats through technical measures such as area closures, gear changes and mitigation measures for sensitive species. Importantly, the action plan will also focus on key enabling measures such as strengthening the implementation of existing policies, improving the availability and quality of marine knowledge and information, and identify the possibilities under the EU funding instruments for a fair and just transition to support the objectives of the action plan.

While these ongoing policy developments will focus minds on ecological objectives in the marine environment, and they may contribute to a **certain degree of contribution to passive restoration**, it remains to be seen in how far they will result in larger scale improvement in ecosystem condition and specific, targeted restoration outcomes. Progress in implementing the MSP is significantly behind schedule and so-far poorly aligned with new EU commitments on protected areas and restoration. While the reformed CFP since 2013 provides conservation and management tools to implement measures to support restoration, the implementation of key elements such as the landing obligation and restricting fisheries in areas of ecological importance such as Natura 2000 sites has been slow. Helping achieve the objectives of the MSFD and of the Birds and Habitats Directives forms part of the CFP's objectives, in particular through reaching fully sustainable fisheries, setting fish stock recovery areas and setting conservation measures for complying with the EU's environmental legislation. Hisorically, the CFP has focussed on the socio-economic dimension of fisheries, while the reformed CFP of 2013 has added environmental sustainability as one of its key objectives. Under the regionalisation process, certain Member States proposed conservation measures for protected areas and minimising the risk of by-catch of protected species. Considering the urgency to act, progress is considered slow and additional action would be required under the nature

[48] For example in relation to total allowable catches (TACs), multi-annual plans, landing obligations, technical measures and discard plans.

restoration law to step up the recovery of marine ecosystems. Under the current rules, this is going to continue in future and **despite the hopeful developments since the adoption of the EU Green Deal and the EU Biodiversity Strategy for 2030, the expectation is that ecosystem condition will only slightly improve in the period to 2030 under the baseline scenario.** This would be either through indirect means such as contributions to passive restoration, or through more directed actions, which as experience shows are not likely to have much effect due to their voluntary nature.

1.4.4. Investment

As explained in Chapter 3, insufficient investment in ecological restoration is one of the key barriers to action, even for restoration required under legislation such as under the Nature Directives and the Water Framework Directive. There are some reasons to expect increases both in budgets available for nature restoration as well as their more targeted application, partly enabled by progress in implementation as outlined in section 4.2.2. Firstly, the decision to invest 7,5 % of the EU's Multi-annual Financial Framework (MFF) in biodiversity by 2024, and 10 % by 2027, will increase the overall portfolio available for biodiversity. The European Commission is developing an improved system to track biodiversity-related investments in the EU budget. Another improvement under the current MFF is that the budget for the EU LIFE programme increased by about 60 % compared to the previous MFF cycle, which will result in a significant increase in targeted EU-funded restoration projects.

At the same time, there are concerns that the largest EU investment pillar for biodiversity, could reduce in practice if Member States continue to use the flexibility that CAP implementation provides to prioritize productive measures and investments which often do not or insufficiently deliver on biodiversity objectives or even hamper them. Moreover, Prioritized Action Frameworks for Natura 2000 indicate that funds allocated by EU and Member States have been insufficient to meet needs in the current period. Therefore, it remains to be seen if these slight improvements will be sufficient to bridge the funding gap.

Lastly, the Biodiversity Strategy for 2030 mentions that a dedicated 'EUR 10 billion natural-capital and circular economy investment initiative' will be established, building on InvestEU and operated by the EIB Group in cooperation with other public and private investment teams. Also here it remains to be seen if this will mobilise substantial amounts of private investments for ecosystem restoration, in light of limited success of the Natural Capital Financing Facility.

1.4.5. National developments

An initial and short assessment of national political, policy and legal developments on nature restoration and related fields was carried out as part of this impact assessment. This is described in Annex XI. From this it can be predicted that for some EU Member States, national policies would be likely to have a positive effects on biodiversity trends and nature restoration. However, evidence shows that MS activities are not evenly distributed across the EU and also tend to show degrees of difference in effort and resultant action. Furthermore, in a number of MS, there was little evidence that could be found of restoration activity supported by national policies. All this goes to indicate that one could expect rather small, and unevenly distributed efforts of restoration following from the contributions of national policies.

1.5. Discussion & conclusions

The baseline analysis for specific ecosystems as well as the wider cross-cutting considerations presented above lead to three main findings for the baseline. First, socio-economic and environmental pressures on ecosystem are likely to increase. Second, ongoing restoration activities are limited and, third, they are likely to only slightly increase in future, despite recent policy and legal initiatives. We expand on these findings below.

Socio-economic drivers. In the period to 2050, the EU population is expected to continue to grow, albeit at a reduced rate compared to the recent past. This combined with global population growth and wealth growth will increase demand for natural resources and pressure on productive land use in agriculture, forestry and across other ecosystems. In contrast, agricultural abandonment will continue in remote and less productive agricultural areas, because of socio-economic factors and rural depopulation.

Environmental drivers: the impacts of climate change on ecosystems are increasing. In the future, across most of Europe, drought event frequency, heavy winter precipitation and forest fire risk are all projected to increase, Important cross-cutting pressures such nitrogen pollution will decline further but will be partly offset by accelerating pressures from climate change.

Ongoing restoration. As estimated by Eftec[49] in 2017, areas restored varied by ecosystem but taken together, were insubstantial. When extrapolated to the area restored over the 9-year period covering 2022-2030, they represent less than **1% or less of total ecosystem extent.**At the same time, from the baseline assessments of specific ecosystems outlined in Annex VI, semi-natural grasslands, heathlands and other semi-natural agricultural habitats, and some mires as well as coastal wetlands, would be expected to continue their limited decline. With increasing flood risks we expect that the relative priority given to wetlands and rivers and lake ecosystems in restoration efforts will further increase compared to other ecosystems. Similarly, we expect increased ambition to reduce soil-based GHG emissions and increased investments for land-based climate change mitigation action, including wetland restoration through re-wetting. However, these increases if based on voluntary commitments will likely fall short of needed effort, and more importantly will not deliver on the restoration of other ecosystem types in scope.

Recent policy and legal initiatives. The European Green Deal makes biodiversity a political priority in the EU. The European Climate Law and within that the review of EU regulation on LULUCF and the Renewable Energy Directive, if implemented effectively, have the potential to contribute to ecosystem recovery. The EU Biodiversity Strategy for 2030 will, if implemented, also contribute to improvements in the condition and coverage of European ecosystems. The Farm to Fork Strategy makes commitments to reducing pressures on ecosystems, especially agroecosystems. Higher ambition for biodiversity in agro-ecosystems

[49] Eftec (2017) Technical support in relation to the promotion of ecosystem restoration in the context of the EU Biodiversity Strategy to 2020. Available at: https://ec.europa.eu/environment/nature/pdf/promotion_of_ecosystem_restoration_in_the_context_of_the_EU_biodiversity_strategy_report%20.zip

is also a possibility under the CAP, although it will ultimately depend on the choices made by Member States and it is not possible to assess the impacts of the CAP reform as the reform is still under negotiation. In summary, the is more favourable for nature restoration compared to the recent past. This will likely result in higher restoration action than would be expected based on recent experience and trend.

Considering ongoing and growing pressures on ecosystems and in light of the lack of voluntary implementation of 'Target 2' of the EU Biodiversity Strategy to 2020, we conclude that the baseline restoration effort is likely to remain at an insufficient scale to meet restoration needs. Furthermore, restoration is likely to happen too slowly to reverse the present, steep biodiversity declines and to underpin ecosystem resilience in the face of climate change.

Contributions to restoration are likely to mainly be passive restoration and at insufficient levels to restore ecosystem to good health. Active restoration would only be addressed, and if at all, through voluntary actions, and with little expected impact.

For these reasons, we have considered a 'conservative' baseline in our calculations in which the 'full' restoration needs observed today will not be addressed by the existing policies and legislations outlined above. Therefore, these needs have to be addressed by EU targeted action on restoration.

In summary, the baseline analysis sees several positive developments, but the continuous increase in ecosystem degradation may outweigh their benefits. Without additional action to accelerate progress on nature restoration across different ecosystems, biodiversity and ecosystems would decline further. As the analysis also demonstrated, there is a large potential to improve existing action with a more binding framework.

2. OPTION 2: OVERARCHING LEGALLY BINDING TARGET COVERING ALL OR MOST EU ECOSYSTEMS

If there were a single overarching target for ecosystem restoration rather than individual, ecosystem-specific targets, Member States would have greater freedom and flexibility in choosing which ecosystems to prioritise for restoration.

It is important to note that the main flexibility would be in the prioritisation and sequencing of ecosystem restoration since both the overarching target and ecosystem-specific targets would require restoration of all (or almost all) ecosystems by 2050. However, Member States would be free to choose which ecosystems to prioritise at the start of this period and which to leave for later.

Having an overarching rather than ecosystem-specific targets would have advantages in terms of:

- **Subsidiarity**: Member States would have greater flexibility in meeting the targets and could prioritise restoration actions according to their needs and circumstances;

- **Cost-effectiveness**: Member States could prioritise ecosystems with lower costs or higher benefit-cost ratios, which would save costs and/or enhance net benefits in the short to medium term;
- **Contribution to policy objectives**: Member States could prioritise restoration of ecosystems which made greatest contribution to their policy objectives in the short to medium term. This could include, for example, contribution to climate mitigation targets or addressing more local priorities such as reducing flood risk.
- **Political visibility and accessibility:** A single, easy to communicate legally -binding target would facilitate building broad awareness of new EU political and political ambition on nature restoration. Since there is something in it for everyone, it could help ensure buy-in across stakeholder groups and could help put biodiversity on par with 'headline' climate targets such as achieving climate neutrality.

The main disadvantage of an overarching rather than ecosystem-specific targets would be that it might be expected to result in uncertain and uneven rates of restoration of ecosystems. There is a risk that it could result in "picking of low hanging fruit", i.e., prioritisation of restoration of ecosystems that are easiest and most inexpensive to restore. The historic bias in designating protected areas in places which were facing little anthropogenic pressure and therefore had a low opportunity cost is a good example of this phenomenon[50]. Another example are experiences in implementing Greening under the EU's Common Agricultural Policy (CAP) where large flexibility in implementation options led to high inefficiencies from a biodiversity perspective as authorities and farmers prioritized the economically most advantageous options with little to no biodiversity outcomes[51]. While such flexibility could have some advantages in reducing short term costs, there would potentially be adverse impacts on:

- **Biodiversity:** Biodiversity restoration requires coordinated international action as ecosystems and species do not respect national borders**.** This is recognised in the Birds and Habitats Directive and the biogeographical approach in the latter. Therefore, rather than restoring species and habitats according to the EU priorities and biogeographical requirements, prioritising at a Member State level would undermine the ability to achieve coordinated restoration of ecosystems and the recovery of species at a population level. If some species continued to decline, this could reduce progress in meeting overall biodiversity objectives, and some species might face threat of extinction through delays in restoration of their habitats.
- **Future costs**: Prioritising ecosystems with lower costs of restoration could increase the costs of future action.
- **Effectiveness**: Focusing on ecosystems which are easiest and cheapest to restore would potentially increase the risks of failing to deliver against the targets, by leaving the greatest challenges to be addressed in future years.

[50] See, for example, Joppa, L. & Pfaff A., *High and Far: Biases in the Location of Protected Areas*, 2009.

[51] Alliance Environnement, *Evaluation of the impacts of the CAP on habitats, landscapes, biodiversity*, Report to the European Commission, 2019.

- **Certainty:** There would be greater uncertainty relating to the restoration actions taking place across the EU, and their likely outcomes;
- **Co-ordination**: Variations and uncertainties in action and outcomes at Member State level would make it more difficult to co-ordinate action across the EU, to share evidence and resources, and to implement co-ordinated action across borders.
- **EU Added value:** The absence of co-ordinated action might reduce the ability to achieve EU goals, and therefore the justification for EU funding; and undermine confidence amongst Member States that they can adopt ambitious goals that are comparable to others.

2.1 Factors affecting Prioritisation of Ecosystem Restoration Action

The flexibility inherent in the overarching target option makes it challenging to assess likely implementation scenarios and therefore likely impacts. The prioritisation of ecosystems as described in the baseline scenario would likely still be similar, however the significant increase in effort required in terms of area restored would increase the scope and magnitude of impacts and likely implementation pathways. Therefore, evaluation was made to map the likely decision-making factors that would guide the direction of implementing actions. If there was an overarching target instead of ecosystem-specific targets, we might expect Member States to prioritise restoration of ecosystems according to one or more of the following criteria:

- **Ecosystem extent:** Ecosystems with greater area requiring restoration will make up a greater proportion of an overall restoration target.
- **Technical feasibility**: Member States would be unlikely to prioritise ecosystems which are technically difficult to restore, or where there is a high risk of failure;
- **Cost:** With an overarching target, and given limits on funding, there would be a tendency to prioritise ecosystems with lower restoration costs;
- **Benefit-cost ratio:** There would be merit in prioritising restoration of ecosystems which offer greatest benefits, in terms of the value of ecosystem services, relative to costs of restoration;
- **Opportunity costs/stakeholder resistance**: There may be a tendency to avoid restoring ecosystems in situations where this has high opportunity costs (e.g. because it restricts opportunities for development or food production) and meets resistance from stakeholders (e.g. farmers, fishers and developers);
- **Need for co-ordinated international action:** With a variety of priorities and approaches at Member State level, it might be more difficult to co-ordinate restoration actions across borders, potentially prioritising restoration of ecosystems within national borders;
- **Contribution to climate mitigation and adaptation:** We might expect Member States to prioritise restoration of ecosystems that are particularly sensitive to the direct and indirect effects of climate change as well as ecosystems where this

contributes most to specific policy agendas, including in relation to climate change mitigation and adaptation.

Table VII-1 summarises these issues with respect to the different ecosystem types. The table indicates that these different criteria may have varying effects on the degree to which different ecosystems might be prioritised for restoration, and that there may be different responses by different Member States, according to the emphasis placed on different priorities (e.g. cost, stakeholder interests, climate change agenda) as well as the extent of each ecosystem in each Member State.

2.2 Summary

In conclusion, the introduction of an overarching target would have several important advantages with regards to subsidiarity, cost-effectiveness (at least in the short-term), contribution to policy objectives, political visibility and accessibility. However, by itself it would most likely fail to restore biodiversity at a level required to meet EU-wide and international biodiversity objectives due to an implementation effort that would not be well--balanced to restoration needs of all ecosystems, of insufficient coordination between EU-Member States on EU-wide restoration needs and challenges and required integration with e.g. implementation of the CAP and CFP, low political certainty of restoration outcomes and therefore accountability which may risk undermine EU added value in biodiversity policy.

Table VII-1: Overview table of likely dimensions impacting on the prioritisation of certain ecosystem types over others in implementing an overarching target

Key: Green=Criterion is likely to encourage restoration of this ecosystem within an overall target; Orange=Criterion may have a moderate or mixed effect in encouraging restoration of the ecosystem; Red=Criterion may discourage restoration of this ecosystem within an overall target

Please note: The scope of this impact assessment also includes pollinators and soils which, due their cross-cutting nature, were not included as a separate ecosystem in this table. Their restoration needs would however need be integrated in the implementation of the overarching target under different ecosystem types.

Ecosystem	Ecosystem extent	Technical feasibility	Need for coordinated international action	Cost per hectare	Cost: benefit ratio	Opportunity cost/ stakeholder resistance	Contribution to climate mitigation and adaptation	Contribution to disaster prevention and protection	Overall assessment
Agro-ecosystems	High	Strong evidence base and good experience through agri-environment interventions	Moderate	Moderate for semi-natural habitats, high for improved grasslands and croplands	Good B:C ratios	Would support extensive farming systems. High opportunity costs for intensively farmed areas, which could give rise to resistance without adequate incentives under the CAP	Moderate potential for carbon storage and sequestration; high contribution to adaptation by increasing soil health	Moderate: reducing bare ground, erosion, soil compaction and tillage reduces run-off rates and flooding and landslides	Extensive ecosystem with potential for large scale restoration; depends on incentivising farmers to change land management practices under area-related interventions including agri-environment interventions
Forest	High	Restoration needs and practices are relatively well understood, but	Moderate	Moderate per hectare costs	Good B:C ratios	Moderate – main trade-off is with more	Strong carbon sequestration potential through forest restoration and		Restoration involves significant capital costs, but likely to be

Ecosystem	Ecosystem extent	Technical feasibility	Need for coordinated international action	Cost per hectare	Cost: benefit ratio	Opportunity cost/ stakeholder resistance	Contribution to climate mitigation and adaptation	Contribution to disaster prevention and protection	Overall assessment
		recovery takes many decades				commercial forestry	re-creation [adaptation]		a priority given extensive area of degraded forest, and potential to contribute to climate agenda
Heathland and scrub	w	Restoration needs and practices are relatively well understood	Moderate	Relatively low costs per hectare	Good B:C ratios	Low – relatively low value land with few alternative uses	Strong carbon sequestration potential through restoration,	Moderate: reducing bare ground and overgrazing, reduces run-off, flooding, erosion, and landslides. Risk of intense large fires can be reduced by grazing, scrub management and managed burning	Likely to be prioritised because of relatively low restoration and opportunity costs; however, limited ecosystem area restricts its contribution to overall target
Marine	High	Many habitats may be difficult to restore and/or restoration hampered by evidence gaps.	High – the need for co-ordinated action could be a barrier to restoration without specific	Variable – potential for extensive use of low cost, passive restoration	Uncertain – difficult to assess with given evidence and may vary widely for	Restoration may face significant resistance from fishing sector in response to	Varies by marine habitats; significant uncertainties regarding impact of		Only relevant for MS with a coastline; extent of marine ecosystem

Ecosystem	Ecosystem extent	Technical feasibility	Need for coordinated international action	Cost per hectare	Cost: benefit ratio	Opportunity cost/ stakeholder resistance	Contribution to climate mitigation and adaptation	Contribution to disaster prevention and protection	Overall assessment
		However, other habitats may require passive restoration only.	marine ecosystem targets.	techniques, while active restoration measures may be expensive.	different restoration methods and habitats. May be strong B:C ratios where passive restoration applied.	limits on fishing activity and perceived opportunity costs (at least in short term)	restoration actions		restoration uncertain due to significant knowledge gaps. Could be an attractive option for extensive marine habitats suitable for passive restoration, especially where resistance from fisheries sector does not present challenges.
Peatlands and wetlands	Low	Re-wetting of most drained semi-natural peatland is straightforward, full restoration of highly degraded peatland is difficult	Moderate	Moderate per hectare costs	Good B:C ratios	Low for Annex 1 habitats	Exceptionally high potential for carbon storage and sequestration, improved water retention can also contribute to adaptation	High in flood prone catchments where reversing drainage reduces run-off rates and downstream flooding	Likely to be a priority for restoration for those MS with degraded peatlands, given strong climate

Ecosystem	Ecosystem extent	Technical feasibility	Need for coordinated international action	Cost per hectare	Cost: benefit ratio	Opportunity cost/ stakeholder resistance	Contribution to climate mitigation and adaptation	Contribution to disaster prevention and protection	Overall assessment
									mitigation benefits.
Rivers and Lakes	Low	Technical challenges in barrier removal and floodplain restoration	High – the need for co-ordinated action could be a barrier to restoration without specific freshwater ecosystem targets.	High – often requiring substantial capital works	High B:C ratios, given high ecosystem service values for freshwaters	Opportunity costs are a barrier to floodplain restoration	Relatively low priority for mitigation, but floodplain restoration plays important role in adaptation	High – Restoring wetlands and floodplains can contribute to flood prevention and mitigation through improved connectivity	Restoration has relatively high costs but offers strong benefit cost ratios; as freshwaters represent a small proportion of overall area, likely to be driven more by MS priorities than an overall target
Urban	w	Significant technical challenges in unsealing land, recycling developed and contaminated sites	Moderate	High – costs of unsealing land, remediating contaminated sites, changing construction practices	High B:C ratios for urban green space, especially through health and wellbeing benefits	High land prices and many competing demands for land in urban areas	Importance of urban green space, tree cover, sustainable drainage in climate change adaptation		Limited land area and high costs, but also high benefits. Urban ecosystem restoration more likely to be driven by MS priorities than its

Ecosystem	Ecosystem extent	Technical feasibility	Need for coordinated international action	Cost per hectare	Cost: benefit ratio	Opportunity cost/ stakeholder resistance	Contribution to climate mitigation and adaptation	Contribution to disaster prevention and protection	Overall assessment
									contribution to an overarching target.

3. OPTION 3 AND OPTION 4

See individual thematic assessments in Annex VI, summary table in Annex III, as well as Chapter 6.

4. COSTS OF ENABLING MEASURES

Enabling measures will include:

a) Surveys of ecosystems to establish extent and condition, where this is not known;
b) Development of national restoration plans;
c) Administration of restoration measures;
d) Monitoring of restored ecosystems;
e) Reporting progress against restoration targets.

The administrative costs of these measures can be estimated by estimating the number of days work involved for each, and costing that at a standard time cost per day (following the Standard Cost Model for quantification of administrative burdens, set out in the EU Better Regulation Guidelines and Toolbox).

a) Ecosystem surveys

Establishing the extent of restoration activity required depends on data on the extent and condition of the relevant ecosystems. There are currently significant data gaps, particularly regarding the extent of degraded ecosystems requiring restoration. The **EEA Dashboard**[52] indicates that the condition of approximately 732 516 km^2 of Annex 1 habitats across the EU is unknown, and would need to be surveyed to determine restoration priorities. We assume a survey cost of EUR 15/ha surveyed, based on data for from the EMBAL survey[53]. This would give a total one-off survey cost of EUR 1 099 million across the EU.

b) Development of national restoration plans

Each Member State will be required to develop a national restoration plan. This will set out the current extent and condition of ecosystems, the pressures facing them, the targets for ecosystem restoration, the restoration measures required, the stakeholders involved, the resource needs and funding arrangements, and the arrangements for monitoring and reporting.

[52] https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/condition-of-habitat.

[53] Costings for EMBAL assume 3 x 25 hectare plots are covered per day, with an average daily cost of EUR 557 for skilled surveyors. If it is assumed that 50 % of surveyor time is spent in the field, this gives an average cost of EUR 15 per hectare.

Each Plan could be subdivided into approx. 6 ecosystem types (e.g. marine and inter-tidal habitats; wetlands & peatlands; rivers & lakes; agro-ecosystems (including soils and pollinators); heaths etc; forests), presenting a specific plan for each ecosystem.

The time and costs required for each Plan would vary by Member State, according to the extent of their ecosystems and the complexity of issues and restoration requirements. The average time requirements for each Member State Plan are estimated in Table VII-2.

Table VII-2 Estimated time inputs for national restoration plans

Requirement/ section	Time input per ecosystem (days)	Total days per plan (based on 6 ecosystems)
Compile and present data on ecosystem extent, condition, pressures	100	600
Define ecosystem restoration targets and actions	50	300
Define resources and funding arrangements	30	180
Define monitoring and reporting arrangements	30	180
Public consultation/ engagement	40	240
Compile overall national plan		100
Total time	**250**	**1,500**

It is estimated that each National Restoration Plan (covering the 6 ecosystem types) would require total time inputs amounting to 1500 days on average, or 6.5 person years of work.

In this assessment we apply a standard cost of EUR 317 per day – this includes salary and overhead costs and is based on the civil rate of EUR 300 per day for public servants applied in the Fitness Check of EU Environmental Monitoring and Reporting Obligations (ICF, 2017), updated for inflation.

Applying an average cost of EUR 317 per day would give an average cost of EUR 475 500 per MS plan. **The total for 27 Member State plans would amount to a one-off cost of EUR 12.8 million.**

c) Establishing an EU wide methodology, indicators and baselines for ecosystems and targets

Further administrative effort is required to establish an EU wide methodology, indicators and baselines for targets for those ecosystems for which these are insufficiently developed. This includes targets for at least five ecosystems (e.g. marine, urban, soils, agro-ecosystems, forests or others for which targets are yet not defined, as well as pollinators). The cost estimate for establishing an EU wide methodology, indicators and baselines for ecosystems is based on two methods:

Method 1: based on experience with MSFD

Based on experience of developing methodologies, baselines and indicators under the MSFD, it is estimated that this will require work over a period of 3-4 years with inputs from the European Commission, EU experts (EEA, JRC) and Member State officials.

Over the 3-4 year time period, this is estimated to involve:

- 1 EC staff member working full time to oversee the development of the EU wide methodology and indicators for each ecosystem [800 days per ecosystem]
- 8 EU experts (EEA, JRC, DG ENV) spending an average of 25 days each on data analysis and indicator development [700 days per ecosystem]
- 27 Member State experts spending 20 days per year each on meetings/ networks/ data inputs [1890 days per ecosystem].

On this basis, total time inputs would amount to 3 390 days at a cost of EUR 1.07 million per indicator (based on a cost per day of EUR 317 as above). This would amount to a total one-off cost of EUR 5.35 million across the five ecosystems.

Method 2: based on experience with MAES – Mapping and Assessing Ecosystem Services

Since the mapping of ecosystems and assessment of ecosystem services started in 2016 under MAES, the progress that was made by Member States until March 2021 is outlined by the light green in the figure below:

Figure VII-7: Progress by MS to map ecosystems and its services under MAES

Source: MAES

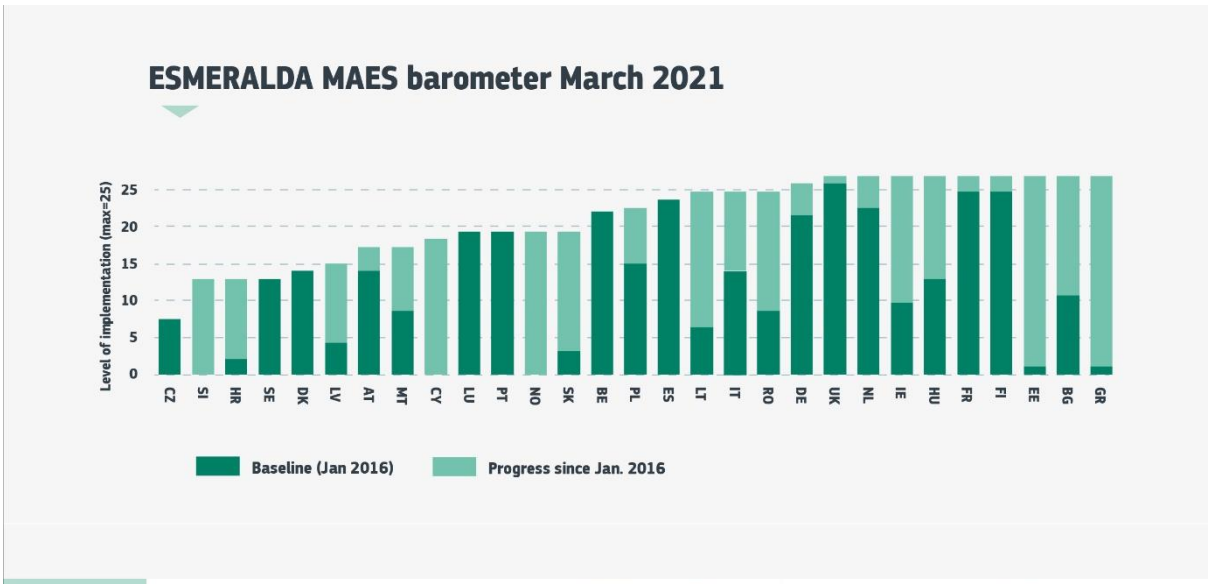


Figure 14. Measuring successful implementation of MAES in the 27 EU member states, Norway and the UK. The barometer measures implementation of MAES based on a set of 25 yes/no questions that survey the progress made in policy integration and research. A baseline was set in January 2016 and since then the progress has been measured every six months until March 2021.

At EU level, for JRC and EEA a total of 2 FTE per year has been occupied to write the guidance reports and to carry out the EU ecosystem assessment under MAES between 2013 and 2020.

MAES was mainly implemented by countries (but in some cases supported with EU or European Economic Area budgets). Every MS that made progress between 2016 and 2021 (in the Figure VII-7) has used a budget between EUR 100,000 and 1.5 million. This range does not consider costs incurred by a number of MS (Finland, Netherlands, UK, Spain, Portugal, Luxembourg, Denmark, Sweden and Czechia) that did work relevant to MAES prior to 2016 or even 2013. For MS that primarily used national budgets, project costs are estimated to range between EUR 100 000 (Ireland, Italy, Poland, Slovakia, Cyprus, Slovenia and Malta), EUR 300 000 (Estonia, Latvia and Lithuania) and EUR 1 000 000-2 000 000 (Hungary, Greece, Bulgaria, Romania and Croatia).

Additional costs were covered by projects like H2020 ESMERALDA (3 000 000) and MESEU and Train (ENV service contracts, 400 000) to help MS implement MAES.

Thus, the costs for implementing MAES (2013-2020) are estimated at EUR 16.5 million, which is comparable to the size of an average Horizon research project.

Cost item	**Amount in EUR**
EU staff	1.5 million
MS own financing	5 million
EU support to member states (through EU budgets under LIFE, Regional, service contracts H2020, EEA grants Norway):	10 million
Total	***16.5 million***

Translating these estimations for MAES to the context of establishing an EU wide methodology, indicators and baselines for ecosystems, a one-off cost of around **EUR 7.8 million** can be expected.

Cost item	**Amount in EUR**
EU staff: 2 FTE for 4 years at EU level	800 000
MS own financing	4 million (150 000 per MS)
EU projects to give overall support and guidance	3 million
Total	***7.8 million***

Conclusion

The average of both cost estimates (EUR 5.35 million for MSFD and EUR 7.8 million for MAES) leads to the one-off cost estimate of **EUR 6.56 million** to establish an EU wide methodology, indicators and baselines for the 5 afore mentioned ecosystems.

d) Administration of restoration measures

The impact assessment estimates the costs of the measures required to meet ecosystem restoration targets. In addition to the costs of the restoration works, further costs will be incurred by Member State authorities in administering programmes of restoration action.

Based on data from the Prioritised Action Frameworks (PAFs), we estimate that the costs of administration and communications (excluding surveys, planning, and monitoring, which are estimated here separately) account for an average of 10 % of the costs of nature conservation measures.

Table VII-3 presents estimates of the annual costs of habitat restoration, maintenance, and re-creation measures for five types of HD Annex 1 habitats, based on analysis for this impact assessment study. The annual cost of these measures is estimated at EUR 4.4 billion over the 9 years 2022-2030, based on the 15 % ecosystem restoration target. Based on estimated administration costs at 10 % of the costs of these measures, the costs of administering these habitat actions will amount to a further EUR 438 million across the EU each year.

Table VII-3 Estimated costs of administration of restoration measures for Annex 1 habitats (EURO)

Ecosystem	Estimated Annual Average Costs, 15 % restoration target (2022-2030)	Estimated Annual Administration Costs at 10 %
Forests	2 607 607 200	260 760 720
Grasslands	1 220 709 426	122 070 943
Heathlands and scrublands	168 896 807	16 889 681
Marshes	164 950 693	16 495 069
Peatlands	221 050 458	22 105 046
Total	**4 383 214 584**	**438 321 458**

e) Monitoring of restored ecosystems

Ecosystem restoration needs to be followed by a programme of monitoring, to record changes in condition of ecosystems in response to restoration measures.

We estimate that monitoring will be required for restored and re-created ecosystems on average as follows:

- One visit to all areas 1 year after restoration
- 60 % of restored areas 2 years after restoration
- 30 % of restored areas 3 years after restoration
- On average, visits to all areas once every 6 years, to coincide with BHD, WFD and MSFD reporting, adjusted to risk (e.g. more frequent visits to areas that have the potential to change rapidly)

This implies that each restored hectare would be monitored on average 4.3 times over the period 2022-2050 (based on a 90 % restoration target by 2050). However, based on current practice Member States would only sample 10-15% of area which would provide a sufficiently representative sample.

The EEA Dashboard indicates that a total of between 321 220 km^2 and 1 053 736km^2 of Annex 1 habitats require restoration across the EU, based on the areas known not to be in good condition and those in not good or unknown condition, respectively.

Applying an average monitoring cost of EUR 15/ha (see under survey costs above) on 15 % of restored area, and a 90 % restoration target by 2050, would give a total monitoring cost of between EUR 280 million and EUR 918 million over the period 2022-2050, or an average of EUR 10 to 32 million per year (midpoint EUR 21 million per year).

f) Regulatory reporting

Member States will be required to report to the Commission progress in implementing restoration plans and in restoring the condition of degraded ecosystems.

It is assumed that reporting will be based on existing data collected under the actions identified above, and require inputs averaging 50 -100 days per Member State every 6 years (similar to requirements under the Habitats Directive; ICF, 2017).

On this basis, and applying a cost of EUR 317 per person day of work required, costs of regulatory reporting would amount to approximately EUR 107 000 per year across the EU27.

Table VII-4 Summary of Costs of Enabling Measures

Estimated Costs		
	One-off costs	**Annual costs**
Surveys of ecosystems	1 099 000 000	
Development of national restoration plans;	12 800 000	
Development of methodologies and indicators (5 ecosystems)	6 580 000	
Administration of restoration measures (2022-2030; 15 % target)		438 321 000
Monitoring of restored ecosystems		20 643 103
Reporting progress against restoration targets		107 000
Sub-total	***1 118 380 000***	***459 071 103***
Costs from 2022 to 2050	***1 118 380 000***	***12 853 990 884***
Total costs from 2022 to 2050		***13 972 370 884***

Annex VIII: Background information for potential restoration targets

This Annex includes facts and figures per ecosystem derived from the Member States' reporting and assessments under Article 17 of the Habitats Directive (source: EEA).

Because of its size, it is split and provided in separate files.

Annex IX: Key relevant findings from the evaluation study on the EU Biodiversity Strategy to 2020

1. THE EU BIODIVERSITY STRATEGY TO 2020

The EU Biodiversity Strategy to 2020[54] provided the EU framework for action on biodiversity in the 2011-2020 period. It responded to the EU's global commitments under the Convention on Biological Diversity. It set out the following targets, actions and horizontal measures:

Headline target: Halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.
Target 1: Fully implement EU Nature Legislation To halt the deterioration in the status of all species and habitats covered by EU nature legislation and *achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments, 100 % more habitat assessments and 50 % more species assessments under the Habitats Directive show an improved conservation status; and 50 % more species assessments under the Birds Directive show a secure or improved status.*
Target 2: Maintain and restore ecosystems and their services *By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems*
Target 3: Increase the contribution of agriculture and forestry to biodiversity *By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services.* *By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forest holdings above a certain size that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services.*
Target 4: Ensure sustainable fisheries and support healthy marine ecosystems *Achieve Maximum Sustainable Yield (MSY) by 2015. Achieve a population age and size distribution indicative of a healthy stock, through fisheries management with no significant adverse impacts on other stocks, species and ecosystems, in support of achieving Good Environmental Status by 2020, as required under the Marine Strategy Framework Directive.*
Target 5: Combat Invasive Alien Species
Target 6: Help avert global biodiversity loss
Horizontal measures: Strengthen financing, partnerships and governance

[54] Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM/2011/244 final).

2. EVALUATION OF THE EU BIODIVERSITY STRATEGY TO 2020

In March 2022, the Commission published the report of a support study on the evaluation of the Strategy implementation[55] assessing its effectiveness, efficiency, relevance, coherence and EU added value. It concluded that progress towards the headline target has been limited, and the target has not been reached. None of the six targets of the Strategy have been fully achieved, despite numerous actions being undertaken. Biodiversity, and the flow of benefits from healthy ecosystems, has continued to decline in the EU[56] and globally[57]. Although many of the Strategy's actions have been delivered, progress on the ground has been too slow and uneven, and its effect limited by continued pressures on biodiversity from human activities[58]. The findings of the evaluation study indicate that, in terms of implementation progress[59]:

- **Progress to the headline target has been limited.** There have been positive examples of pressures reduction, restoration and sustainable management of ecosystems, that demonstrate the feasibility of halting and reversing biodiversity loss. However, their scale has been too small to reverse degradation, and the loss of biodiversity and ecosystem services has continued in the EU and globally.
- **Progress to Target 1 has been moderate** (despite significant progress in implementing the actions). Less than half (47 %) of all species assessments under the Birds Directive, and only 15 % of habitat assessments under the Habitats Directive showed good status in the 2013-2018 reporting period (a decrease compared to the 2010 biodiversity baseline). The proportion of species assessments under the Habitats Directive that show favourable status or improving trends has increased from 17 % to 27 %. Despite progress in designation, the achievement of favourable conservation status has been hindered by management deficiencies such as a lack of adequate conservation objectives and measures for many sites, conflicting land management objectives, and funding constraints (funding has increased but remains clearly insufficient).
- **Progress to Target 2 has been limited** (despite significant progress in implementing the actions). The initiative on the Mapping and Assessment of Ecosystems and their Services (MAES) has helped to build a significant knowledge base on EU ecosystems and the services they provide, and the EU Green Infrastructure Strategy (2013) has helped to mobilise funding for green infrastructure from EU instruments. The Commission has provided guidance to the Member States on developing Restoration

[55] Trinomics B.V. (2021) Support to the evaluation of the EU Biodiversity Strategy to 2020, and follow-up: Final study report (Publications Office of the EU, 2022).

[56] European Environment Agency, State of Nature in the EU 2020, European environment — state and outlook 2020 (SOER), 2020.

[57] Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

[58] In particular related to land take and use intensification, the over-extraction of biological resources (such as timber and fish), pollution (such as pesticides and nutrients), and the increasing impacts of climate change and invasive alien species. See EU Ecosystem assessment (JRC 2020).

[59] See SWD/2021/XXX, Section 3.1. Implementation progress.

Prioritisation Frameworks to advance towards the 15 % restoration target. However, only a few Member States have presented such frameworks and restoration progress has been slow and uneven. Pressures on ecosystems continue and affect their capacity to deliver essential benefits to people.

- **Progress to Target 3 has been limited** (despite moderate progress in implementing the actions). Biodiversity has continued to decline in agricultural habitats, and to a lesser extent in forests. In agroecosystems, these declines have been primarily because of two trends: (i) intensification of cultivation techniques on most grasslands and croplands, involving high fertiliser and pesticide use, crop specialisation, increases in field size and losses of non-farmed habitats and landscape features, on the one hand, and (ii) agricultural abandonment (and in some cases, conversion) in semi natural habitats, such as semi-natural grasslands. In forest ecosystems, investments in improving forest resilience, including biodiversity aspects, were included in more than two-thirds of the national Rural Development programmes, however payments for biodiversity had a limited uptake. Budgets and uptake have been far below the scale of implementation required for Member States to meet their legal obligations under the Habitats and Birds Directives.
- **Progress to Target 4 has been limited** (despite moderate progress in implementing the actions). Thanks to measures under the revised Common Fisheries Policy, several commercial fish stocks have shown recovery. However, other stocks have continued to be overfished and/or are outside the safe biological limit. Data gaps (on the status and trends of marine ecosystems) hinder the design of effective marine biodiversity measures. Further pressures from land and sea use, pollution, invasive alien species and climate change need to be addressed to achieve Good Environmental Status of marine ecosystems.
- **Progress to Target 5 has been limited** (despite full implementation of the actions). The adoption of the IAS Regulation and the strengthening of the EU plant and animal health regimes have been important first steps to combat IAS in the EU. Implementation on the ground is still in its early stages and its full impact is yet to be realized. Invasive alien species remain a persistent and growing threat across the EU ecosystems.
- **Progress to Target 6 has been limited,** despite measures to increase financing and support for global biodiversity, tackle illegal wildlife trade and some drivers of global biodiversity loss related to EU consumption (such as deforestation). Biodiversity and ecosystem functions and services are deteriorating worldwide.
- **Horizontal measures** (governance, partnerships and financing) have been moderately successful: there are many examples of partnership-building activities across the targets, with actions focused on information-sharing and collaboration. Significant action has been undertaken to integrate biodiversity objectives in the EU policies in the 2014-2020 budget and to increase the contribution of related funding instruments to EU and global biodiversity. However, funding has continued to be a major limitation to implementation across all targets. The lack of legally binding provisions, and the

absence of a dedicated financing instrument have been identified as challenges for funding mobilisation.

The Strategy and its targets were widely recognised by experts and stakeholders as being **relevant** to the EU's needs with respect to biodiversity, as evidenced by the literature review, stakeholder interviews and national case studies. However, stakeholders consulted in the course of the evaluation support study have pointed to issues that should have been given greater prominence such as **climate change**; **cultural heritage and landscapes**; more emphasis on **the range of ecosystems** and the **range of pressures on biodiversity** in each main ecosystem type in the EU.

The evaluation lessons emerging in the course of the evaluation support study have been considered in the development of the EU Biodiversity Strategy for 2030, and they will inform the design of measures to deliver the 2030 commitments. Findings and lessons of pertinence to the impact assessment of binding EU nature restoration targets are presented below.

3. KEY FINDINGS OF RELEVANCE TO THE EU NATURE RESTORATION TARGETS

3.1. Achievements in implementation

The implementation of the Strategy has been associated with a range of positive achievements and impacts[60]:

- **Examples of successful local protection and restoration**, including the restoration of degraded vulnerable habitats and the return of emblematic bird and mammal species, as well as deployment of nature-based solutions and green infrastructure. While projects financed to date often do not have the critical mass to reverse the trends of biodiversity loss, ***they have demonstrated the feasibility of biodiversity protection and restoration, as well as the benefits arising from healthy nature***. Evidence overwhelmingly indicates that the benefits flowing from healthy ecosystems far exceed the costs related to their protection, restoration and sustainable management, across all biodiversity targets[61].
- **The EU Green Infrastructure Strategy**[62] has encouraged the inclusion of green infrastructure measures in various national biodiversity strategies and plans and policy documents, such as on the sustainable development of coastal areas, climate change adaptation strategies, and EU urban policy[63]. Increased political momentum and actions by cities to create green infrastructure have also been noted in some Member States.
- The implementation of the Strategy has resulted in **significant improvements of the knowledge base on ecosystems and their services**, via the initiative on the Mapping and assessment of ecosystems and their services, with the involvement of national

[60] See SWD/2021/XXX, Section 5.1 Effectiveness, 5.1.2. Major achievements and challenges, and underlying factors.

[61] See SWD/2021/XXX, Section 5.2 Efficiency, 5.2.1. Cost-effectiveness and socio-economic impacts.

[62] EU Green Infrastructure Strategy (COM/2013/249 final).

[63] Review of progress on the implementation of the EU green infrastructure strategy (COM/2019/236 final).

authorities and the science and research community in all Member States. The methodological framework was applied in the first EU-wide assessment of ecosystems and their services published by the Commission at the end of 2020. Member States have also developed initiatives to engage stakeholders and citizens in knowledge and monitoring work, thus supporting both data collection and awareness raising.

3.2. Failures in implementation

Despite these successes, the evaluation also identified significant shortcomings. These include, in relation to restoration efforts:

- While there are examples of local restoration success, ***data on ecosystem restoration efforts in the EU is incomplete***. The non-binding nature of the Strategy means that there are no reporting mechanisms linked to it (beyond those established under existing legislation)[64].
- Estimates in studies suggest that ***restoration activity is significantly below what would have been required*** to reach the target of restoring 15 % of degraded ecosystems: between 2 850km^2 and 5 700 km^2 of habitat restoration is occurring annually in the EU, whereas the restoration needs of Annex I habitats alone (i.e. assessments reported in ′not good′ condition) are estimated at between 167 000 km^2 to 263 000 km.
- The Commission provided guidance (in 2014) and requested the Member States to develop ***Restoration Prioritisation Strategies*** in order to improve the quality, scale and consistency of ecosystem restoration, whilst also defining areas of intervention which can be used to target EU funds. However, very few Member States developed and submitted such strategies. ***The absence of Restoration Prioritisation Frameworks (RPF) has been a barrier to the strategic planning, financing, implementation and monitoring of restoration activities.***
- ***Challenges to the achievement of the Nature Directives***[65] related to the availability and targeting of funding and other resources, weaknesses in the management of Natura 2000 sites, and incoherence with other policies and activities.
- ***Approaches to implementation and the uptake of biodiversity support measures in EU instruments*** have been uneven across the Member States in the implementation of EU policies and related funding instruments.
- ***Many direct and indirect pressures and drivers of biodiversity loss have persisted or increased***, with a significant proportion of these accelerating in recent times.

3.3. Factors of success or failure

The evaluation identified a range of factors that have enabled or hindered progress, including:

[64] See SWD/2021/XXX, Section 5.1 Effectiveness, 5.1.2. Major achievements and challenges, and underlying factors.

[65] Fitness Check of the EU Nature Directives.

- ***Policy integration.*** Mainstreaming and prioritizing biodiversity objectives in other EU policies is essential, considering the complex interactions between biodiversity, the provision of ecosystem services, the impacts of land, water and sea use and management and the potential of nature-based solutions to contribute to wider environmental and socio-economic objectives. While policy integration increased under the Strategy, it has remained insufficient. ***Biodiversity targets of voluntary nature were not systematically prioritised for funding in the design and implementation of EU instruments in other policy areas, and measures of low or no positive biodiversity impact were often favoured in national programming.***
- ***Understanding of win-win approaches*** between biodiversity protection and restoration, on the one hand, and wider environmental and socio-economic objectives on the other. Such understanding could increase the deployment of nature-based solutions for biodiversity and climate adaptation, carbon sequestration and storage, disaster prevention and other benefits from healthy ecosystems. Biodiversity loss and climate change are closely linked, yet the potential for synergies between improving ecosystem resilience and nature based solutions, on the one hand, and climate mitigation and adaptation, on the other, has not been sufficiently used. In addition, awareness and understanding of natural capital and nature-related financial risk is needed to encourage greater private sector engagement in efforts to protect and restore biodiversity and ensure its sustainable management.
- ***Resources for implementation.*** Funding for biodiversity has increased since 2010 but remains clearly insufficient. ***Insufficient funding was commonly cited as a key barrier to restoration.*** The Strategy did not specify the biodiversity financing needs and set no target, which was a major setback in securing the needed resources.

Box 1. Cost-effectiveness of biodiversity protection and restoration

Despite significant variations of magnitude in estimates, evidence overwhelmingly indicates that the benefits flowing from healthy ecosystems far exceed the costs related to their protection, restoration and sustainable management, across all biodiversity targets.

The actual costs of Target 2 implementation activities in 2016 were estimated at between €4.8 million and €33.1 million (highly uncertain). The one-off cost of restoring 15 % of degraded ecosystems has been estimated at around €9.6 billion, and the additional cost of maintaining all restored ecosystems in good condition was estimated at €618 to €1 660 million per year. Restoration activity has been significantly below what would be required to fulfil Target 2, and the realised total expenditure during the 2010-2020 period is significantly lower.

The total benefits of implementation across the EU cannot be estimated or monetised due to lack of systematically collated evidence on the restoration undertaken. Economic activity associated with ecosystem restoration has been estimated to be between €11.5 and €79.5 million. Restoration and the deployment of green infrastructure contribute to a range of socio-economic benefits linked to improved air and water quality, flood control, noise reduction, recreation and social opportunities, pollination, soil fertility and

health. The restoration of forest, wetlands and other ecosystems has brought millions of euros in savings across the EU due to lower water retention and purification costs[66, 67]. National parks can generate substantial employment both directly and indirectly in the broader region[68]. Urban green infrastructure can generate benefits in the form of enhanced health and well-being[69]. According to some estimates, 110 000 direct FTE jobs each year can be supported by investment needed to achieve Target 2 (15 % restoration)[70]. However, very little of the required investment and restoration effort has materialised, and thus most of these benefits and jobs were not created.

EU and international studies have shown that investments in marine biodiversity can generate high economic returns in enhanced yields, higher quality fish products, and tourism. Funding allocated to measures for the protection and restoration of marine biodiversity under the European Maritime and Fisheries Fund has been estimated at around €199 million in 2015, €134 million in 2016, €136 million in 2017, €90 million in 2018 and €128 million in 2019. The benefits provided by healthy fish stocks and oceans are immeasurable.

The Strategy has not fully achieved any of its Targets. This means that not only the full benefits provided by the Strategy's targets and actions have not materialised, but also natural capital and ecosystem services are further deteriorating. Other socio-economic impacts, such as health impacts, social vulnerability, and safety, can also emerge due to the failure to protect biodiversity and ecosystems. Human induced biodiversity loss also undermines efforts to mitigate climate change and adapt to its inevitable impacts.

- ***The choice of policy instrument.*** The voluntary nature of the Strategy has been commonly cited by environmental organisations as a key reason for limited action and progress on the biodiversity agenda throughout Europe, particularly in relation to the low response in developing Restoration Prioritisation Frameworks, and restoration efforts lagging far behind the 15 % ambition set in Target 2.

Box 2: The nature of the Strategy as an instrument

The EU Biodiversity Strategy to 2020 had an important role in providing a coherent, strategic EU level framework, giving rise to political commitment, setting common targets, actions and mechanisms for their coordinated implementation and progress tracking, and providing links with other relevant EU policies and legislation. At the same time, the Strategy constituted a largely voluntary framework within which a range of instruments, from voluntary to binding ones, needed to work together to

[66] EEA Report No 6/2016 European forest ecosystems. State and trends.

[67] Siuta and Nedelciu, *Report on Socio-Economic Benefits of Wetland Restoration in Central and Eastern Europe*, a publication by CEEweb for Biodiversity, 2016, Budapest, Hungary.

[68] Nunes et al., *The Social Dimension of Biodiversity Policy: Final Report*, 2011.

[69] European Environment Agency Report No 21/2019 *Healthy environment, healthy lives: how the environment influences health and well-being in Europe*.

[70] ICF et al., *The EU biodiversity objectives and the labour market: benefits and identification of skill gaps in the current workforce*, 2012.

ensure delivery. The evaluation examined whether alternative policy tools would have had the potential to better deliver the targets in a cost-effective manner than a strategy. Implementation experience has helped to identify areas within this wider strategic framework, within which:

- **voluntary mechanisms and incentives worked well based on the motivation of stakeholders to engage** in biodiversity efforts, such as cooperation of front-running businesses in the EU Business@Biodiversity Platform, or the development of green infrastructure in EU regions and cities that had already set for themselves ambitious biodiversity objectives.

- **voluntary instruments worked well in support of the implementation and enforcement of EU legislation** in the Member States, such as the provision of Commission guidance on Natura 2000 for different sectors, or the biogeographical cooperation process helping to implement the EU Nature Directives.

- **reliance on voluntary instruments alone was not sufficient to ensure delivery,** in particular when urgent, strategic and large scale action was needed. This was the case of one of the flagship targets to reverse biodiversity loss: Target 2 to restore at least 15 % of degraded ecosystems in the EU, which also reflected the global Aichi Target and the EU's commitment under the Convention on Biological Diversity.

Legislative and regulatory instruments are the main tool for environmental policy and have been widely used at EU level. According to SOER 2020 , there are significantly fewer binding targets for biodiversity than for other environment areas, such as climate change, air pollution, waste, and chemicals. When biodiversity policy objectives and targets are not met (as has been the case for several consecutive biodiversity policy instruments), there is a tendency to reiterate them and extend the timeframe for their achievement. SOER 2020 points to six key areas for bold action, one of which is the development of systemic policy frameworks with binding targets to mobilise and guide actions across actors and levels.

It was a clear conclusion of the evaluation, and a view held by a high number of stakeholders consulted that, while voluntary instruments could play an important role in certain contexts, the lack of legislative teeth was a significant factor in the Strategy's failures in effectiveness and cost-effectiveness. For the operationalisation of the biodiversity targets, the Strategy could have benefited from a different combination of regulatory and market-based instruments. The EP Resolution of January 2020 called upon the Commission to "move away from voluntary commitments and to propose an ambitious and inclusive Strategy that sets legally (and, consequently, enforceable) binding targets for the EU and its Member States".

- ***Clearly formulated, measurable targets.*** Many of the Strategy's targets and actions were not measurable or specific enough to guide implementation and enable the

monitoring of results. For example, challenges to restoration have arisen from the ***ambiguity of the 15 % restoration target***[71]: the ecosystems it referred to[72], how to measure the achievement of the objective[73], unclarity of what restoration activities comprise, and the absence of baseline information to define what 'degraded' ecosystems are.

- ***Knowledge*** (including cooperation and dialogue between policy-makers and science and research stakeholders) is essential for evidence-based decision-making, robust policy development, implementation and monitoring. Gaps in data and monitoring (including on pressures and their impacts on biodiversity) or lack of transparency and access to data have hindered progress in the implementation of the Strategy. At the same time, knowledge needs have been recognized and the Strategy has supported the development and application of common methodologies for the mapping and assessment of ecosystems and their services, and and approaches to reflect the value of biodiversity in decision-making[74].
- ***Clear responsibilities for implementation, co-ordination and cooperation between relevant stakeholders.*** Most stakeholders consulted in the course of the evaluation considered that the Strategy had either 'partially' or 'poorly' engaged stakeholders in implementation, in particular at national/regional levels. Stakeholders noted that the governance of the Strategy had contributed significantly to access to information on the state of biodiversity, yet it has not achieved cooperation and coordinated action across policy areas. Private sector engagement has been regarded as a significant untapped potential to reduce pressures on biodiversity from business activities.
- Last but not least, ***political priority*** given to biodiversity protection and restoration, especially vis-à-vis other policy objectives, is essential for successful implementation.

4. KEY LESSONS AND THEIR RELEVANCE TO THE NATURE RESTORATION INITIATIVE

1. Effective implementation requires specific, measurable targets with clear definitions, timelines and responsibilities for implementation.

In relation to nature restoration, the proposed EU Nature Restoration Law will set out concrete definitions, targets, timelines and responsibility for implementation.

2. Well-designed biodiversity protection, restoration and sustainable use measures can bring wider environmental and socio-economic benefits

The proposed EU Nature Restoration Law puts a strong emphasis on biodiversity as well as socio-economic benefits for restoration, in particular support to climate mitigation and

[71] European Habitats Forum *Detailed Response to the EU Biodiversity Strategy*, 2011.

[72] Tucker et al., *Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy*, Report to the European Commission, Institute for European Environmental Policy, 2013.

[73] European Court of Auditors, Special Report no 13/2020 *Biodiversity on farmland: CAP contribution has not halted the decline*.

[74] *Guidance on the integration of ecosystems and their services in decision-making*.

adaptation, disaster risk reduction and the provision of a range of further ecosystem services.

3. Actions to halt and reverse biodiversity loss needs to cover the range of pressures on all main ecosystem types

The impact assessment for the EU Nature Restoration Law has carefully considered the range of main EU ecosystem types and the feasibility of setting targets that tackle both pressures (passive restoration) and active measures to restore degraded ecosystems. Where sufficient evidence was available, concrete targets have been proposed. Where further research is needed, the legislation includes provisions for strengthened monitoring to collect the evidence needed.

4. A mixture of policy instruments is needed to deliver the biodiversity commitments

The approach to an overarching strategic framework for coherent biodiversity action has been retained in the EU Biodiversity Strategy for 2030. At the same time, a range of policy instruments are envisaged to deliver its commitments, from a new Nature Restoration Law through to strengthened financing and partnerships.

5. A substantial increase of funding is necessary, with a robust tracking system

The EU Biodiversity Strategy for 2030 indicates the scale of funding that needs to be made available for the implementation of the Strategy and sets out measures to meet the implementation funding needs. This is matched by an increased funding ambition for biodiversity in the EU budget for the 2021-2027 period. Legal restoration targets are expected to both strengthen the mainstreaming of measures in support of restoration in EU instruments, and the uptake of such measures at the national level.

6. EU programmes and instruments should be biodiversity-proof to ensure no harm

Nature restoration targets and the need to ensure the sustainability of restored ecosystems will be taken into account in the biodiversity proofing of EU programmes and instruments.

7. A robust biodiversity governance framework is needed to ensure evidence-based policy-making, stakeholder engagement, responsibility for implementation, and robust and transparent monitoring and review mechanisms

The Commission put in place, in 2022, an enhanced governance and monitoring framework for the EU Biodiversity Strategty for 2030.

Lesson 8. Knowledge, awareness, capacities and skills are crucial to support action on biodiversity across all parts of society, sectors and levels

In synergy with other EU instruments, the Nature Restoration Law will encourage actions in the Member States to strengthen knowledge, awareness and skills for restoration.

Lesson 9. Biodiversity loss and climate change are inter-linked and need to be tackled together

The proposed Nature Restoration Law builds on the strong synergies between restoring healthy ecosystems and the benefits they provide for climate mitigation and adaptation.

Annex X: Coherence with EU legislation and policy initiatives related to nature restoration; approach to non-deterioration

This annex includes:

1. Synergies and added value of the Nature Restoration Law with respect to BHD, WFD, MSFD and climate regulation.
2. An overview (table) of policy initiatives and laws that are existing and currently in preparation as well as how they (could) relate to the setting of legally binding restoration targets.
3. The approach to ensure non-deterioration of ecosystems that are in good condition and of those that still need to be restored.

1. Synergies and added value of the Nature Restoration Law with respect to BHD, WFD, MSFD and climate legislation.

Birds and Habitats Directives (BHD):

Based on the arguments presented below, the **added value of the new legislation on restoration** will be:

1) to set a clear **deadline** for achieving good status for species and habitats of EU conservation concern (all birds, habitats and species listed in the Habitats Directive's annexes);
2) to create **explicit restoration obligations** for species and habitats of EU conservation concern outside the Natura 2000 network;
3) to give a **real impetus to restoration in Natura 2000** as well as in other protected areas (30 % voluntary conservation improvement target for both terrestrial and marine set out in EU Biodiversity Strategy);
4) put in place a **strategic restoration** planning by Member States up to 2050, thereby creating a mechanism to achieve good status which would address in a coherent way the restoration needs under the Habitats, Birds, Water Framework and Marine Strategy Framework Directives;
5) to set **restoration targets** for ecosystems not explicitly / comprehensively covered by existing legislation, such as soil, pollinators, urban;
6) to **create strong links with the climate mitigation and adaptation agenda** by requiring Member States to prioritize the most climate relevant restoration, i.e. creating a win-win situation.

The **Birds Directive** aims to protect all wild bird species and their habitats across the EU.

It requires restoration of bird populations to favourable conservation status (FCS)[75] for all 460 species of naturally occurring birds in the wild state in the European territory of the Member States to which the Treaty applies.

However, the Directives' specific provision on restoration mainly relate to the habitats of bird species for which Member States have to classify, protect and conserve Special Protection Areas (part of the Natura 2000 network), which cover 197 species and sub-species listed in Annex I of the directive as well as regularly occurring migratory species not listed in Annex I. Outside Natura 2000, while there is a more general duty under Article 3 of the Directive to maintain or re-establish a sufficient diversity and area of habitats for all 460 species of birds, these provisions are more general and harder to implement/enforce.

The Habitats Directive covers 1200 threatened or endemic species of wild animals and plants, collectively referred to as species of Community interest (listed in its Annexes II, IV and V), as well as 233 rare habitat types, listed in its Annex I.

The Habitats Directive requires restoration to FCS for all habitat types and species of Community interest. However, its specific provisions on restoration relate to Annex I habitats as well as habitats of the species listed in Annex II within Special Areas of Conservation (part of the Natura 2000 network). Outside Natura 2000, there is no specific provision on restoration for habitat and species of Community interest, albeit the achievement of the directive's objective would require restoration to happen.

The Natura 2000 network on land currently covers 18 % of the EU surface, ranging from 8,3 % in Denmark to 36,7 % in Croatia, which reflects differences in biodiversity richness but also different designation strategies by the MS. The network covers approximately 34 % of the surface of all Annex I habitat types, which means that about two thirds lies outside.

Therefore, it can be concluded that – as regards the Habitats and Birds directives - the areas for which there is no specific provision on restoration cover all land and sea that do not fall within Natura 2000 sites, i.e. the majority of the EU territory, large parts of which are undergoing continuous degradation (EU Ecosystem Assessment 2020).

Moreover, since the Birds and Habitats Directive do not specify a deadline by which FCS shall be reached, the pace of implementation of measures towards this goal has been very slow; action has been concentrated in setting up Natura 2000 sites and to date it has been mainly linked to protection of the habitats and species in the sites, rather than to their restoration.

[75] The Environmental Liability Directive (Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage) has de facto equated the Birds Directive objective to the one of the Habitats Directive, as it applies the concept of favourable conservation status (FCS) to birds, too.

Although protection and restoration of habitats (e.g. peatlands) under the Birds and the Habitats Directive will benefit soil health and soil biodiversity, this is not an explicit objective of the Directives. Furthermore, although some pollinators are protected under the Habitats Directive (e.g. rare butterfly species) and they also benefit from habitat conservation measures (e.g. for grasslands) they are not a particular focus of the Nature Directives. Finally, there is no EU legislation requiring the restoration of urban ecosystems.

Water Framework Directive (WFD) and Marine Strategy Directive (MSFD)

The Nature Restoration Law proposal and in particular the freshwater and a marine targets will

- Support an **acceleration** of the implementation of both the MFSD and the WFD;
- Can cover topics which go **beyond** the direct scope of application of both the MFSD (fine grained detail for several marine habitats) and the WFD (free flowing rivers, connectivity with riverine habitats, and small water bodies);
- Support efforts to secure a **more frequent and regular** monitoring of the actual state of biodiversity, in line with the more frequent and regular monitoring promoted under the 8th EAP and, more recently, under the Zero Pollution Action Plan too.

The fact that MS would have to set out National Restoration Plans on how to reach the above targets, further requirements to address key pressures on both marine and freshwater ecosystems can be introduced. These can accelerate the implementation of both the MFSD and the WFD – paving the way for a more ambitious approach to both MFSD and WFD targets, notably beyond the, respectively, 2020 and 2027 legal deadlines for achieving good status for all seas, rivers and lakes, transitional and coastal water bodies.

Marine environment:

In the future in particular for **marine species**, the legal proposal can pave the ground for a much more granular monitoring of data on all these species, allowing to set targets for species in a second step, as soon as Member States will have collected sufficient data. In this context, synergies will be sought with the upcoming "Action plan to conserve fisheries and conserve marine ecosystems", which builds on the Technical Measures report adopted last September and which will, among a variety of actions, focus on certain individual species. Habitats (for example seagrass beds) harbour an abundant variety of species. Protecting habitats therefore has the added value of restoring both ecosystems as well as those (non-resident) species that rely on these habitats. Habitats are more easily monitored and progress can be registered over a short-medium period of time. Focusing on restoring them as a first step makes sense.

Also in the future there is a possibility to turn the indicators used to achieve the marine targets into indicators to achieve Good Environmental Status under the MFSD. Progress towards achieving the restoration targets could thus feed into progress under the MSFD.

There are also synergies in terms of better cross-linking the reporting on restoration efforts (hence better integrate the policy objectives) under the MSFD, WFD and HD to be able to tell a comprehensive story of marine environmental protection.

Freshwater environment

The targets proposed for "Rivers, lakes and riverine/alluvial habitats" would stimulate synergistic for the WFD. In particular, the restoration target in the form of a requirement to map and, where possible, remove obsolete barriers, as an opportunity to:

- accelerate the implementation of the WFD;
- help to maintain good status / non deterioration after 2027.

Achieving WFD objectives will in itself contribute to the 2030 BD target (considering that 20 out of 32 Annex I Habitats Directive categorised as "rivers, lakes and alluvial habitats" are rivers and lakes), and will contribute to the 2050 BD target by enabling a prioritisation of barriers to be removed. The prioritisation will build upon the systematic approach taken under the WFD, enabling to identify

1) barriers justified under Art 4(3) WFD;

2) barriers in natural river water bodies and measures required to achieve good status (possibly but not necessarily taking down barriers) and

3) barriers whose removal can be carried out in the most cost effective manner, to achieve high status/free flowing rivers and create floodplains to the benefit of ecosystems outside, yet directly dependent on, water bodies.

Similarly, the requirement to map out smaller water units, which may not be part of the WFD delineated water bodies, to verify how severely they have been impacted, the primary pressures and the current conditions they are in, can help pave the way towards setting specific restoration targets in a second stage, and ultimately could play a critical role in meeting the EU restoration policy objectives by 2050, by closing existing data gaps of unmapped and unknown habitats and conditions.

Climate Legislation

Enabling effective implementation will also be supported by establishing effective synergies with climate legislation.

A specific opportunity is the review of the Regulation on land use, land-use change and forestry (LULUCF). This work would develop monitoring requirements on LULUCF emissions and removals, particular from high carbon stock land, land under protection or restoration provisions, and land with high climate risk, and explicitly link to the land definitions in environmental legislation. This would in the longer term enable cross referencing between land-based climate change mitigation, and adaptation, disaster risk

reduction and ecological condition. This would lead to better cross correspondence between climate law and the restoration law in the longer term.

A related opportunity is the forthcoming mandatory requirement to ensure progress in adaptation to climate change under Article 4 of the EU Climate Law, to adopt and implement national adaptation strategies and plans, and to promote nature-based solutions and ecosystem-based adaptation.

2. Overview of links and synergies with EU legislation and policy initiatives

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
EU Directives, Regulations and Decisions			

Birds and Habitats Directives[76]	Existing	• HD Article 2(2) requires that measures taken pursuant to the HD shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest (habitats listed in Annex I and species listed in Annex II and/or IV or V). However, it does not set a deadline or timeframe for achieving this objective.
		• According to HD Article 3, Natura 2000 shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favorable conservation status in their natural range.
		• HD Article 10 furthermore states that MS shall in their land-use planning and development policies encourage the management of landscape features with the aim of improving connectivity within the N2000 network.
		• HD Article 6 is the key provision governing the protection and the management of Special areas of conservation. In particular:
		  ○ HD Article 6(1) states for special areas of conservation, MS shall 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.
		  ○ HD article 6(2) states that MS shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas
			• Definition of good ecosystem status under NRL has to be aligned with favourable conservation status (FCS) under BHD.
			• NRL will support delivering the voluntary target in the BS2030 that habitats and species show no deterioration in conservation trends and status and at least 30 % reach favourable conservation status or at least show a positive trend.
			• Restored ecosystems outside Natura 2000 under NRL could be designated as (strictly) protected areas thus contributing to the relevant BDS2030 targets.
			• The NRL will complement the BHD by: (1) setting a deadline for achieving FCS for birds, Annex I habitats and species listed in Annex II and/or IV or V, which is missing in both the Birds and Habitats Directives; (2) creating more explicit restoration obligations for Annex I habitats and habitats of birds and species listed in Annex II and/or IV or V outside of the Natura 2000 network; (3) putting in place the mechanism to achieve FCS, e.g. by requiring MS to prepare restoration plans; and (4) creating links with the climate change policy, e.g. by requiring Member States to restore carbon and nature rich habitats.

[76] Birds Directive: EUR-Lex - 32009L0147 - EN - EUR-Lex (europa.eu), Habitats Directive: EUR-Lex - 01992L0043-20130701 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive. • The BD requires restoration to FCS for all species of naturally occurring birds in the wild state in the European territory of the Member States to which the Treaty applies. This shall be achieved by means of protection, management and restoration of species and their habitats across the territory of the Member States, as well as in Special Protection Areas (SPA) for certain bird species. • By virtue of article 7 of the HD, obligations arising under Article 6 (2) (and (3) and (4)) of the HD also apply to SPA classified under the BD.	
Water Framework Directive (WFD)[77]	Existing	• Establishes a framework for the protection of inland surface waters (including rivers, lakes, transitional waters, coastal waters) and groundwater which i.a. prevents further deterioration and protects and enhances the status of aquatic ecosystems.	• The NRL definition of good ecosystem condition does not duplicate, nor substitute the 2027 target of good status for all water bodies under WFD; it rather complements it. • In line with the BDS2030, the NRL targets on freshwater ecosystems reinforce and work in synergy with the targets of the WFD (achieve good ecological status for all water bodies by 2027) • NRL targets contribute to accelerate the implementation of WFD and reinforce the synergies between WFD and the nature legislation. • NRL requirement on non-deterioration would match the existing WFD requirement to take measures to prevent deterioration of the status of all bodies of water
Marine Strategy Framework Directive (MSFD)[78]	Existing	• Establishes a framework within which Member States shall take the necessary measures to reach the target of achieving or maintaining good environmental status in the marine environment by the year 2020 at the latest.	• Definition of good ecosystem status under NRL aligned with good environmental status under MSFD. • The MSFD implementation of Art.13 (and the ongoing MSFD review) may consider the NRL targets as measures to achieve good environmental status.

[77] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy EUR-Lex - 32000L0060 - EN - EUR-Lex (europa.eu)

[78] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy EUR-Lex - 32008L0056 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		• Requires MS to develop marine strategies that protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected.	• NRL targets reinforce existing MSFD targets (and do not create a derogation from the deadline/ambition). • NRL targets focus on the maintenance of ecological functions at a higher resolution than the normal management/reporting scales under the MSFD, ensuring consistency and synergy of the policy objectives.
Marine Spatial Planning Directive (MSPD)[79]	Existing	• Requires MS to consider i.a. environmental aspects to support sustainable development and growth in the maritime sector, applying an ecosystem-based approach. • Requires MS to set up marine spatial plans that consider interactions of activities and uses and contribute to i.a. the preservation, protection and improvement of the environment, including resilience to climate change impacts.	• NRL could provide concrete objectives and measures to apply the ecosystem-based approach enshrined in the MSPD • The links between NRL and marine protected areas could provide more certainty and usefulness to the spatial plans
Floods Directive (FD)[80]	Existing	• Establishes a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for i.a. the environment.	• NRL reinforces FD because the restoration of the ability of marine and freshwater ecosystems to provide regulating services, such as natural water retention, could help prevent and mitigate the effects of floods (climate adaptation). • Also, healthy ecosystems are more resilient to the effects of severe floods.
Climate Law	Existing (Regulation 2021/1119 of 30 June 2021).	• Establishes a framework for the irreversible and gradual reduction of greenhouse gas emissions and enhancement of removals by natural or other sinks in the Union. • Sets a legally binding target of net zero greenhouse gas emissions (climate neutrality) by 2050 and negative emissions thereafter. • Introduces a new EU target for 2030 of reducing net greenhouse gas emissions by at least 55 %, compared to 1990. This includes the review and possible revision of climate and	• NRL, by focusing on restoring ecosystems with a high potential for climate adaptation/mitigation (e.g. through carbon removals), will contribute to achieving Climate Law targets. • The Climate Law contributes to the NRL by strengthening EU policies on climate change (both mitigation and adaptation), which is a major pressure on biodiversity loss. • The Climate Law acknowledges the role of ecosystem restoration in maintaining, managing and enhancing natural sinks and promoting biodiversity (consideral 23).

[79] Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning EUR-Lex - 32014L0089 - EN - EUR-Lex (europa.eu)

[80] Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks EUR-Lex - 32007L0060 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		energy laws to be able to achieve this updated target (fit for 55 package). • Requires MS to develop and implement adaptation strategies to strengthen resilience and reduce vulnerability to the effects of climate change. • Strengthens existing provisions on adaptation to climate change. • Establishes a framework for achieving progress in pursuit of adaptation goals, in a consistent manner in all policy areas, including biodiversity (in particular nature-based solutions).	• Under the Climate Law, Member States shall promote nature-based solutions and ecosystem-based adaptation.
Climate Governance Regulation[81]	Existing	• Specifies common rules on the planning, monitoring and the reporting of climate action, in particular emissions and removals associated to land use, land-use changes and forestry.	• The review of the LULUCF Regulation proposes to introduce high-level monitoring provisions for land with high carbon stock, land under restoration, land under protection and land with high climate risk. • The NRL would allow to amend this list, when restoration targets will be clarified.
Environmental Impact Assessment Directive (EIAD)[82]	Existing	• Requires 'developers' to do an environmental impact assessment for a wide range of defined public and private projects, and covers impacts on biodiversity, with particular attention to species and habitats protected under BHD.	• The potential NRL requirements for non-deterioration and to identify, describe, assess and disclose the impacts of (new) sectoral policies likely to exacerbate ecosystem degradation processes, could be aligned with the EIA Directive. • NRL could say that assessment of project-level impacts needs to be done according to the EIAD where this could apply, including for interests that go beyond the species/ habitat protected under the BHD.
Strategic Environmental Assessment	Existing	• Examines the likely environmental impacts of certain plans or programmes in order to take them into account in the decision-making process, with the aim of achieving a high-	• The potential NRL requirements for non-deterioration and to identify, describe, assess and disclose the impacts of (new) sectoral policies likely to exacerbate ecosystem degradation processes, could be aligned with the SEAD.

[81] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action EUR-Lex - 32018R1999 - EN - EUR-Lex (europa.eu)

[82] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment EUR-Lex - 32011L0092 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Directive (SEAD)[83]		level protection of the environment and to promote sustainable development.	Restoration plans under the NRL themselves would also require SEAD.
Eel Regulation No 1100/2007[84]	Existing	• Sets a framework for the recovery of the European Eel.	• NRL will greatly help in the restoration of eel habitats (in particular in river and coastal areas) and ultimately in the recovery of eels.
Common Fisheries Policy (CFP)[85]	Existing	• Lays out rules and guidance on the conservation, management and sustainable exploitation of living aquatic resources. • The CFP provides a framework for the conservation of marine biological resources and the management of fisheries and fleets exploiting those resources; it aims to ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and consistent with achieving socio-economic benefits.	• NRL marine targets could contribute to achieve sustainable fishing.
Common Agricultural Policy (CAP)	Existing (renewal being negotiated)	• To reach the MFF/NextGen target to spend 30 % on climate objectives, 40 % of CAP spending must be dedicated towards these objectives. If CAP budget will be spent on e.g. carbon removals, this would contribute to achieving the NRL targets.	• Possible NRL targets on agroecosystems may also be addressed by the CAP, e.g. in terms of crop diversity, nutrient balance, fertiliser use, pesticide use and risk reduction. Depending on the target some indicators might be available under CAP monitoring. • NRP might introduce additional targets/indicators on agroecosystems that supplement requirements in the coming CAP to further improve the balance between farming and nature. For such cases, CAP might not provide the framework for monitoring and evaluation.
Environmental Accounts Regulation (EAR)	Incoming	• Proposes a new ecosystem accounting module providing legal definitions of ecosystem extent, ecosystem condition, conversion and ecosystem services, as well regular reporting on these by MS.	• Definitions under EAR and NRL are streamlined where beneficial.

[83] Assessment of the certain effects of plans and programmes on the environment Directive 2001/42/EC of the European Parliament and of the C... - EUR-Lex (europa.eu)

[84] Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel EUR-Lex - 32007R1100 - EN - EUR-Lex (europa.eu)

[85] Common fisheries policy (CFP) (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Environmental Liability Directive (ELD)[86]	Existing	• Establishes a framework of environmental liability, i.a. to prevent and/or remedy environmental damage to water, protected species and natural habitats (both within and outside N2000 under certain circumstances, as confirmed by the Commission Guidelines/Notice on environmental damage in paragraph 90) through restoration of the environment to its baseline condition - in case of strict/fault-based liability.	• The potential NRL requirements might contribute to knowledge of baseline conditions through monitoring, and knowledge of remediation techniques through methodological provisions on restoration. • ELD establishes a precedent of legally binding prevention and restoration obligations outside N2000. • "Environmental damage" under ELD includes not only damage to Annex I habitats themselves but impairments of the "natural resource services" that they provide. As paragraph 42 of the Notice notes, these can include carbon services and flood protection.
LULUCF Regulation 2021-2030	Existing (Regulation 2018/841)	Establishes a non-debit rule at MS level, Require that all land categories contribute to the reduction of emissions and the enhancement of removals. • MS forest reference levels should be consistent with the objective of contributing to the conservation of biodiversity.	MS have published national forest accounting plans, which, among other, explains how forest reference levels are consistency with biodiversity conservation objective.
LULUCF Regulation 2021-2030 (525/2013) proposal	Existing COM (2021) 554 final	• Strengthen LULUCF objectives at EU and MS level. • Compliance reports shall include an assessment of synergies between mitigation and biodiversity. • Maps and monitors certain habitats relevant for restoration. • Potential co-benefits for restoration in terms of carbon sinks in the land use sector.	• Monitoring requirements are being streamlined (through amendments to the Governance Regulation). NRL will be able to update the elements introduced by the LULUCF Regulation Review. • LULUCF targets will push Member States to enhance natural carbon sinks. • Compliance reports will assess synergies between climate and biodiversity
8th Environmental Action Programme (Commission proposal for a Decision of the	Being adopted, provisional agreement reached by co-legislators on December 1, 2021	• Legal framework that guides environmental and climate policymaking and implementation until 2030. • Includes a policy objective to i.a. restore biodiversity. • Lists potential indicators that overlap with the NRL (common birds, grassland butterflies, fish stock, and land take or soil cover/ sealing). • Potential co-benefits for restoration.	• The foreseen 8th EAP headline indicator set should be coordinated with the indicators and monitoring foreseen in the NRL, to ensure overall coherence and reduction of administrative burden.

[86] Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage CL2004L0035EN0040010.0001.3bi_cp 1..1 (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
EP and Council)[87]			
Taxonomy Regulation[88] Delegated acts on (1) biodiversity and ecosystems, (2) Climate Adaptation and (3) Mitigation	Existing and Incoming, 2021. Climate delegated act (Del Reg 2021/2139)	• It outlines criteria for activities so that they substantially support at least one of six areas (incl. biodiversity and ecosystems) without doing any significant harm to another. • Economic activities qualifying as environmentally sustainable will support reaching the NRL targets for protection and restoration of ecosystems. • Restoration of wetlands (including peatlands) is identified as a sustainable investment under the EU Taxonomy Regulation Climate Delegated Act.	• The Taxonomy Regulation and its Delegated Act defines technical screening criteria for sustainable activities, including ○ Biodiversity DNSH criteria for activities with a significant contribution to climate change mitigation or adaptation ○ Mitigation and adaptation DNSH criteria for activities with a signification contribution to biodiversity and ecosystem restoration.
Legislation and guidance on green public procurement (to boost NBS)[89]	Incoming, 2022	• The existing EU GPP sets criteria to facilitate the inclusion of green requirements in public tender documents with the aim to reach a good balance between environmental performance, cost considerations, market availability and ease of verification. • Potential co-benefits for restoration when environmental performance criteria reduce pressures on biodiversity.	
Invasive Alien Species (IAS) Regulation[90]	Existing	• Invasive alien species (IAS) generally cause damage to ecosystems, reduce their resilience, including to climate change and affect (mostly negatively) the ecosystem services provided. • Degraded ecosystems are particularly prone to the establishment of IAS. Many IAS thrive particularly in heavily modified, ecologically degraded environments. • The IAS Regulation calls for undertaking proportionate restoration measures to strengthen the ecosystems' resilience towards invasions and to repair the damage caused.	• The list of IAS of Union concern was updated the last time in 2019 and currently includes 36 plants and 30 animals. A new update of the list is currently under preparation. The species listed are to be addressed as a priority across the Union. As these may negatively affect a wide range of ecosystems, whether terrestrial, aquatic or marine, implementation of the measures foreseen under the IAS Regulation contribute to the objectives of the NRL. • On the other hand, the NRL can be expected to contribute to achieving the objectives of the IAS Regulation as ecosystem restoration often requires the removal of invasive alien species.

[87] Decision of the European Parliament and of the Council on a General Union Environment Action Programme to 2030. 8EAP-draft.pdf (europa.eu)

[88] EU taxonomy for sustainable activities | European Commission (europa.eu) EU Taxonomy Climate Delegated Act: EUR-Lex - C(2021)2800 - EN - EUR-Lex (europa.eu)

[89] Case studies and recommendations: Public procurement of nature-based solutions - Publications Office of the EU (europa.eu)

[90] Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species EUR-Lex - 32014R1143 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		• Article 20 of the IAS Regulation requires Member States to "carry out appropriate restoration measures to assist the recovery of an ecosystem that has been degraded, damaged, or destroyed by invasive alien species of Union concern unless a cost-benefit analysis demonstrates, on the basis of the available data and with reasonable certainty, that the costs of those measures will be high and disproportionate to the benefits of restoration. • Article 20 further specifies that these restoration measures shall include at least the following: (a) measures to increase the ability of an ecosystem exposed to disturbance caused by the presence of invasive alien species of Union concern to resist, absorb, accommodate to and recover from the effects of disturbance and (b) measure to support the prevention of reinvasion following an eradication campaign. • Article 21 of the Regulation states that, in accordance with the polluter pays principle Member States shall aim to recover the costs of measures needed to prevent, minimise or mitigate the adverse impacts of invasive alien species, including environmental and resources costs as well as the restoration costs.	Restored, healthy ecosystems can reduce the risk of establishment of new IAS and reduce their spread in the case of already established ones. • A pre-requisite for ecosystems to qualify as restored under the NRL could be that IAS are removed or controlled so that they don't significantly alter their main structure and function.
National Emission reduction Commitment Directive (NECD)[91]	Existing	• Sets national reduction commitments for the periods 2020-29 and 2030 onwards for a range of air pollutants that affects ecosystems and biodiversity negatively and contributes to off-setting restoration efforts through eutrophication, acidification and tissue damage. • NECD helps reduce pressures on biodiversity loss, thereby also contributing to the foreseen non-deterioration requirement under the NRL.	

[91] Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC EUR-Lex - 32016L2284 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Regulation on deforestation-free products[92]	Existing	• This Regulation does not cover restoration but focuses on minimising deforestation and forest degradation. • It aims to guarantee that the products that EU citizens consume on the EU market do not contribute to deforestation and forest degradation within the EU and globally.	
EU strategies, programmes or initiatives			
European Green Deal[93]	Existing	• Key elements of the European Green Deal depend on or contribute to the restoration of ecosystems, including the BDS2030, Farm to Fork Strategy, the climate-neutrality ambition by 2050 and the increased climate ambition by 2030, the new EU Climate Adaptation Strategy, the zero pollution ambition/action plan, the Chemicals Strategy for Sustainability, the Circular Economy Action Plan, and the Just Transition Mechanism. Also relevant are the new EU Forest Strategy and the new EU Soil Strategy.	• NRL contributes to various elements of the Green Deal, which are specified in separate rows dedicated to these elements.
Mid-term review and final evaluation of the Biodiversity Strategy to 2020[94]	Existing	• Provides lessons learned related to restoration.	• The following lessons learnt have informed the NRL development: (1) successful local examples demonstrate the feasibility of, and the benefits from restoration, (2) reliance on voluntary instruments alone proved insufficient to mobilise coordinated restoration action of sufficient scale; (3) targets need to be specific enough to guide implementation and monitoring, and backed by clear definitions; (4) insufficient funding is a major barrier to restoration; and (5) an EU-wide monitoring effort is necessary to fill knowledge gaps. For more information see Annex IX.

[92] Proposal for a regulation on deforestation-free products (europa.eu), 17 November 2021

[93] A European Green Deal | European Commission (europa.eu)

[94] Report from the Commission to the European Parliament and the Council the mid-term review of the EU Biodiversity Strategy to 2020 EUR-Lex - 52015DC0478 - EN - EUR-Lex (europa.eu); Trinomics B.V. (2021) Support to the evaluation of the EU Biodiversity Strategy to 2020, and follow-up: Final study report (Publications Office of the EU, 2022) (For a summary of main relevant findings: see Annex IX). The Commission Report on the evaluation of the EU Biodiversity Strategy to 2020 due in April 2022.

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Biodiversity Strategy for 2030 (BDS2030)[95]	Existing	Contributes to restoration through I.a. the following commitments: • Legally binding targets to be proposed in 2021. • No deterioration of any protected habitats and species by 2030 - trend to be positive for at least 30 %. • Organic farming: 25 %. • Landscape features: 10 %. • 50 % reduction of use and risk of chemical pesticides. • 3 billion trees planted. • Reverse decline in pollinators. • Restore 25 000 km free flowing rivers . • New Urban Greening Platform: the Green City Accord. • Invasive alien species: half the number on the red list. • Reduction of pollution from fertilisers. • Reduction of damage to seabed, bycatch.	• NRL contributes to achieving the headline ambition to ensure that by 2050 all of the world's ecosystems are restored, resilient, and adequately protected, and that Europe's biodiversity is on the path to recovery by 2030. • NRL contributes to delivering on the commitment to propose legally binding targets. • NRL goes beyond the BDS2030 by including a non-deterioration requirement not only for HD Annex I habitats and habitats of protected species and within/outside N2000, but also for ecosystems beyond any protection (e.g. those not covered by HD Annex I habitats and habitats of protected species).
Farm to Fork Strategy (F2F)[96]	Existing	Includes targets that have the potential to contribute to restoration by reducing pressures on biodiversity resulting from food production: • Reduce the overall use and risk of chemical pesticides by 50 % and the use of more hazardous pesticides by 50 % by 2030. • Reduce nutrient losses by at least 50 %, while ensuring that there is no deterioration in soil fertility. This will reduce the use of fertilisers by at least 20 % by 2030. • Halve per capita food waste at retail and consumer levels by 2030 (which is to be legally binding once data/baselines become available in 2022). Contributes to restoring agro and marine ecosystems, if done right, through the following: • Target that at least 25 % of the EU's agricultural land is under organic farming by 2030 and a significant increase in organic	• As regards the agriculture related targets of F2F, COM invited MS, in their CAP Strategic Plan, to set explicit national values for those targets, taking into account its specific situation and recommendations. • The reduction of pressures under F2F helps reduce (further) deterioration and thereby decrease the totality of needed restoration. • The requirement of no deterioration in soil fertility under F2F and the non-deterioration requirement under NRL will strengthen one another. • Restoration targets for agro-ecosystems under NRL need to be considered in transition efforts to organic farming under F2F. • The organic action plan under F2F (including the use of CAP interventions) does not include targets that are legally binding target, which can be addressed by the NRL.

[95] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: EU Biodiversity Strategy for 2030 Bringing nature back into our lives (20 May 2020). EUR-Lex - 52020DC0380 - EN - EUR-Lex (europa.eu)

[96] A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system COM/2020/381 final (20 May 2020) EUR-Lex - 52020DC0381 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		aquaculture (which means the environmental status and biodiversity health needs to be improved). • Commitment to bring fish stocks to sustainable levels by applying zero tolerance in the fight against illegal, unreported and unregulated fishing (IUU) and combat overfishing, promote sustainable management of fish and seafood resources and strengthen ocean governance, marine cooperation and coastal management'. • EU carbon farming initiative under the Climate Pact will promote a new green business model based on climate benefits such as carbon sequestration.	• F2F seeks to enforce existing rules and modify the demand side but does not foresee direct restoration activities e.g. establishing no-take zones. NRL can address this gap. • The promotion of business models for carbon sequestration under F2F would support the achievement of targets related to soils under NRL. • Ecosystem restoration under NRL will contribute to the F2F goals by increasing the health of ecosystems that provide services and resilience to the benefit of the food system.
Zero Pollution Action Plan[97]	Existing	• Contributes to restoration by mitigating pollution as a pressure on biodiversity loss, by initiating actions to better prevent, monitor and remedy pollution from air, water, soil and consumer products.	• NRL contributes to monitoring and remedying pollution, including from soil.
Circular Economy Action Plan[98]	Existing	• Sets out a plan to reach a climate-neutral circular economy. More circular natural resource use (e.g. electronics, packaging, plastics, textiles, construction material) can contribute to restoration e.g. by mitigating pressures on biodiversity loss resulting from land use for extracting and processing materials, fuels and food. • Sets out the objective to significantly reduce total waste generation and halve the amount of residual (non-recycled) municipal waste by 2030, i.a. by developing methodologies to minimise the presence of substances that pose problems to heatlh or the environment in recycled materials and articles made thereof. • Mentions that the development of a regulatory framework for certifying carbon removals will be explored to incentivise the uptake of carbon removal and increased circularity of carbon, in full respect of the biodiversity objectives. This can	

[97] Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil' (12 May 2021) EUR-Lex - 52021DC0400 - EN - EUR-Lex (europa.eu)

[98] A new Circular Economy Action Plan For a cleaner and more competitive Europe (11 March 2020) EUR-Lex - 52020DC0098 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		contribute to restoration when carbon removal and storage are nature based, e.g. through restoration of ecosystems, forest protection, afforestation, sustainable forest management and carbon farming/sequestration. • Announces a regulatory framework for certifying carbon removals based on robust and transparent carbon accounting to monitor and verify the authenticity of carbon. • The initiatives under the Circular Economy Action Plan promotes the uptake of carbon removal and increased circularity of carbon in respect of the biodiversity objectives, thereby reducing pressures on biodiversity loss.	
Chemicals strategy for sustainability towards a toxic-free environment (CS)[99]	Existing	Outlines i.a. the following actions related to chemical pollution in the natural environment: • Proposes new hazard classes and criteria in the CLP Regulation to fully address environmental toxicity, persistency, mobility and bioaccumulation. • Ensure that the information made available to authorities on substances allows comprehensive environmental risk assessments by strengthening requirements across legislation • Address the impact on the environment of the production and use of pharmaceuticals in the upcoming pharmaceuticals strategy for Europe. • Support research and development for decontamination solutions in terrestrial and aquatic environments. • Reinforce the regulation of chemical contaminants in food to ensure a high level of human health protection. • CS helps reduce the pressures on biodiversity loss of chemical pollution (e.g. in soils), thereby also contributing to the foreseen non-deterioration requirement under the NRL.	

[99] Chemicals Strategy for Sustainability Towards a Toxic-Free Environment (14 October 2020) Strategy.pdf (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Green Infrastructure Strategy100	Existing	• The Natura 2000 network is at the core of the EU's Green Infrastructure (GI) strategy. Additional measures through GI deployment, including GI projects at EU level, would improve the network's coherence and would help achieve the objectives of nature directives aiming to maintain or restore at favourable conservation status for all species and habitats of Community importance, while at the same time contribute to other targets of the BDS2030. • Depending on the local situation, GI deployment will therefore require both the conservation of existing biodiverse ecosystems in good ecosystem condition, as well as the restoration of degraded ecosystems.	• National Restoration Plans put in place by MS could take into account Green Infrastructure deployment. GI projects will also help achieve the objectives of the NRL, if biodiversity principles are followed.
Sustainable Carbon Cycles communication	Existing (COM (2021) 800 final)	• The Communication sets out short- to medium-term actions to support carbon farming and upscale this green business model to better reward land managers for carbon sequestration and biodiversity protection. By 2030, carbon farming initiatives should contribute 42Mt of CO2 storage to Europe's natural carbon sinks. Measures to achieve this goal include: ○ promoting carbon farming practices under the Common Agricultural Policy (CAP) and other EU programmes such as LIFE and Horizon Europe's "Soil Deal for Europe" research mission, and through national public financing and private finance; ○ standardising the monitoring, reporting and verification methodologies needed to provide a clear and reliable certification framework for carbon farming, allowing for developing voluntary carbon markets; ○ provide improved knowledge, data management and tailored advisory services to land managers, both on land and within blue carbon ecosystem.	• NRL will include targets that can also be contribute to carbon farming, increasing carbon sequestration while often providing important co-benefits for biodiversity and other ecosystem services. Although very site-dependent in application, the following are effective examples of improved land management practices: ○ Afforestation and reforestation that respect ecological principles favourable to biodiversity and enhanced sustainable forest management including biodiversity-friendly practices and adaptation of forests to climate change; ○ Agroforestry and other forms of mixed farming combining woody vegetation (trees or shrubs) with crop and/or animal production systems on the same land; ○ Use of catch crops, cover crops, conservation tillage and increasing landscape features: protecting soils, reducing soil loss by erosion and enhancing soil organic carbon on degraded arable land; ○ Targeted conversion of cropland to fallow or of set-aside areas to permanent grassland;

[100] Green Infrastructure (GI) — Enhancing Europe's Natural Capital (6 May 2013) EUR-Lex - 52013DC0249 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		• The Communication also aims to develop blue carbon initiatives, as using nature-based solutions on coastal wetlands and regenerative aquaculture.	○ Restoration of peatlands and wetlands that reduces oxidation of the existing carbon stock and increases the potential for carbon sequestration. • NRL will also include targets which are effective carbon removal solutions ensuring no negative impact on biodiversity or ecosystem deterioration in line with the precautionary and Do No Significant Harm principles. • NRL will benefit of the the carbon farming challenge: every land manager should have access to verified emission and removal data by 2028 to enable a wide uptake of carbon farming;.
EU Pollinators Initiative[101]	Existing	• Aims to address the decline of pollinating insects, a key structural and functional component across different types of terrestrial ecosystems (agro-ecosystems, forests, wetlands, heathland and scrubs). Restoration of such ecosystems would not be possible without restoration of pollinator populations. • Sets actions to tackle the major causes of pollinator decline, which are at the same time key pressures on ecosystems, such as land use (change), agriculture, pesticides, environmental pollution, invasive alien species.	• There is no overlap, only complementarity and synergies. The NRL would strengthen the Initiative by providing a legal character to its critical elements (overarching objective, monitoring). • The Initiative is currently developing a monitoring system and indicators for pollinators which can be used to set a baseline/target on pollinators and a monitoring obligation under the NRL. • The Initiative's action framework will steer and guide the development of the NRP under the NRL.
Climate Adaptation Strategy[102]	Existing	• Sets out how the European Union can adapt to the unavoidable impacts of climate change. and become climate resilient by 2050. • Proposes actions that push the frontiers of knowledge on adaptation so that we can gather more and better data on climate-related risks and losses. • Promotes nature-based solutions for adaptation • Promotes carbon farming as a new green business model based on climate benefits such as carbon sequestration (CO_2-removal from atmosphere). "Through carbon farming, the Commission will promote a new business model for land-based carbon	• NRL 2050 target that all EU ecosystems are restored by 2050 reinforces the CAS 2050 climate resilience target, and vice versa. • MS can use CAS data on climate-related risks and losses when determining restoration priorities. • NRL contributes to CAS because restoration can be done in a way that it is a NBS for adaption. • NRL will include targets that can also be considered as nature-based solutions for adaptation

[101] EU Pollinators Initiative (1 June 2018) EUR-Lex - 52018DC0395 - EN - EUR-Lex (europa.eu)

[102] Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (24 February 2021) EUR-Lex - 52021DC0082 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		removals, including financial incentives to rollout nature-based solutions".	
Updated Soil Strategy[103]	Existing	• Sets out a number of initiatives to encourage voluntary action by MS. Possible actions including (1) providing support to MS in drafting national action plans to achieve land degradation neutrality; (2) recommending MS to address degraded soil in the context of the CAP; (3) providing guidelines on afforestation and close to nature forestry as means to restore degraded soil; and (4) outlining what is needed/expected in the NRL. • Proposes to tabling a Soil Health Law including measures to achieve good soil health by 2050.	• Soil Strategy outlines what is necessary in the NRL to achieve soil-related objectives. • The Soil Health Law announced in the Soil Strategy (and subject to impact assessment) will contribute to restoring ecosystems, in particular by improving soil health. • NRL binding requirements will substantially contribute to soil objectives, e.g. in light of soil health and soil biodiversity being insufficiently addressed by existing legislation. • Soil Strategy actions will complement and help achieve the NRL targets, and vice versa. • Indicators and monitoring in the Soil Strategy and NRL are aligned.
New Forest Strategy (FS)[104]	Existing	• Promotes restoration of damaged forests addressing climate change adaptation (e.g. developing an EU framework/guidance) based on best available knowledge and practices, including on biodiversity friendly afforestation and restoration. • Includes measures for strengthening forest protection and restoration and improving and harmonising the planning and monitoring of EU forests. • Provides a roadmap for planting at least 3 billion additional trees by 2030. • Facilitates existing EU financing mechanisms, explores the potential of EIB funds, and provides financial incentives for forest owners and managers for improving the quantity and quality of EU forests (protection and restoration). • (still under discussion): "The Commission will also "encourage MS to design an ecoscheme for forest protection, restoration, […] and develop guidance to pro-vide inspiration […].	• Developing Sustainable Forestry Management indicators and criteria under FS will be streamlined with and support the achievement of NRL forestry targets: COM will identify additional indicators as well as thresholds or ranges for sustainable forest management concerning in particular forest ecosystem health, biodiversity and climate objectives. Subject to the impact assessment, these will be included in the future legislative proposal on EU forest planning and monitoring. • FS makes explicit reference to NRL.

[103] EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate (17 November 2021) EUR-Lex - 52021DC0699 - EN - EUR-Lex (europa.eu)
[104] New EU Forest Strategy for 2030 (16 July 2021) EUR-Lex - 52021DC0572 - EN - EUR-Lex (europa.eu)

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
		Develops guidance on the different financing measures for forest protection, restoration […]."	
Action Plan to conserve fisheries resources and protect marine ecosystems	Incoming, 2022	• Provides an action plan to conserve fisheries resources and protect marine ecosystems, thereby reducing pressures on marine ecosystem/species degradation.	• NRL targets/monitoring and the action plan both contribute to reaching favourable conservation status and good environmental status of marine waters.
EU guidance documents			
Guidance on the prioritisation of species and habitats for restoration to improve status of at least 30 % of species and habitats currently not in FSC[105]	Existing (June 2021)	• The guidance provides clarification on the scope of the target and suggests criteria for MSs to prioritise habitats and species for which measures shall be put in place to improve their status, or at least achieve a strong positive trend, by 2030.	• There are strong synergies between the NRL and the so-called "30% status improvement target", insofar as both aim at achieving, by 2030, significant improvements in the status of habitats and species protected under EU Nature legislation. De facto, most of the measures required to improve the status of species and habitats would quality as ecosystem restoration measures under the proposed NRL. • As achieving the (voluntary) 30% status improvement target by 2030 requires that Member States submit their pledges in 2022 and start implementing the necessary improvement measures as soon as possible thereafter, implementing the target might act as a "test-bed" or precursor for the legally binding and ecosystem-specific (and hence more constraining) targets under the NRL, the date of entry into force of which cannot yet be anticipated.
Criteria and guidance for protected areas designation[106]	Existing (January 2022)	• The guidance provides criteria for MSs to identify additional protected areas.	• There are synergies with the NRL as restored ecosystems under NRL outside Natura 2000 or other existing protected areas could be designated as (strictly) protected areas thus contributing to the relevant BDS2030 targets. Furthermore, protected areas and strictly protected areas may contribute to achieving the restoration targets under NRL.

[105] Guidance on the selection and prioritisation of species and habitats for priority actions to ensure that at least 30% of species and habitats not currently in favourable status are in that category by 2030, or at least show a strong positive trend, June 2021. link: https://circabc.europa.eu/ui/group/fcb355ee-7434-4448-a53d5dc5d1dac678/library/4d8f2f91-7708-4ed2-ba0e-e7a945a6d56a/details

[106] SWD(2022) 23 final

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
Technical guidance and support to MS to identify sites and help mobilise funding for the restoration of 25,000 km of free flowing rivers[107]	Existing (December 2021)	• Aims to support the identification of restoration sites and of funding opportunities to achieve the BDS2030 target of restoring 25 000 km of rivers into free-flowing state.	• The guidance document is a stepping stone towards faster and more ambitious implementation of the WFD, in line with the BDS2030. • It is designed to provide clarification on the concept of free-flowing rivers and to contribute to a common understanding of how this target is linked to the objectives of the WFD and of EU Nature Directives. • The guidance will support MS in devising measures to achieve a potential NRL target related to the restoration of rivers into free-flowing state.
Technical guidance on urban greening	Incoming (Q1 2022)	• In the BDS2030 the Commission 'called upon' all cities of over 20 000 inhabitants to develop Urban Greening Plans – this technical guidance will explain what and how this process can be implemented. • The technical guidance will, in this way, help to set the framework from which local authorities can plan and implement actions to improve the quality of urban ecosystems by making Urban Greening Plans. • It will include suggestions for the governance of urban green planning (i.e. how to integrate it with other local planning processes and how to engage local actors in the process) and set a baseline of what indicators need to be mapped, measured and monitored to understand local ecosystems.	• To set and meet any targets – voluntary or legally based – relating to urban greening, the quality of urban ecosystems requires appropriate, systematic mapping and monitoring of certain key indicators at the local level. • The technical guidance will support this process fully. Any NRL targets for urban ecosystems will be mirrored in the technical guidance (and supported by the establishment of an urban greening platform).

Establishment of a new cooperation-based EU biodiversity governance (including a monitoring and	Incoming	• BDS2030 announced the setting up of a new cooperation-based EU biodiversity governance framework to steer the implementation of biodiversity commitments agreed at national, European and international level. This framework is under development and will be finalised in cooperation with the Member States and stakeholders. It will include a system of expert groups for the coordinated implementation of the Strategy, a monitoring and review mechanism to enable regular	• The governance structure for the implementation of the future EU Nature Restoration Law will be integrated into the wider biodiversity governance framework. This may include:
			  ○ new expert groups, Committees, scientific or stakeholder bodies to be set up for the implementation of the new legislation,
			  ○ certain aspects of the NRL implementation to be reflected in the mandate of existing groups and bodies as appropriate (e.g. on

[107] Guidance on Barrier Removal for River Restoration (europa.eu), 21 December 2021

Policy initiatives and laws	Status	Relevance for ecosystem restoration	Possible alignment/overlap/synergies with the proposed Nature Restoration Law (NRL)
review mechanism)		progress assessment and corrective action if needed, as well as measures to support administrative capacity building, input from science, transparency, stakeholder dialogue and participatory governance at different levels.	soil, on forests and nature, on monitoring and assessment and others), ○ interaction with further groups to ensure synergies with other policy areas, ○ the integration of indicators and requirements set by the new NRL to monitor restoration progress and gather knowledge on ecosystem condition and services, into the wider biodiversity and environmental monitoring frameworks; and building on existing indicators to the extent possible, and ○ the streamlining of reporting processes and online tracking tools to minimise administrative burden.
Guidance on new sustainability criteria on forest biomass for energy, that have to be developed under the Renewable Energy Directive – 2021 (suggestion EASME)[108]	Incoming, 2021	• Provides guidance on sustainability criteria on forest biomass for energy, that will be developed under the Renewable Energy Directive (RED). • A draft RED and implementing act are currently under discussion with MS. The degree of emphasis on biodiversity, for example in the context of regeneration, is still to be decided on.	

[108] JRC Publications Repository - The use of woody biomass for energy production in the EU (europa.eu), 2020

3. Approach to non-deterioration

It is important to ensure that the condition of ecosystems in the EU does not deteriorate. This can apply to areas that need to be restored as well as those that are already in good condition and need to be maintained. Protecting areas that still need to be restored from further degradation means that less efforts/investments will be needed to restore them later, and protecting areas that are already restored means that the returns on such investments are maintained. A further argument for non-deterioration can be based on the potential of providing ecosystem services such as carbon sequestration or natural carbon storage, e.g. wetlands. These would naturally favour the non-deterioration of these territories. Overall, an approach needs to be developed in which restoration goes hand in hand with (long-term) protection and maintenance.

To address the issue of non-deterioration it is useful to consider areas of terrestrial territory according to the following three main regimes:

a. Annex I habitats of the HD and habitats of protected species and within N2000. It is estimated that 44 % of HD Annex I habitat area lies within Natura 2000. For these areas, the duty of non-deterioration is already covered by existing legislation.
b. Annex I habitats of the HD and habitats of protected species but outside N2000. 56 % of HD Annex I habitat area lies outside Natura 2000. For these areas, the duty of non-deterioration is partly covered by fault-based or negligence-based prevention and remediation duties under the Environmental Liability Directive, and sometimes by strict liability under this. It is also implicitly covered by the requirement of the Habitats Directive to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest at national/biogeographical level. In addition, aquatic and riparian habitats within this category benefit from the non-deterioration and other requirements of the Water Framework Directive. The duty not to deteriorate also exists for breeding sites and resting places of protected species, but this is limited to those listed in Annex IV of the Habitats Directive. Relevant duties also exist for wild birds' habitats across the territory of the Member States. However, even taken together, there are shortcomings. ***Therefore, to ensure a comprehensive protection level, establishing additional duties under the nature restoration law to ensure non-deterioration would probably be needed.*** These could however, be lighter than those obligations to ensure non deterioration within Natura 2000.
c. Ecosystems beyond any protection (e.g. those not covered by Annex I habitats and not habitats of protected species). Ensuring no deterioration for habitats other than HD Annex I habitats and habitats of protected species is more challenging, although some results are achievable through , for instance, minimum standards for farmers benefitting of CAP support of Good Agricultural and Environmental Conditions (GAEC) under current cross-compliance. Resulsmay also be achievable in other ways; aquatic and riparian habitats within this category, for instance, benefit from the non-deterioration and other requirements of the Water Framework Directive. ***A process to set a further non-deterioration requirement*** (e.g. through

new duties as explained below) ***could be established together with the process for setting additional targets*** (e.g. through setting up a monitoring mechanism to measure ecosystem conditions and set baselines first). These targets and any requirements of non-deterioration could then be established in law in step 2.

The following points should also be taken into consideration:

- Habitats outside Annex I that are turned into an Annex I habitat types (through restoration / re-establishment) would then become part of Annex I and enjoy the same protection, either as in a) or b).
- The EIA and SEA Directives can help identify projects and plans likely to exacerbate ecosystem degradation and can be used to help avoid some degree of non-deterioration across a), b) and c).

A similar approach could be envisaged for marine territories. The Marine Strategy Framework Directive aims to achieve the broad goal of Good Environmental Status (GES) of the EU's marine waters. Further to that, Annex I marine habitats are protected within Natura 2000 marine sites, for instance, and enjoy a measure of protection outside them thanks to the ELD, the overarching objective of the Habitats Directive and other instruments.

Restored areas need to receive a type of protection that will ensure the full recovery of the restored areas and ensure the long-term viability of the restored ecosystem. These could for example be designated as protected areas and be taken into account for the 30 % protected area and 10 % strictly protected area targets. Member States may choose other means to ensure long-term protection of the restored areas, such as Other effective area-based conservation measures (OECM) or private land conservation measures. Where appropriate, in particular in the marine environment, Member States may choose to achieve the restoration targets by ensuring strict protection of the areas hosting the degraded ecosystems (passive restoration).

Annex XI: Restoration frameworks in Member States

Obtaining data on the area of ecosystems undergoing restoration in Europe is a challenge due to a number of factors, including the fact that much restoration activity is voluntary and that there are few legal mechanisms that require reporting of the areas restored[109]. The Netherlands, Germany, Belgium (Flanders), Austria and Spain have put in place Restoration Prioritisation Frameworks. Furthermore, in the first Expert Workshop towards an EU legal proposal for binding restoration targets organised by the Commission (9 December 2020), a number of Member States also shared information about national restoration efforts.

Member States that have submitted Ecosystem Restoration Prioritisation Frameworks (RPF) at national or sub-national level (Target 6A in the EU Biodiversity Strategy to 2020)[110]	
Netherlands	Naar een strategisch kader voor ecosysteemherstel ('RPF') in Nederland (Towards a strategic framework for ecosystem restoration in the Netherlands), 2014.
Germany	Priorisierungsrahmen zur Wiederherstellung verschlechterter Ökosysteme in Deutschland (Prioritisation framework for the restoration of degraded ecosystems in Germany), 2015.
Flanders (Belgium)	Prioriteitenkader voor ecosysteemherstel in Vlaanderen (Prioritisation framework for ecosystem restoration in Flanders), 2016.
Austria	Strategischer Rahmen für eine Priorisierung zur Wiederherstellung von Ökosystemen auf nationalem und subnationalem Niveau, 2020[111].
Spain	Spanish National Strategy for Green Infrastructure, Connectivity and Ecological Restoration, 2021.

Additional information on national restoration efforts shared by Member States in the first Expert Workshop towards an EU legal proposal for binding restoration targets organised by the Commission, 9 December 2020	
Sweden	• Prioritised Action Framework (PAF) for Natura2000 in Sweden • National environmental objectives • National species action programmes • Regional plans for Green Infrastructure • National programme of action for remediation of water courses • Municipal biodiversity programmes • Wetlands restoration project 2018 - ongoing. Promoting construction of new and restored wetlands all over Sweden

[109] Technical support in relation to the promotion of ecosystem restoration in the context of the EU biodiversity strategy to 2020, Final Report.

[110] SWD/2019/184 final.

[111] Publikationsdetail *Strategischer Rahmen für eine Priorisierung zur Wiederherstellung von Ökosystemen auf nationalem und subnationalem Niveau*, (umweltbundesamt.at).

	in order to strengthen the landscape's own ability to maintain and balance water flows
Ireland	Ireland's Protected Raised Bog Restoration Programme
Finland	• Biodiversity strategy • Helmi programme • METSO programme • Ecosystem restoration and management monitoring for different habitat groups (forests, semi-natural grasslands, mires)
Portugal	2030 Biodiversity & Nature Conservation National Strategy - Resolution of the Portuguese Council of Ministers: Axis 1 - Improve natural heritage conservation status Axis 2 - Promote recognition of the natural heritage value Axis 3 - Encourage appropriation of natural values & biodiversity by the stakeholders. Biodiversity & Nature Conservation Action Plan Protected Areas Management Plans

Annex XII: Financing options at EU level

This annex provides an overview of the financing needs as well as potential sources of financing for ecosystem restoration at EU level, including programmes and funds under MFF 2021-2027, Next Generation EU as well as private investments. Member States would be asked to outline in their National Restoration Plans how they would access these sources. In addition, Member States would need to outline available funds from their national and local budgets as well as how market-based instruments are used to help cover the cost of ecosystem restoration and prevent deterioration.

The Biodiversity Strategy for 2030 states that biodiversity action requires at least EUR 20 billion per year stemming from "private and public funding at national and EU level", of which the EU budget will be a key enabler and component. As such, in December 2020 the EU co-legislators came to the **interinstitutional agreement**[112] to set a biodiversity spending target of 7.5 % as of 2024 and 10 % as of 2026 under the 2021-27 MFF. Mainstreaming and tracking of biodiversity in EU programmes and funds are currently being revised to strengthen biodiversity considerations and fill the financing gap that is, according to draft Programme Statements in March 2021, foreseen to be at least €1.924 billion for 2026 and €2.291 billion for 2027.

Specifically, the European Agricultural Fund for Rural Development (EAFRD) and European Agricultural Guarantee Fund (EAGF) will be central to achieving higher levels of biodiversity spending under the 2021-27 MFF. Furthermore, Cohesion policy funds and the European Maritime Fisheries and Aquaculture Fund (EMFAF) will also play a central role in achieving the biodiversity ambition. Other programmes will also contribute to this target, such as LIFE, Copernicus and InvestEU. Member States would also be encouraged to seek synergies between different programmes and funds to support large-scale implementation of restoration projects.

Moreover, the Biodiversity Strategy for 2030 states that a significant proportion of the part of the 2021-27 MFF dedicated to climate action will be invested in biodiversity and nature-based solutions. As ecosystem restoration will directly contribute to climate mitigation and adaptation objectives, restoration would also benefit from the climate spending target in the MFF.

Financing needs for ecosystem restoration under policy options 3 and 4

Restoration costs

According to the two scenarios with different ambition levels (15-40-100 % restoration versus 30-60-100 % restoration, both for 2030-2040-2050) presented in the table below based on a more detailed table in Annex VI, the average annual restoration, re-creation and maintenance costs to 2030 for **peatlands, marshlands, forests, heathland and scrub,**

[112] Regulation (EU, Euratom) 2020/2092.

grasslands, rivers, lakes and alluvial habitats, and coastal wetlands are estimated at EUR 5.3 billion for Scenario A and EUR 7.6 billion for Scenario B.

Ecosystem type	Scenario A: 15 % by 2030, 40 % by 2040, 100 % by 2050		Scenario B: 30 % by 2030, 60 % by 2040, 100 % by 2050	
	Average annual cost to 2030 (€M)	Average annual cost to 2050 (€M)	Average annual cost to 2030 (€M)	Average annual cost to 2050 (€M)
Peatlands	202	265	274	266
Marshlands	165	175	173	177
Coastal Wetlands	195	331	352	331
Forests	2097	2811	2916	2816
Agro-Ecosystems	1221	1353	1367	1353
Heathland and scrub	139	148	148	149
Rivers, lakes and alluvial habitats	1299	2282	2407	2279
Total	5318	7365	7637	7371

Note: opportunity costs in terms of foregone income (e.g. by landowners as a result of rewetting a grassland so that it becomes a wetland) are included in the calculation of restoration and maintenance costs. Opportunity costs of potential land use changes (e.g. turning grassland into an industrial district) are not included.

For **Natura 2000 sites**, estimates of restoration costs until 2030 are also available under the MS Prioritised Action Frameworks (PAFs) submitted in March 2021: a total cost for one-off maintenance and restoration projects sites for a number of ecosystem types amount to approximately EUR 10 billion over 2021-27 (1.4 billion annually). It should be noted that these figures focus on Natura 2000 i.e. do not address the broader ecosystem restoration funding needs including beyond the N2000 network.

PAF figures on restoration based on aggregated estimations by Member States	
A: Natura 2000 site-related maintenance and restoration measures for species and habitats	***One-off/ project costs (MEUR/year)***
Marine and coastal waters	103
Heathlands and shrubs	79
Bogs, mires, fens and other wetlands	201
Grasslands	334
Other agroecosystems (incl. croplands)	89
Woodlands and forests	352
Freshwater habitats (rivers and lakes)	272
Total annual costs	***1 430***
Total (2021-2027)	***10 010***

Note: Opportunity costs such as income foregone are included in the figures for Member States that are planning to compensate landowners for restoration.

The annual cost figure, for example of EUR 7.6 billion under scenario B, is expected to be higher because restoration and maintenance costs for **marine**, **urban** and **soil ecosystems** as well as **pollinators** are not included due to uncertainties and data gaps on the restoration need and costs, although it is likely that pollinators will benefit from costs incurred to restore terrestrial ecosystems such as grasslands.

Costs for enabling measures (administrative costs)

Besides restoration and maintenance, there are costs foreseen for enabling measures such as establishing methodologies and indicators, developing National Restoration Plans and monitoring progress. According to the impact assessment study in Annex VI, these are estimated to include annual costs averaging EUR 583 million from 2022 to 2030 and EUR 498 million over the period 2022-2050..

Estimated costs for enabling measures (MEURO)		
	Average annual costs 2022-2030	***Average annual costs 2022-2050***
Surveys of ecosystems	122.1	37.9
Development of national restoration plans;	1.4	0.4
Development of methodologies and indicators (5 ecosystems)	0.7	0.2
Administration of restoration measures	438.3	438.3
Monitoring of restored ecosystems	20.6	20.6
Reporting progress against restoration targets	0.1	0.1
Total annual costs	***583.3***	***497.6***

Conclusion

While the cost estimates will need to be more precisely calculated, they do provide an indication of how much financing at least needs to be mobilised, namely between **EUR 5.9 billion and 8.0 billion over the period 2022-2030**. While these costs can be largely compensated by increased potential for ecosystem services, it should be noted that this estimate does not consider the restoration and maintenance costs for some ecosystems for which data is lacking. As such, the **total costs are expected to be higher**. Moreover, the precise costs for each Member State will vary in line with subsidiarity, as costs depend on the specific restoration needs, priorities, measures as well as land prices and wages per Member State.

Cost item	**Amount in EUR billion**
Restoration and maintenance costs for peatlands, marshlands, forests, heathland and scrub, grasslands, rivers, lakes and alluvial habitats, and coastal wetlands	5.3 – 7.4
Enabling measures	0.6
Sub-total	***15.9 – 8.0***

Restoration and maintenance costs for marine, urban and soil ecosystems as well as pollinators	Not exactly determined

EU programmes and funds under MFF 2021-27 and Next Generation EU

The table below provides an overview of how EU programmes and funds under MFF2021-2027 and Next Generation EU can contribute to biodiversity with a focus on ecosystem restoration in their specific policy areas. The information, including estimates of available funds for biodiversity wherever possible, is based on the 'Biodiversity Financing and Tracking: First Interim Report' (study commissioned by ENV to IEEP/Trinomics, 2021), guidance on river restoration that is currently being prepared as well as an ongoing exercise of DGs ENV and BUDG to estimate the contributions from MFF funds and programmes to biodiversity in order to reach the new MFF target of 7.5/10 % for biodiversity spending.

According to figures prepared by DGs BUDG and ENV, under the MFF 2014-2020, biodiversity spending amounted to EUR 85 billion, which was about 8 % of the EU budget. Under the MFF 2021-2027, **estimates for biodiversity spending are available for 8 funds/programmes, amounting to nearly EUR 100 billion** (EUR 99 123.3 million), an average of approximately EUR 14 billion annually, of which a portion can be employed to the benefit of ecosystem restoration, including restoration projects, capacity building, knowledge exchange, monitoring and transboundary cooperation. **This means that the EUR 14 billion annual biodiversity spending under the MFF could cover to a large extent the annual total costs of restoration of EUR 6-8 billion, complemented with other sources of funding mentioned below.** Under the current methodology to track biodiversity spending in the MFF, it is not possible to estimate how much funds are channelled to ecosystem restoration.

EU programmes and funds under MFF 2021-27 and Next Generation EU

Source	**Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)**	**How could this financing source be used for ecosystem restoration?**	**Explanation**	**Financing type (grants/ loans) + beneficiaries**
European Agricultural Guarantee fund (EAGF) under the Common Agricultural Policy (CAP) – still under discussion	37 885.2	• Restoration projects for agro-ecosystems	• EAGF funds could be used by MS to finance restoration (soil, habitats and species) under the foreseen eco-schemes, if MS outline this in their national CAP strategic plans for the following specific objective for the period 2023-27: contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes • It is estimated that 14.8 % was counted as biodiversity expenditure under MFF 2016-2020.	• Grants • Beneficiaries: farmers
European Agricultural Fund for Rural Development (EAFRD) under the CAP – still under discussion	26 513.2	• Restoration projects for agro/ forest ecosystems • Capacity/knowledge building • Knowledge exchange • Cooperation	• EAFRD funds could be used for restoration, particularly under the following priorities of (1) restoring, preserving and enhancing ecosystems related to agriculture and forestry (for 2021-22); as well as under the specific objective (2) contributing to the protection of biodiversity, enhancing ecosystem services and preserving habitats and landscapes (for 2023-2027). • MS would need to incorporate restoration measures in national CAP strategic plans. • At least 30 % of funding for each RDP must be dedicated to measures relevant for the environment and climate change, much of which is channelled through grants and annual and multiannual payments to farmers who switch towards more environmentally friendly practices or make investments environmental related. • While the European Commission approves and monitors CAP SP decisions regarding implementation, such as the selection of projects and the granting of payments are handled by national and regional managing authorities. • It is estimated that 33% of the total EAFRD budget under MFF 2014-2020 benefitted biodiversity.	• Co-financing for EAFRD • Beneficiaries: farmers, foresters and other land owners

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
European Regional Development Fund (ERDF) Cohesion Fund (CF)	20 138.2	• Restoration projects • Capacity/knowledge building • Cooperation	• ERDF could finance restoration projects that support i.a. (1) innovation and research; and (2) the low-carbon economy. • ERDF: at least 30 % of ERDF resources shall be allocated to Policy Objective 2 ('A greener, low-carbon Europe') in each MS/category of regions, covering investments in i.a. biodiversity, green infrastructure and pollution reduction. Investments could include ecosystem approaches as well as preserving and protecting the environment. • ERDF Interreg could finance cooperation across borders to jointly tackle common challenges and find shared solutions in fields i.a. environment (e.g. restoration projects). For cross-border cooperation, transnational cooperation and outermost regions' cooperation, 60 % of EU resources in programmes shall be allocated to at least 3 policy objectives, including Policy Objective 2 which is compulsory. • CF supports Policy Objective 2, and may contribute to the thematic concentration requirement for the ERDF allocation. MS whose GNI per capita is less than 90 % of the EU average are eligible. • ERDF and CF could also finance technical assistance. • ERDF and CF are implemented under shared management. Each MS prepares at national level a Partnership Agreement, including strategy, need, complementarity with other EU instruments and priorities to be supported by the funds, that is then implemented through programmes.	• ERDF: grants/financial instruments; maximum co-financing rate from 40 % to 85 % depending on the category of regions. • ERDF Interreg: co-financing up to 80 % (85 % for outermost regions) • CF: co-financing up to 85 %. • Beneficiaries: MS, private sector organisations, universities, associations, NGOs, civil organisations, etc.
Neighbourhood, Development and International Cooperation Instrument - Global Europe (NDICI - Global Europe)	NDICI: 6 209.7 Interreg PA III: 438.5	• Transboundary restoration projects • Transboundary cooperation	• NDICI could facilitate cooperation, knowledge exchange and finance for the restoration of ecosystems that extend to non-EU countries, with benefits in return for the EU • The first pillar of NDICI (geographical, including climate and environmental objectives) has potential to contribute to restoration. An EU Delegation, in close consultation with	• Grant, Service Contracts, blending • Beneficiaries: third countries/regions bordering the EU

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
Interreg Pre-Accession Assistance (PA) III		• Transboundary knowledge exchange	EUMS (Team Europe Initiative) and the local Authorities, draft country MIPs (Multiannual Indicative Programmes). Restoration projects could be added once the MIPs are adopted, considering they remain flexible. • It is unlikely that the second pillar (thematic liked to SDGs and global challenges) would contribute to restoration, unless there is a clear global initiative. • The third pillar (rapid response) can contribute in case of an emerging opportunity or need in terms of nature restoration in a third country, to which the EU could take a strong policy stance to influence decisions. • Restoration could furthermore be stimulated under Regional Programmes managed by INTPA, e.g. to restore the Amazon Basin. • Technical Assistance and Information exchange (TAIEX) could also be relevant for knowledge exchange between COM, MS and a third country in the context of transboundary restoration (workshops, missions and study visits). • The budget line on Overseas Countries and Territories (OCT) could also be relevant for restoration. • Interreg PA III can also be relevant. The draft regulation states that actions under this Regulation should, whenever possible, mainstream environmental sustainability and climate change objectives across all sectors with particular attention to environmental protection and tackling cross-border pollution. While it does not mention restoration explicitly, it could support restoration projects of ecosystems that extend to non-EU countries (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia, and Turkey), supporting cooperation between candidate countries, potential candidate countries and EU Member States, to contribute in their accession preparations.	

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
Horizon Europe	6 042.0	• Capacity/knowledge building	• Horizon's first strategic plan 2021-2024 sets out i.a. the following strategic orientation: Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources. • The priority area of 'societal challenges – supporting research that addresses major social, environmental and economic issues and challenges' could support research activities underpinning the deployment of restoration projects (e.g. scientific research on ecological processes, development of tools for mapping and assessment). • Cluster 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment) includes a number of research areas related to biodiversity and nature protection, where calls will be launched in 2021-2 under the first work programme that can build the foundation or a future legal instrument. Also there will be a specific biodiversity focuses partnership, which will be launched this year. • The priority area of 'excellent science – aiming to boost top level research in the EU' could help to strengthen the capacity, skills, infrastructure and basic science underpinning restoration research. • Beneficiaries can respond to calls for proposals/ tenders.	• Grants and procurement financing • Beneficiaries: typically consortia including universities, research institutes and businesses
European Space Programme: Copernicus	930.0	• Monitoring	• Drawing from satellite Earth Observation and in-situ (non-space) data, the service component of Copernicus could be used to help monitor indicators of ecosystem condition i.a. across the areas of land, marine, atmosphere and climate change. • It supports applications i.a. on environment protection, management of urban areas, regional and local planning, agriculture, forestry and fisheries.	• N.a. • Beneficiaries: MS
Programme for the Environment and Climate Action (LIFE)	(2021-22) 966.5	• Restoration projects • Capacity/knowledge building (e.g.	• LIFE could fund restoration projects, in particular those supporting the BHD, N2000, IAS Regulation, BDS2030 and Green Deal.	• Grants, blending, prizes.

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
		testing innovative solutions)	• LIFE also offers technical assistance. • Beneficiaries can submit restoration proposals. • The EU LIFE Programme has been the EU's top funder for the restoration projects in a study by UNEP-WCMC, FFI and ELP, funding 76 % of the projects and accounting for 48 % of all funding for restoration in Europe.	• Beneficiaries: Public and private sector bodies and civil society organisations
European Maritime Fisheries and Aquaculture Fund (EMFAF)		• Restoration projects (marine and rivers) • Capacity/knowledge building	• EMFAF could fund marine and inland (river) water restoration projects, both inside and outside N2000, in support of the priorities of i.a. (1) fostering sustainable fisheries and the conservation of marine biological resources; and (2) strengthening international ocean governance and enabling safe, secure, clean and sustainably managed seas and oceans. • Under shared management, EMFAF is managed jointly by COM and MS and is implemented through national programmes prepared by MS managing authorities, where they outline their choices for fulfilling the objectives of the fund and identify actions in line with their national strategy. Under direct management, beneficiaries can respond to calls for proposals, including by CINEA, based on work programmes set out annually by the Commission. • In addition, under direct management, the EMFAF will support voluntary contributions to international organisations and technical assistance.	• Co-financing • Beneficiaries: MS, who can finance project submissions to calls for proposals • Grants and tenders • Beneficiaries: Public and private sector bodies and civil society organisations
European Social Fund (ESF) +		• Capacity/knowledge building •	• ESF could indirectly contribute to restoration by co-financing projects to equip people with the skills to contribute to restoration projects. • It is unlikely that substantial amounts of funds will be made available for biodiversity, let alone restoration.	• Grants • Beneficiaries: MS
Just Transition Fund (JTF)		• Restoration projects (e.g. peatlands)	• The first pillars of the Just Transition Mechanism is a new Just Transition Fund of €17.5 bn (€7.5 bn from 2021-2027 MFF and	• Co-financing according to Cohesion policy rules

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
		• Capacity/knowledge building	10 bn from the EU Recovery Instrument) to support MS in their green transition. • JTF may support investments in land recovery action in eligible territories most affected by an economic transition to carbon neutrality by 2050. • MS need to develop territorial just transition plans including social, economic, and environmental challenges; development needs (incl. environmental rehabilitation); and objectives to be met by 2030. • JTM could provide technical assistance, e.g. on how to integrate restoration in transition projects. • MS may, on a voluntary basis, transfer to the JTF additional resources from their national allocations under the ERDF and ESF+. • The second pillar under JTM, a dedicated InvestEU scheme, will be addressed under the InvestEU item.	• Loans backed by EU guarantees • Beneficiaries: MS
European Solidarity Corps		• Restoration projects	• Organisations can apply for the European Solidarity Corps funding as a response to calls for proposals by COM to develop restoration projects in which young people (18-30) can participate once approved. • Young people can do volunteering (2 weeks to 1 year), usually abroad in the Programme or Neighbouring Countries. COM outlines volunteering opportunities. • Young people can prepare their own Solidarity Projects addressing local challenges such as restoration.	• Grants • Beneficiaries: young people, MS
InvestEU		• Restoration projects	• InvestEU, including a dedicated scheme linked to the Just Transition Mechanism, is expected to mobilise more than €372 billion of public and private investment through an EU budget guarantee of €26.2 billion that backs the investment of financial partners such as the European Investment Bank (EIB) Group and others.	• Co-finance through loans, guarantees, equity etc., backed by an EU guarantee • Beneficiaries: implementing partners with whom the Commission has concluded a guarantee agreement (e.g.

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
			• It could co-finance and attract private investments for either specific restoration projects or broader projects where restoration is a component. • See more information in the section on public-private investments.	EIB, EBRD, national promotional banks)
Technical Support Instrument (TSI)		• Capacity/knowledge building • Knowledge exchange	• TSI provides tailor-made technical expertise to EU Member States to design and implement reforms in the areas of i.a. climate action (but biodiversity qualifies as well), for example in the drafting of National Restoration Plans. • MS can once a year submit a request for strategic and legal advice, studies, training and expert visits on the ground.	• Grants (no co-financing needed) • Beneficiaries: MS
Recovery and Resilience Facility (RRF)		• Restoration projects	• RRF could finance restoration projects, or projects with a restoration component. All reforms and investments must be implemented by 2026. • The preamble of the RRF Regulation states that the Regulation should contribute to mainstreaming biodiversity action in Union policies, and that the instrument should also tackle broader environmental challenges within the Union, i.a. the protection of natural capital and preserving biodiversity. Article 18(4e) states that the RRPs should include a qualitative explanation of how measures contribute to the green transition, including biodiversity, and whether they account for an amount that represents at least 37% of the plan's total allocation, based on the climate tracking methodology present in Annex IV. In the climate tracking methodology, biodiversity-related Intervention Fields include 050 on "nature and biodiversity protection, natural heritage and resources, green and blue infrastructure" as well as 049 on the protection, restoration and sustainable use of Natura 2000 sites. • Based on the 22 adopted Recovery and Resilience Plans, the majority of Member States have shown a strong commitment to biodiversity. Relevant measures include reforms and	• Combination of loans and grants • Beneficiaries: MS

Source	Preliminary estimates of funds available for biodiversity in 2021-2027 (MEUR)	How could this financing source be used for ecosystem restoration?	Explanation	Financing type (grants/ loans) + beneficiaries
			investments dedicated to restoring degraded ecosystems; implementing sustainable forest management and protecting habitats and species; improving forests' health and resilience; strengthening the knowledge of natural environment, such as biodiversity monitoring and setting conservation objectives and Natura 2000 management plans. Climate adaptation measures are also included in the plans, and can contribute to biodiversity objectives (e.g. when integrating nature based solutions).	

Private investments

Recognising that public grants cannot cover all the finance needed to reverse biodiversity loss and to have all EU ecosystems restored by 2050, there is a critical role for private sector grants as well as public and private commercial funding (including green equity and debt or bonds).

Private and/or commercial finance and investment solutions are increasingly considered as an option, as attention for the interrelation between nature, the economy and finance grew significantly over the last years. **WEF**[113] stated (2021) that over half of global GDP depends on nature and the services it provides. The **Independent 'Dasgupta' Review on the Economics of Biodiversity**[114] (2021) offers another recent case in point, by underlining that our economies, livelihoods and well-being highly depend on nature. The study '**Indebted to Nature: Exploring biodiversity risks for the Dutch financial sector**'[115] (2020) furthermore demonstrates that the financial sector–through investments in economic activities that depend on ecosystem services–is exposed to considerable material risk as a result of biodiversity loss. This makes the case for investing in nature and biodiversity for risk mitigation and economic resilience purposes. The **Task Force on Nature-related Financial Disclosures (TNFD)**[116] is currently developing a framework for financial institutions and corporates to identify and report on nature-related risks and dependencies.

At the same time awareness is growing that opportunities to invest in nature are huge. According to the **World Economic Forum**[117], action for nature-positive transitions at the global level could generate up to US$ 10.1 trillion in annual business value and create 395 million jobs by 2030. Through the **Finance for Biodiversity Pledge**[118], a number of financial institutions have committed to share knowledge, engage with companies, assess impacts on biodiversity, set targets and report publicly with the ultimate goal to reverse biodiversity loss in this decade.

An upcoming field is financing nature-based solutions (NBS) through multiple-benefit business cases where revenue streams come from co-benefits in terms of climate adaptation, health and carbon. The Impact Assessment study by the contractor provides insight in the co-benefits arising from services provided by specific ecosystems (e.g. peatlands offering much potential for carbon storage and sequestration), thereby helping to identify possible revenue streams for restoration.

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[113] New Nature Economy Report.

[114] Final Report - The Economics of Biodiversity: The Dasgupta Review.

[115] https://www.dnb.nl/en/actueel/dnb/dnbulletin-2020/indebted-to-nature/.

[116] https://tnfd.info/.

[117] World Economic Forum, *New Nature Economy Report II: The Future of Nature and Business*, 14 July 2020.

[118] https://www.financeforbiodiversity.org/about-the-pledge/.

There is also growing attention for the interrelation between nature, the economy and finance at EU level. The **EU Business @ Biodiversity Platform**[119], for example, provides a forum for dialogue and policy interface to discuss the links between business and biodiversity at EU level. It was set up by the European Commission with the aim to work with and help businesses integrate natural capital and biodiversity considerations into business practices. Other initiatives at EU level such as the upcoming Renewed Sustainable Finance Strategy, Green Bond Standard, EU Taxonomy and Non-financial Reporting Directive also contribute to ensure that the financial system supports the transition towards a sustainable economic recovery.

There are multiple examples of schemes and partnerships that aim at channeling private investments towards biodiversity objectives, such as the **Nature+ Accelerator Fund**[120], **Rewilding Europe**[121], **Commonland**[122], **Naturvation**[123], **CDC Biodiversité's offset banking**[124] and the **Coalition for Private Investment in Conservation**[125].

UNEP-WCMC, FFI and ELP (2020) studied the **funding of ecosystem restoration in Europe**[126], and found the following:

- Between 2010 and 2020, more than EUR 1.2 billion has been committed to over 400 projects, restoring over 11 million hectares of degraded ecosystems across Europe.
- To enable this, more than 200 funders from international bodies (most notably the European Commission), European governments, foundations and the private sector committed more than EUR 847 million in primary funding, with a further EUR 360 million committed as co-funding.
- Over 85 % of the restoration projects focused on terrestrial ecosystems, totalling over EUR 1 billion in project funding, with the majority of projects focusing on terrestrial forests, grasslands and wetlands.
- Over EUR 138 million has been committed to restoring European seas, focusing primarily on coastal marine ecosystems.
- Biodiversity conservation was the focus for 8 out of 10 projects and received nearly 80 % of the known funding. The aims of the remaining projects predominantly reflect climate change-related ambitions, such as mitigation and adaptation.

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[119] https://ec.europa.eu/environment/biodiversity/business/index_en.htm

[120] *Nature + Accelerator Fund*. An innovative and scalable market strategy for Nature-based Solutions.

[121] https://rewildingeurope.com/.

[122] https://www.commonland.com/.

[123] https://naturvation.eu/.

[124] https://www.cdc-biodiversite.fr/la-compensation-ecologique/recourir-a-un-site-naturel-de-compensation/.

[125] http://cpicfinance.com/.

[126] UNEP-WCMC, FFI and ELP, A summary of trends and recommendations to inform practitioners, policymakers and funders, 2020.

Whilst the needs and opportunities are clearly on the rise, the overall finance and investment landscape for nature and biodiversity finance and investment remains scattered and overall insufficient to counter negative trends.

The Commission will therefore consolidate and intensify its efforts to mobilise public and private funds and partnerships in support of the objectives set out in the EU Biodiversity Strategy for 2030 and related initiatives such as the **Commission Communication on Repair and Prepare for the Next Generation**[127]. In line with those strategic orientations, efforts are under way to establish a dedicated 'EUR 10 billion natural-capital and circular economy investment initiative' building on InvestEU and taking into consideration lessons learned from other public private funds such as the **Natural Capital Financing Facility**[128] and the **Global Energy Efficiency and Renewable Energy Fund**[129] operated by the EIB Group in cooperation with other public and private investment teams. It will make use of the EUR 9.8 billion guarantee for the Sustainable Infrastructure window (of which 60 % is earmarked for climate and environment targets), EUR 6.5 billion under the Research, Innovation and Digitalization window as well as EUR 6.9 billion under the Small and Medium Businesses window. On top of this, other EU programmes and funds will be tapped from as well as philanthropic institutions would be welcomed to contribute as well with the aim to unlock even more private funds. Note that this initiative under InvestEU is only a small part of the portfolios of EIB Group and other implementing partners, which means that there are potentially many more funds to tap from.

The availability of a pipeline of viable investment proposals (project and corporate investments) will be a critical factor for success. Based on lessons learned from the past, a significant effort is required to ensure the supply of adequate and multi-disciplinary technical assistance. A EUR 50 million green advisory initiative is therefore being established, funded from the LIFE programme. Funds will be used to top-up the InvestEU Advisory Hub that provides advisory services to public and private project promoters, as well as supporting financial and other intermediaries that take care of the implementation of financing and investment operations. Such advisory support includes three components: (1) project advisory for project identification, preparation, financial structuring, establishment of investment platforms and blending facilities; (2) capacity building for strengthening investment readiness and capacity of organisations, environmental and social sustainability impact assessments, procurement and compatibility with state aid rules; and (3) market development for preparatory activities in the form of studies, market assessment for policy development, communication and awareness raising. The LIFE sponsored contribution will be used i.e. to establish and co-finance a roster of green investment experts and other means to promote the development of natural capital

[127] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committe and the Committee of the Regions Europe's Moment: Repair and Prepare for the Next Generation, COM/2020/456 final.

[128] Natural Capital Financing Facility. Boosting investment for biodiversity and nature-based adaptation to climate.

[129] https://www.eib.org/en/products/equity/funds/geeref

assessments that can help identify green investment opportunities for companies, sectors, and regions in the EU (possibly to be extended internationally).

To further encourage and support the mainstreaming of biodiversity among businesses and financial institutions, there is a considerable amount of information and tools available, such as the EIB's step-by-step guide to invest in nature, B@B's report **'Positive Impact Finance for Business & Biodiversity: Opportunities and challenges on scaling projects and innovations for biodiversity by the financial sector'**[130] and SBTN's **'Science-based Targets for Nature: Initial Guidance for Business'**[131].

All should allow to untap the significant potential for investing in nature restoration, including from private and commercial actors. Success will nevertheless require persistence over time; realistically, it can easily take five years or more to develop a significant pipeline of economically viable projects. The setting of a first batch of legally binding targets for nature restoration across the EU will greatly encourage public and private actors to join efforts in designing and funding viable nature restoration assets and activities that will enhance the resilience of our economies and people depending on it.

Conclusion

While the cost estimates will need to be more precisely calculated, it does provide an indication of how much funding at least needs to be mobilised, namely about **EUR 6-8 billion annually** until 2030, excluding restoration and maintenance costs for marine, urban and soil ecosystems as well as pollinators. So, the total cost is expected to be higher than this figure.

To reach this amount, a range of sources can be harnessed: First, under the **MFF to 2027** 100 billion will be available for biodiversity spending, which is equivalent to **EUR 14 billion annually**, of which a percentage could be used for restoration. Similar amounts could potentially become available under subsequent MFFs, especially if the biodiversity spending target of 10 % is extended.

Second, the **'EUR 10 billion natural-capital and circular economy investment initiative'** could be used, which is to be partially financed by InvestEU's sustainable infrastructure window of EUR 9.8 billion, of which 60 % is earmarked for climate and environmental targets. Parts of the guarantees under this facility could be employed as well as mobilise additional funds from private sources. The Research, Innovation and Digitalization window (EUR 6.5 billion) and Small and Medium Businesses window (EUR 6.9 billion) could also be tapped into, in addition to other funds from EIB Group and

[130] https://ec.europa.eu/environment/biodiversity/business/assets/pdf/Positive_Impact_Finance-EU_Business_Biodiversity_Platform_2018.pdf

[131] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf

other implementing partners. To do so coherently, MS could stimulate and/or partner up with private entities to submit project proposals that benefit restoration.

Third, **market-based instruments** could be promoted to help cover costs of restoration and to prevent deterioration, for example fiscal approaches, payments for ecosystem services, result-based payment schemes, etc.

Lastly, **national budgets** could cover any outstanding costs. The revised *Guidelines on State aid for environmental protection and energy (CEEAG)*[132] and the revision of *Commission Regulation (EU) No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (block exemption Regulation)*[133] will allow Member States to grant state aid based on the investment costs for restoration, decontamination and biodiversity improvement works including protection/maintenance. Specifically, the guidelines state that investments may qualify if they lead to i.a. (a) the remediation of environmental damage; (b) the rehabilitation of natural habitats and ecosystems; (c) the protection or restoration of biodiversity and (d) the implementation of nature-based solutions for climate change adaptation and mitigation. If an investment does not fulfil the criteria for falling under the block exemption Regulation, the State aid would have to be notified to the Commission and analysed further before it could be approved. The aid may cover 100 % of the eligible costs minus the increase in the value of the land. The limit for funding individual restoration projects without notification is EUR 20 million per project. Above this amount, Member States will need to notify the investment to the Commission. State aid, however, cannot be granted to cover forgone income of economic operators, as the amount of the aid is calculated on the basis of the costs of the restoration project. Something else to keep in mind is that if the land or marine area is not used to conduct economic activities, support for its restoration projects would in principle fall outside the framework for state aid, as the notion of aid applies to support that benefits an economic activity.

In sum, while these figures provide order of magnitude estimates only, it supports the idea that there is a variety of sources of funding available to finance the costs for restoration, maintenance (including compensation) and enabling measures. In theory there is sufficient funding available, however, it depends on the priorities and actions of Member States and the EU whether these funds will be channeled towards ecosystem restoration. It can be expected that a legally binding instrument will contribute to this significantly.

[132] Communication from the Commission – Guidelines on State aid for climate, environmental protection and energy 2022, C/2022/481.

[133] https://ec.europa.eu/competition-policy/state-aid/legislation/regulations_en