



ENVIRONMENTAL REPORT

Strategic Environmental Assessment of
Interreg Central Europe 2021-2027 Programme

October 2020



Prepared by

Integra Consulting s. r. o.

Pobřežní 18/16

Praha 8, 186 000, Czech Republic

ZaVita d.o.o.

Tominškova ulica 40

1000 Ljubljana, Slovenia

SEA team:

Jiří Dusík (Team Leader) jiri.dusik@integracons.com

Klemen Strmšnik Klemen.Strmsnik@zavita.si

Ivana Šarić ivana.saric@vitaprojekt.hr

Sabina Cepuš Sabina.Cepus@zavita.si

Quality assurance review:

Martin Smutný martin.smutny@integracons.com

Matjaž Harmel Matjaz.Harmel@zavita.si

On behalf of

Interreg Central Europe Managing Authority

City of Vienna

Municipal Department for European Affairs

A - 1080 Wien, Friedrich-Schmidt-Platz 3

Austria

CONTENTS

CONTACT.....	13
NON-TECHNICAL SUMMARY	14
Introduction.....	14
Interreg Central Europe Programme	14
Environmental policy objectives and issues for Interreg Central Europe 2021-2027 programme	15
Environmental baseline trends in the Interreg Central Europe 2021-2027 programme area	17
Potentially significant impacts of Interreg Central Europe 2021-2027 on environment and human health ..	17
Proposed mitigation measures.....	18
Monitoring arrangements	20
GLOSSARY OF ACRONYMS AND TERMS.....	21
1 STRATEGIC ENVIRONMENTAL ASSESSMENT PROCESS FOR INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME.....	9
1.1 Aims of the strategic environmental assessment	9
1.2 SEA process steps and alternatives of the programming document dealt with	10
1.3 Methodology.....	11
1.4 Difficulties encountered or uncertainties in the assessment.....	12
2 INTRODUCTION TO INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME PROPOSAL.....	13
2.1 Interreg Central Europe Programme.....	13
2.2 Programme area	13
2.3 Interreg Central Europe 2021-2027 proposal	14
2.4 Relationships between the INTERREG Central europe 2021-2027 programme and other relevant plans or programmes	19
3 ENVIRONMENTAL POLICY OBJECTIVES AND ISSUES FOR INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME.....	20
3.1 Introduction	20
3.2 Air.....	21
3.2.1 Context	21
3.2.2 Relevant policy objectives	21
3.3 Climate	22
3.3.1 Context	22
3.3.2 Relevant policy objectives	23
3.4 Water	23
3.4.1 Context	23
3.4.2 Relevant policy objectives	24
3.5 Soil.....	25
3.5.1 Context	25
3.5.2 Relevant policy objectives	26
3.6 Biodiversity, Natura 2000 and Ecosystem services	27
3.6.1 Context	27
3.6.2 Relevant policy objectives	27
3.7 Population & human health.....	29
3.7.1 Context	29
3.7.2 Relevant policy objectives	29
3.8 Material assets	30
3.8.1 Context	30
3.8.2 Relevant policy objectives	30

3.9	Cultural heritage	31
3.9.1	Context	31
3.9.2	Relevant policy objectives	32
3.10	Landscape.....	33
3.10.1	Context	33
3.10.2	Relevant policy objectives	33
3.11	Interactions between the assessment topics 1-9: Cross-cutting concerns related to Resilience	34
3.11.1	Context	34
3.11.2	Relevant policy objectives	35
4	DESCRIPTION OF THE RELEVANT ASPECTS OF THE CURRENT STATE OF THE ENVIRONMENT AND ITS LIKELY EVOLUTION WITHOUT IMPLEMENTATION OF INTERREG CENTRAL EUROPE 2021-2027	36
4.1	Air quality	36
4.1.1	Air quality impacts on ecosystems	36
4.1.2	Air quality impacts on human health and well-being.....	39
4.2	Climatic factors.....	42
4.2.1	Efforts to mitigate the climate change	45
4.3	Water	48
4.3.1	Qualitative status of water	48
4.3.2	Quantitative status	52
4.4	Soil.....	52
4.4.1	Land use.....	52
4.4.2	Condition of soil.....	55
4.5	Biodiversity, Natura 2000 and Ecosystem services	57
4.5.1	Protected areas and Natura 2000 network	57
4.5.2	Trends in key protected species (Natura 2000).....	59
4.5.3	State of other headline bio-indicator species.....	60
4.5.4	Ecosystem services and green infrastructure.....	63
4.5.5	Expected future trends in biodiversity	65
4.6	Population & human health	66
4.6.1	Public health	66
4.6.2	Environmental health	68
4.6.3	Noise.....	70
4.7	Material assets	73
4.7.1	Material resource efficiency.....	73
4.7.2	Waste management	74
4.8	Cultural heritage	76
4.8.1	Cultural heritage protection and preservation.....	76
4.9	Landscape.....	78
4.9.1	Landscape protection	78
5	POTENTIALLY SIGNIFICANT IMPACTS OF PROPOSED INTERREG CENTRAL EUROPE 2021-2027 ON ENVIRONMENT AND ENVIRONMENTAL POLICY OBJECTIVES.....	82
5.1	Linkages between Interreg Central Europe 2021-2027 proposal and the EU environmental objectives	82
5.2	Potentially significant impacts of Interreg Central Europe 2021-2027 proposal on environment and human health	83
5.2.1	Air	83
5.2.2	Climatic factors.....	84
5.2.3	Water.....	86

5.2.4	Soil	88
5.2.5	Biodiversity, Natura 2000 and Ecosystem services	90
5.2.6	Population & human health	92
5.2.7	Material assets	94
5.2.8	Cultural heritage	95
5.2.9	Landscape	96
5.2.10	Synergistic & cumulative impacts of the entire Interreg Central Europe 2021-2027 proposal.....	98
6	PROPOSED MITIGATION AND ENHANCEMENT MEASURES	101
6.1	Generic cross-cutting recommendation for the entire Interreg Central Europe Proposal	101
6.1.1	Mitigation measure no. 1	101
6.2	proposed mitigation and enhancement measures for SO 1.1: Strengthening innovation capacities in central Europe.....	101
6.2.1	Mitigation measure no. 2	101
6.2.2	Enhancement measure no. 1.....	102
6.2.3	Enhancement measure no. 2.....	102
6.2.4	Enhancement measure no. 3.....	102
6.3	Proposed mitigation and enhancement measures for SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	102
6.3.1	Enhancement measure no. 4.....	102
6.4	Proposed mitigation and enhancement measures for SO 2.1: Supporting the energy transition to a climate neutral central Europe	102
6.4.1	Mitigation measure no. 3	102
6.4.2	Enhancement measure no. 5.....	102
6.5	Proposed mitigation and enhancement measures for SO 2.2: Increasing the resilience to climate change in central Europe	103
6.5.1	Mitigation measure no. 4	103
6.5.2	Enhancement measure no. 6.....	103
6.6	Proposed mitigation and enhancement measures for SO 2.3: Taking circular economy forward in central Europe.....	103
6.6.1	Enhancement measure no. 7.....	103
6.7	Proposed mitigation and enhancement measures for SO 2.4: Safeguarding the environment in central Europe.....	103
6.7.1	Enhancement measure no. 8.....	103
6.8	Proposed mitigation and enhancement measures for SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	104
6.8.1	Mitigation measure no. 5	104
6.8.2	Mitigation measure no. 6	104
6.8.3	Mitigation measure no. 7	104
6.9	Proposed mitigation and enhancement measures for SO 3.2: Greening urban mobility in central Europe.....	104
6.9.1	Mitigation measure no. 8	104
6.9.2	Enhancement measure no. 9.....	105
6.9.3	Enhancement measure no. 10.....	105
6.10	Proposed mitigation and enhancement measures for SO 4.1: Strengthening governance for an integrated territorial development in central Europe	105
6.10.1	Enhancement measure no. 11.....	105
7	PROPOSED MONITORING ARRANGEMENTS.....	106
8	LITERATURE.....	107

CONTACT

Full legal name: Integra Consulting s.r.o.
Address: Pobřežní 18/16, Prague 8, 186 00, Czech Republic
Contact Person/s: Jiří Dusík, Partner and Senior Consultant
Tel: +420 603 214 487
E-mail: jiri.dusik@integracons.com

Full legal name: ZaVita d.o.o.
Address: Tomišškova ulica 40, SI-1000 Ljubljana, Slovenia
Contact Person/s: Klemen Strmšnik, Project Manager
Tel: +386 (0)51 641 211
E-mail: klemen.strmsnik@zavita.si

NON-TECHNICAL SUMMARY

INTRODUCTION

A Strategic Environmental Assessment (hereinafter SEA) for the future Interreg CENTRAL EUROPE 2021-2027 Programme (Interreg CE) is conducted in accordance with the EU Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (hereinafter SEA Directive) and the UNECE Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (hereinafter SEA Protocol).

The assignment was performed in an interactive way through regular virtual meetings between the contractor and the Interreg CE MA/JS and two exchanges on the progress of the SEA with the Working Group CE21+ that elaborates the programme.

This SEA is based on the draft programme strategy as outlined in the proposed Interreg Programme (IP) version 1 which may be subject to further consultations and changes. In particular, Specific Objective 3.1 might be discontinued in the final version of the programme.

The assessment has taken into consideration the fact that the IP primarily focuses on transnational coordination, strategic and operational planning, capacity building and skills improvement, best practice transfer and knowledge exchange. It involves “limited investment” interventions - any supported actions with an “investment character” will be supported for the purpose of the piloting of innovative solutions. This often means that only localized direct impacts can be reasonably expected in case of specific projects and their pilot actions.

INTERREG CENTRAL EUROPE PROGRAMME

The Interreg Central Europe (CE) Programme is one of the transnational cooperation programmes established under the European Territorial Cooperation goal in the framework of the EU Cohesion Policy. The programme supports regional cooperation among nine central European countries: Austria, Croatia, the Czech Republic, Hungary, Poland, Slovakia and Slovenia, as well as parts of Germany and Italy.

The current draft Interreg CENTRAL EUROPE 2021-2027 Programme Version 1 (IP v1) suggests four priorities and 9 specific objectives (SOs):

Priority 1: A smarter central Europe through cooperation

- SO 1.1: Strengthening innovation capacities in central Europe
- SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe

Priority 2: A greener central Europe through cooperation

- SO 2.1: Supporting the energy transition to a climate-neutral central Europe
- SO 2.2: Increasing the resilience to climate change in central Europe
- SO 2.3: Taking circular economy forward in central Europe
- SO 2.4: Safeguarding the environment in central Europe

Priority 3: A more connected central Europe through cooperation

- SO 3.1: Improving transport connections of rural and peripheral regions in central Europe
- SO 3.2: Greening urban mobility in central Europe

Priority 4: A better governance for cooperation in central Europe

- SO 4.1: Strengthening governance for an integrated territorial development in central Europe

ENVIRONMENTAL POLICY OBJECTIVES AND ISSUES FOR INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME

The SEA has assessed the proposed IP v1 of the Interreg CENTRAL EUROPE 2021-2027 while considering the following relevant environmental policy objectives.

Environmental policy topics	Key issues and concerns
Air	Impacts on human health and well-being
	Impacts on ecosystems
Climate	Mitigation (GHG emission reductions, renewable energy, energy efficiency)
	Adaptation (adaptive capacity and adaptation measures)
Water	Protection of water ecosystems and wetlands
	Hydro-morphological pressures
	Pollution pressures on water and links to human health
	Water abstraction and its pressures on surface- and groundwater
Soil	Ensuring sustainable use of land and soil
	Preventing loss of soil and soil pollution
Biodiversity and Natura 2000	Protection and preservation of biodiversity and natural ecosystems
	Promotion of green infrastructure and ecosystem-based management
	Protection and preservation of Natura 2000 species and habitats
Population and human health	Public health and environmental health
	Noise
Material assets	Resource use and efficiency
	Waste generation and management
	Buildings
Cultural heritage	Protection and preservation of cultural heritage
	Promotion of participatory management of cultural heritage
Landscape	Protection and preservation of landscapes
Resilience	Resilience to economic, social and environmental shocks
	Resilient agricultural and food production systems
	Resilient health systems
	Resilient infrastructure
	Resilience of urban systems

The environmental policies listed above were comprehensively integrated into the proposed programme design. The following table illustrates multiple (mainly positive) linkages of the above EU environmental policy objectives with the proposed specific objectives of the programme.

SEA topics	Environmental (including health) policy objectives & concerns	Interreg Central Europe Programme 2021-2027 - version 1									
		Priority	1		2		3		4		
		SO	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1
Air	Air quality impacts on human health and well-being										
	Air quality impacts on ecosystems										
Climate	Mitigation (GHG emission reductions, renewable energy, energy efficiency)										
	Adaptation (adaptive capacity and adaptation measures)										
Water	Water ecosystems and wetlands										
	Hydro-morphological pressures										
	Pollution pressures on water and links to human health										
	Water abstraction and its pressures on surface- and groundwater										
Soil	Ensuring sustainable use of land and soil										
	Preventing loss of soil and soil pollution										
Biodiversity and Natura 2000	Protection and preservation of biodiversity and natural ecosystems										
	Promotion of green infrastructure and ecosystem-based management										
	Enabling the necessary transformative change										
	Protection and preservation of Natura 2000 species and habitats										
Population and human health	Public health and environmental health										
	Noise										
Material assets	Resource use and efficiency										
	Waste generation and management										
	Buildings										
Cultural heritage	Protection, preservation and management of cultural heritage										
	Promotion of participatory management of cultural heritage										
Landscape	Protection and preservation of landscapes										
Resilience	Resilience to economic, social, and environmental shocks										
	Resilient agricultural and food production systems										
	Resilient health systems										
	Resilient infrastructure										
	Resilience of urban systems										

Key:

The strength of potential relationships (positive or adverse) determined on the basis of their significance and the territorial magnitude:

	Strong relationship
	Significant relationship
	Weak relationship

ENVIRONMENTAL BASELINE TRENDS IN THE INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME AREA

Chapter 4 of the Environmental Report offers a detailed analysis of the baseline trends for each of the environment issues that were considered within the strategic environmental assessment. Interested readers can refer to it and obtain information on the overall trends in EU, situation in Central Europe and the expected future trend in each of the assessment issues in the broad programme area.

POTENTIALLY SIGNIFICANT IMPACTS OF INTERREG CENTRAL EUROPE 2021-2027 PROPOSAL ON ENVIRONMENT AND HUMAN HEALTH

As evident from the overview provided below, the IP is clearly oriented towards sustainable development and search for green solutions by design. Since all projects and their potential pilot actions with an “investment character” need to be implemented in line with national level legislation and standards, no potentially significant adverse impact is foreseen even for the realistic worst/case scenario of the IP programme implementation.

SO 1.1: Strengthening innovation capacities in central Europe

SO 1.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	/	+1	+1	+1	+1	/	+2	+2	/
Risks	/	/	/	/	-1	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe

SO 1.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	/	+1	/	/	/	+1	+1	/	/
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 2.1: Supporting the energy transition to a climate neutral central Europe

SO 2.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	/	/	/	+1	+1	/	/
Risks	/	/	-1	/	-1	-1	/	/	-1
TB	T+	T+	/	/	T	/	/	/	/

SO 2.2: Increasing the resilience to climate change in central Europe

SO 2.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+2	+2	+2	+2	+2	+2	+2	+T

Risks	/	/	-1	/	/	/	/	/	/
TB	/	T+	T+	/	T+	T+	/	/	/

SO 2.3: Taking circular economy forward in central Europe

SO 2.3	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	+2	+1	+1	+1	+2	/	/
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 2.4: Safeguarding the environment in central Europe

SO 2.4	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	+2	+2	+2	+2	/	/	+2
Risks	/	/	/	/	/	/	/	/	/
TB	/	T+	T+	/	T+	T+	/	/	/

SO 3.1: Improving transport connections of rural and peripheral regions in central Europe

SO 3.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	/	/	/	+1	/	/	/
Risks	-1	-1	/	/	-1	-1	/	/	-1
TB	T	/	/	/	T	/	/	/	T

SO 3.2: Greening urban mobility in central Europe

SO 3.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	/	/	/	+2	/	+1	/
Risks	/	/	/	/	/	/	-1	/	/
TB	/	/	/	/	/	/	/	/	/

SO 4.1: Strengthening governance for an integrated territorial development in central Europe

SO 4.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	+1	+1	+1	+1	+1	+1	+1
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

The transboundary effects of the proposed IP are largely positive. The programme creates only few minor risks of potentially adverse transboundary impacts in the case of transboundary policy/strategic frameworks and infrastructure interventions in border areas that would be independently followed up by investments outside of the Interreg CE programme framework. Such risks can be managed by the existing well-established provisions for the transboundary consultations within the respective EIAs or SEAs that would accompany any such intervention.

PROPOSED MITIGATION MEASURES FOR THE IMPLEMENTATION OF THE INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME

In order to minimize the potential environmental risks of the proposed programme, the SEA process suggested the following mitigation measures:

Programme proposal	Recommended mitigation measures for the programme
<p>Cross-cutting recommendation for the entire programme</p>	<p>The IP should encourage all applicants to use ‘environmental sustainability by design’ approach. This approach implies that environmental or broader sustainability considerations are no longer treated as “afterthoughts” and instead become the core part of decision-making processes ranging from e.g. the business management tools (such as analytics and product development) public sector planning and programming. To promote such thinking in the actual project applications, the CE programme is advised to:</p> <ul style="list-style-type: none"> • encourage the prospective applicants to identify and consider any potentially significant environmental and health issues of concern during their project design; consider available options for implementing projects that do not adversely affect the quality of the environment and ideally contribute to regeneration of the environment and ecosystem functions and services; and prepare arrangements for environmentally sound project implementation; and • explain all of the above considerations in the project application (e.g. in the dedicated section of the project application form templates). <p>The project selection process should recognize and appreciate good practices in environmental sustainability-by-design.</p>
<p>SO 1.1: Strengthening innovation capacities in central Europe</p>	<p>With regard to the programme’s potential support to bio-economy, any supported innovation that involve genetic modifications (e.g. synthetic biology) should be supported only if they prove compliance with the related <i>acquis communautaire</i> for genetic engineering, including the relevant provisions of the EU Biodiversity Strategy 2030.</p>
<p>SO 2.1: Supporting the energy transition to a climate neutral central Europe</p>	<p>The project selection process should ensure that proposals for the production of renewable energy consider their potential impacts on biodiversity and Natura 2000 species and habitats, hydro-morphology, water-use, landscape, noise, vibrations and electromagnetic impacts.</p>
<p>SO 2.2: Increasing the resilience to climate change in central Europe</p>	<p>The project selection process should ensure that proposals for climate change risk (e.g. floods) adaptation measures consider their potential hydro-morphological impacts.</p>
<p>SO 3.1: Improving mobility and accessibility of</p>	<p>Should the programme support the preparation of transport infrastructure plans and programmes that would fall under the scope of the SEA Directive or SEA Protocol, it needs to ensure that the relevant activities include the required strategic environmental assessments.</p>

<p>rural and peripheral regions in central Europe</p>	<p>The programme should encourage all applicants to use ‘environmental sustainability by design’ approach, that considers, particularly in the SO 3.1, whether and how the proposed transport actions:</p> <ul style="list-style-type: none"> • reduce the need for transport; • reduce or optimize the transport flows; • promote switching to least emission-intensive transport systems; • reduce or optimize fragmentation of habitats and • reduce the impacts of the transport systems on air and noise pollution; public health; biodiversity and Natura 2000 species and habitats, landscape fragmentation, hydro-morphological impacts, land take and cultural and archaeological heritage. <p>Should the IP fund the preparation of transport infrastructure projects in border regions that would fall under the scope of the Espoo Convention and the Article 7 of the EIA Directive, it needs to ensure that the activities consider the relevant requirements for transboundary consultations.</p>
<p>SO 3.2: Greening urban mobility in central Europe</p>	<p>As mentioned in the case of SO 3.1, the IP should encourage all applicants to use ‘environmental sustainability by design’ approach, that is particularly relevant to also for the SO 3.2. This approach should enquire whether and how the proposed transport actions:</p> <ul style="list-style-type: none"> • reduce the need for transport; • reduce or optimize the transport flows; • promote switching to least emission-intensive transport systems; and • reduce the impacts of the transport systems on air and noise pollution; public health; and cultural heritage

Additionally, the SEA process has generated 11 suggestions for the enhancement measures which are detailed in Chapter 6.

MONITORING ARRANGEMENTS

The SEA process has not encountered any difficulties and is not constrained by limitations that would restrict the validity of the assessment outcomes.

Considering the fact that the proposed Interreg CE programme 2021-2027 does not have any potentially significant adverse impacts on the environment that could not be easily managed with the proposed mitigation measures, the SEA team does not have any specific recommendations for the monitoring arrangements under the SEA Directive.

GLOSSARY OF ACRONYMS AND TERMS

CE	Central Europe
EC	European Commission
EU	European Union
Interreg CE	Interreg Central Europe
IP	Interreg Central Europe Programme for 2021-2027
MA/JS	Managing Authority and the Joint Secretariat
SEA	Strategic environmental assessment
SEA Directive	Directive 2001/42/EC of the European Parliament and of the Council on the assessment of the effects of certain plans and programmes on the environment
SEA Protocol	Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context
UNECE	United Nations Economic Commission for Europe
WG CE21+	Working Group for preparing the successor Interreg CE Programme for the 2021-2027 programming period

1 STRATEGIC ENVIRONMENTAL ASSESSMENT PROCESS FOR INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME

This chapter presents the aim of the SEA process, the assessment steps and methodology, the reasons for selecting the alternatives dealt with, assessment methodology and any difficulties or uncertainties encountered during the assessment process as per the requirements of the SEA Directive Annex 1, item h.

1.1 AIMS OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT

A Strategic Environmental Assessment (hereinafter SEA) for the future Interreg CE 2021-2027 Programme is conducted in accordance with the EU Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (hereinafter SEA Directive) and the UNECE Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (hereinafter SEA Protocol).

The strategic environmental assessment generally describes the evaluation of the likely environmental, including health, effects, which comprises the determination of the scope of an environmental report and its preparation, the carrying-out of public participation and consultations, and the taking into account of the environmental report and the results of the public participation and consultations in a plan or programme.

The goal of this particular SEA is to further strengthen environmental considerations into the preparation and adoption of the Interreg CE 2021-2027 Programme (INTERREG CE). Specifically, the SEA process aims to:

- Support **sustainable development considerations and** aspirations formulated e.g. in the **European Green Deal** during the elaboration of the programme proposal.
- Systematically consider impacts and contributions of the proposed programme on the **relevant environmental policy objectives adopted at the European Union level**.
- Assess the likely significant impacts (**positive and adverse**) of interventions proposed in the programme and their cumulative effects on key environmental issues in the programme area.
- Suggest **mitigation measures** that help to avoid, minimize or offset potentially adverse impacts and **enhancement measures** that enhance environmental benefits and positive side-effects of the programme
- **Engage environmental authorities** early in the process and provide opportunities for consultations with the **public concerned**.

The SEA process is guided by the following applicable guidance documents:

- Guidance on the implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment¹.
- Annex 1 of the European Commission Guidance on ex-ante evaluation for the 2014-2020 programming².

¹ https://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf

² https://ec.europa.eu/regional_policy/sources/docoffic/2014/working/ex_ante_en.pdf

- European Commission Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment³.

Due to the rapidly evolving policy and development context associated with outbreak caused by the coronavirus SARS-CoV-2 at the time of writing, the assessment also considers the relevant health concerns in accordance with the recommendations contained in the Resource Manual to Support Application of the Protocol on SEA (UN, 2012).

1.2 SEA PROCESS STEPS AND ALTERNATIVES OF THE PROGRAMMING DOCUMENT DEALT WITH

The Interreg CE Managing Authority has commissioned the SEA to independent external experts selected through a tendering process – a consortium of Integra Consulting Ltd. (CZ) and Zavita Ltd. (SI). The SEA was integrated into the IP elaboration and in terms of the SEA procedure involved standard steps outlined in Figure 1.

Figure 1 Steps of the SEA process and timeline

Steps of the SEA process	Schedule	Status
Kick off meeting	31 Jan 2020	Completed
Integrating the SEA process to the programming process timeline	Feb-Apr 2020	Completed
Scoping document and consultations with environmental authorities	June-July 2020	Completed
Informal feedback on the programming document	July-Aug 2020	Completed
Draft Environmental Report	Sep-Oct 2020	Completed
Consultations of env. authorities and the public on Environmental Report	Nov-Dec 2020	Current
Documentation of consultations and final Environmental Report	end 2020 or early 2021	-
Environmental statement	After IP adoption	-
Expected end of the process	spring 2021	-

The assignment was performed in an interactive way between the contractor and the MA/JS through regular virtual meetings and exchanges on the progress of the SEA. In practical terms, the SEA process has involved the following technical tasks that provided inputs into the formulation of the Interreg Central Europe programme for 2021-2027 (hereafter IP):

- The SEA team has started by elaborating an environmental reference framework for the IP using a very early draft IP (during February-March 2020). The framework was closely discussed with the IP programming team and was included in the SEA scoping report that was sent to the relevant EU member states for consultations.
- The scoping consultations with the relevant EU member states (which are covered by the programme conducted during June-August 2020) provided inputs into the finalisation of the environmental reference framework as well as for the elaboration of the draft IP version 1. Annex 1 provides an overview of the comments obtained and responses given by the SEA team and the programming team.

³ <https://ec.europa.eu/environment/eia/pdf/SEA%20Guidance.pdf>

- Additionally, the SEA team has elaborated two sets of working inputs for the formulation of the IP version 1. First, the SEA team prepared an internal Aid Memoir (June 2020) that summarized then key findings coming out of the environmental baseline analyses for the potential use within the IP elaboration. Second, the programming team and the SEA team had a working session in late August 2020 to discuss initially the working draft of IP. Feedback from the SEA team provided through these exchanges (see Annex 2 and 3 to this report for details) presents key suggestions provided by the SEA team. All relevant comments were fully integrated into the IP working draft.
- The SEA team has also informally presented the progress in the SEA process to the 8th Interreg CE Working Group meeting on 24 Sept 2020.

The resulting IP proposal version 1 which was used for the elaboration of this SEA Report has been, thanks to these multiple interactions, fully optimized with regard to the SEA process inputs. The SEA report presented here assesses the impacts of the current IP proposal version 1 on the expected future evolution of the environmental baseline trends (zero-alternative) and highlights only few outstanding issues of concern that should be considered before and during the formal IP adoption and implementation.

1.3 METHODOLOGY

The actual assessment used the guiding questions determined at the end of the scoping process and involved matrices with the textual explanations of the potentially significant impacts of the interventions proposed in the programming document using (template in Figure 2). The analysis was conducted on an issue-by-issue basis, which facilitated consideration of potential cumulative or synergistic impacts of the entire Interreg CE 2021-2027 proposal on each environmental issue/concern.

Figure 2: Assessment matrix template

Interreg CE 2027 proposals	Benefits & risks			Explanations
	+	-**	TB#	
* Potential positive impacts - benefits ** Potential adverse impacts - risks # Potential transboundary effects				

Key:				
+2	+1	-	-1	-2
Significant positive impact	Moderate positive impact	Limited or no impact	Moderate adverse impact	Significant adverse impact

The assessment has taken into consideration the fact that the IP primarily focuses on transnational coordination, strategic and operational planning, innovation, capacity building and skills improvement, best practice transfer and knowledge exchange. It involves “limited investment” interventions - any supported actions with an “investment character” will be supported for the purpose of the piloting of innovative solutions. This often meant that only localized direct impacts can be reasonably expected in case of specific projects and their pilot actions.

Within this context, the assessment worked with plausible scenarios of best-case and worst-case implications that can realistically result from implementation of the proposed interventions in different settings. The key

added value of this approach was the resulting recommendations on environmental mitigation and enhancement measures adjusted on the basis of the European Green Deal aspirations. Figure 3 shows the new mitigation hierarchy reflecting the European Green Deal ambitions developed by the EuropeAid Environment and Climate Change Mainstreaming Facility.

Figure 3 Green Deal adjusted mitigation and enhancement hierarchy

Green Deal adjusted mitigation and enhancement hierarchy		Meaning
Enhance with an aspiration to achieve net gain in environmental quality and ecosystem services	Regenerate	Improve the environmental quality and enhance/restore biodiversity and the ecosystem functions and services
Mitigate to ensure no net loss of environmental quality and ecosystem services	Avoid	Avoid the impact altogether
	Minimize	Minimize the impact or rectify the impact by repairing, rehabilitating, or restoring the affected environment
	Offset	Compensate for the impact by replacing or providing substitute for lost ecosystems and ecosystem services

Source: Palerm & Slotweeg (2020) and IAIA (2018)

The mitigation and enhancement measures that arose from the SEA assessment were discussed with the MA/JS and fine-tuned based on the feedback obtained. This SEA Report treats the proposed mitigation measures as formal recommendations for the implementation of the programme, whereas enhancement measures are treated purely as suggestions that may, or may not, be accepted in the final version of the programme.

1.4 DIFFICULTIES ENCOUNTERED OR UNCERTAINTIES IN THE ASSESSMENT

The SEA team has enjoyed a fruitful cooperation with the MA/JS, involving frequent and open discussions that clarified each question related to the interventions proposed. The SEA process has not encountered any difficulties and is not constrained by limitations that would restrict the validity of the assessment outcomes. In contrary, the SEA team hereby would like to publicly acknowledge its appreciation for the close cooperation and the dialogue with the MA/JS during the programming process.

2 INTRODUCTION TO INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME PROPOSAL

This chapter presents the main key features of the Interreg Central Europe 2021-2027 proposal, its main objectives and the relationship with other relevant plans and programmes (as per requirement of the SEA Directive, Annex 1, item a).

2.1 INTERREG CENTRAL EUROPE PROGRAMME

The Interreg Central Europe (CE) Programme is one of the transnational cooperation programmes established under the European Territorial Cooperation goal in the framework of the EU Cohesion Policy. Transnational cooperation takes place for more than 20 years in the central Europe area and currently the Interreg CENTRAL EUROPE 2014-2020 Programme is being implemented.

The programme supports regional cooperation among nine central European countries: Austria, Croatia, the Czech Republic, Hungary, Poland, Slovakia and Slovenia, as well as parts of Germany and Italy. The overall objective of the current Interreg CENTRAL EUROPE 2014-2020 Programme is “to cooperate beyond borders to make central European cities and regions better places to live and work” by implementing smart solutions answering to regional challenges in the fields of innovation, low- carbon economy, environment, culture and transport. The programme budget totals to around 246 million Euros from the European Regional Development Fund (ERDF). Further information and relevant documents concerning the Interreg CE Programme 2014-2020 can be found on the programme website: www.interreg-central.eu.

The programme is managed by the City of Vienna, acting as programme Managing Authority (MA), with the support of the Joint Secretariat (JS) established in compliance with Article 23(2) of Regulation (EU) No 1299/2013.

In June 2018 the Interreg CE Monitoring Committee (MC), i.e. the body representing the 9 Member States participating in the programme, established a Working Group for preparing the successor Interreg CE Programme for the 2021-2027 programming period (WG CE21+). The WG CE21+ is composed by representatives of the nine Member States with the participation of the European Commission (EC) as observer and the support of the MA/JS.

2.2 PROGRAMME AREA

The Interreg Central Europe Programme covers, either fully or partly, the territories of nine EU Member States: Austria, Croatia, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia. Six of these member states have acceded the EU in 2004 or later.

The programme spreads across a core area of the European Union, spanning from the middle of Germany to EU external borders with Russia, Belarus and Ukraine in west-east direction and from the Baltic to the Adriatic Sea in north-south direction. See Figure 4 for details.

The programme area covers over 1 million square km and is home to about 146 million people (according to 2013 data). The territory features rich natural and cultural heritage and different landscapes ranging high and low mountain ranges, but also wide plains and large river basins and lake districts. The programme area also covers diverse climatic zones.

Central Europe is characterised by structural differences between rapidly developing urban and industrialised growth poles (such as capital city agglomerations like Warsaw, Prague, Berlin, Vienna, and Budapest) and rural and peripheral areas facing often a lower competitiveness and shrinking population.

Figure 4 Interreg Central Europe Programme Area



Source: Interreg Central Europe

2.3 INTERREG CENTRAL EUROPE 2021-2027 PROPOSAL

The Interreg CENTRAL EUROPE 2021-2027 Programme is a transnational cooperation programme within the goal of the European Territorial Cooperation (ETC) supported by the European Regional Development Fund. It aims at promoting cooperation among the regions of the CENTRAL EUROPE programme area through the exchange of knowledge, best practices, expertise, building of capacities and a better coordination of stakeholders. It therefore primarily focuses on soft measures which according to the current draft Interreg CENTRAL EUROPE 2021-2027 Programme (Version 1) are foreseen to be implemented in the following four priorities and 9 specific objectives (SOs):

- Priority 1: A smarter central Europe through cooperation
- SO 1.1: Strengthening innovation capacities in central Europe
- SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe
- Priority 2: A greener central Europe through cooperation
- SO 2.1: Supporting the energy transition to a climate-neutral central Europe
- SO 2.2: Increasing the resilience to climate change in central Europe
- SO 2.3: Taking circular economy forward in central Europe

- SO 2.4: Safeguarding the environment in central Europe
- Priority 3: A more connected central Europe through cooperation
- SO 3.1: Improving transport connections of rural and peripheral regions in central Europe
- SO 3.2: Greening urban mobility in central Europe
- Priority 4: A better governance for cooperation in central Europe
- SO 4.1: Strengthening governance for an integrated territorial development in central Europe

The structure above reflects the provisional IP design based on the agreements of the CE Working Group, including the agreements made during its 8th WG meeting. This IP structure might change, in particular, Specific Objective 3.1 might be discontinued in the final version of the programme. The following table presents the priorities, specific objectives and indicative examples of actions to be supported by the Interreg CE Programme 2021-2027.

Figure 5 Priorities, specific objectives and indicative examples of actions to be supported by the Interreg CE Programme 2021-2027

Specific objective	Possible results
Priority 1: A smarter central Europe through cooperation	
SO 1.1: Strengthening innovation capacities in central Europe	<p>Under this SO, Interreg CE will support transnational cooperation in particular to improve SME competitiveness. The aim is to improve policy learning, to strengthen the capacities of innovation stakeholders and to increase collaboration within and between regional innovation systems. Possible cooperation actions include the development and implementation of strategies, action plans, tools, training and pilot actions. All actions have to respect greening and sustainability aspects as a horizontal principle.</p> <p>Actions should push the uptake of novel technologies and solutions and consider e.g. prototyping and bringing research to the market. They should also foster cross-sector linkages by improving cooperation among innovation stakeholders with similar or complementing challenges. Actions should furthermore contribute to the establishment and strengthening of regional and transnational central European structures (e.g. clusters, innovation networks) and value chains, which will ultimately reduce dependency on foreign suppliers. The cooperation of companies within such interregional partnerships is in particular encouraged if these are part of value chains related to regional smart specialisation strategies.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Green economy, bio-economy • Industry 4.0, robotisation, digital technologies, key enabling technologies • Smart specialisation strategies • Cultural and creative industries • Silver economy and social innovation • Technology and innovation transfer to SMEs • Interregional partnerships along value chains • New schemes for financing innovation
SO 1.2: Developing skills	Under this SO, Interreg CE will support transnational cooperation that improves knowledge and human skills encouraging the introduction and strengthening of

<p>for smart specialisation, industrial transition and entrepreneurship in central Europe</p>	<p>sustainable and innovative products, services or processes especially by SMEs. Possible cooperation actions include the development and implementation of strategies, action plans, tools, trainings and pilot actions. Cooperation can help adapting solutions for e.g. institutional learning, vocational training, lifelong learning, and e-learning to the specific needs, economic conditions and smart specialisation strategies of the targeted territories.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Skills for Industry 4.0, digitalisation, green economy, bio economy, silver economy and healthcare • Capacity-building and institutional learning for smart specialisation • Matching skills to labour market needs • Competences for entrepreneurship • Demographic change, ageing society, brain-drain, regional (urban-rural) disparities of human capital • Counterbalancing job loss due to automation and digitisation • Social entrepreneurship and social innovation leading to better social integration
<p>Priority 2: A greener central Europe through cooperation</p>	
<p>SO 2.1: Supporting the energy transition to a climate-neutral central Europe</p>	<p>Under this SO, Interreg CE will support transnational cooperation to increase energy efficiency and the sustainable use of renewable energies across the programme area. Possible cooperation actions include the joint development and implementation of strategies and action plans, tools, trainings and pilot actions. Actions should improve energy-related policies and capacities and help central European regions and cities to implement affordable sustainable energy solutions that fit their specific territorial settings.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Renewable energy production and usage • Energy efficiency of buildings and public infrastructures • Greenhouse gas emissions from industrial production processes • Energy planning at local and regional levels • Energy demand management and behavioural change • Financing schemes for energy efficiency and renewable energy investments • Smart integration of carbon-neutral solutions across sectors
<p>SO 2.2: Increasing the resilience to climate change in central Europe</p>	<p>In line with EU Green Deal objectives, under this SO Interreg CE will support transnational cooperation to enhance policy learning and regional capacities on climate resilience across the programme area. Possible cooperation actions include the development and implementation of strategies, action plans, tools, training and pilot actions. Actions should address the challenges of the territories to alleviate environmental and socio-economic impacts of climate change and related risks, through the cooperative development of approaches. This will help central European regions and cities to implement climate change adaptation measures that are tailored to their specific territorial settings.</p>

	<p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Climate change resilience and adaptation measures • Climate-proof landscape and urban planning • Weather extremes and related hazards (rainfall events, floods, landslides, heat, draughts, water scarcity, wildfires etc.) • Risk prevention and management • Socio-economic and health-related impacts of climate change
<p>SO 2.3: Taking circular economy forward in central Europe</p>	<p>Under this SO, Interreg CE will support transnational cooperation to increase the deployment of circular economy approaches across the programme area. Possible cooperation actions include the joint development and implementation of strategies, action plans, tools, trainings and pilot actions. Actions should be in line with the EU Green Deal and the EU Circular Economy Action Plan and therefore improve product life cycles, promote circular economy processes and foster sustainable consumption. Transnational cooperation should push the transition to a circular economy by increasing knowledge, improving policy learning as well as practically testing good practices.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Waste prevention and management, recycling and recovery of resources and raw materials • Repair and re-use • Circular economy value chains • Clean production processes and closed loop systems • Sustainable product design (e.g. eco-design) and product development processes • Behavioural changes of producers, consumers, public buyers etc.
<p>SO 2.4: Safeguarding the environment in central Europe</p>	<p>Under this SO, Interreg CE will support transnational cooperation actions such as the development and implementation of strategies, action plans, tools, trainings and pilot actions that protect nature more efficiently and make environmental management more sustainable. Actions should focus on the development and implementation of better environmental policies as well as on the joint development of approaches that are tailored to specific local conditions. Ecosystems that are stretching across borders (e.g. river basins, ecological corridors etc.) should benefit from transnational cooperation beyond already existing multilateral initiatives, such as the Green Belt Initiative.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Biodiversity conservation and recovery • Protection of natural heritage, ecosystems and valuable areas incl. Natura 2000 sites • Environmental pollution (air, water, soil, noise, light etc.) and human health impacts • Integrated environmental management and sustainable use of natural resources • Sustainable land management and landscape planning

	<ul style="list-style-type: none"> • Ecosystem services (e.g. production of food and water, clean air, recreational benefits) • Restoration of degraded ecosystems • Sustainable tourism and the valorisation of natural heritage
Priority 3: A more connected central Europe through cooperation	
<p>SO 3.1: Improving transport connections of rural and peripheral regions in central Europe</p>	<p>Under this SO, Interreg CE will support transnational cooperation to improve the mobility in and accessibility of rural and peripheral regions, especially in view of their linkages to main EU transport corridors and nodes. Sustainable solutions will also help to reduce transport-related pollution and greenhouse gas emissions and positively affect socioeconomic developments. Possible cooperation actions include the joint development and implementation of strategies, action plans, tools, training and pilot actions. Actions should improve transport-related policies and increase capacities for a coordinated, integrated planning of sustainable transport and mobility systems and solutions.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Demand-responsive and flexible regional passenger transport • Accessibility of rural and remote areas and their connectivity to main EU transport corridors • Transport barriers and bottlenecks across borders and beyond • Strategic regional transport and spatial planning • Multi-modal freight transport and logistic chains in rural and peripheral areas
<p>SO 3.2: Greening urban mobility in central Europe</p>	<p>Under this SO, Interreg CE will support transnational cooperation for the development and implementation of strategies, action plans, tools, trainings and pilot actions that aim at better policy learning and increased capacities for sustainable urban mobility. Actions should foster an integrated and smart green mobility in FUAs by considering governance aspects and improving coordination among relevant stakeholders and policies. In line with the EU “Urban Mobility Package”, actions should develop and deploy integrated strategies. They should also test and introduce new green approaches and technologies for delivering solutions for urban mobility challenges. Furthermore, actions should balance out disparities between territories that are less advanced and more advanced in terms of green urban mobility.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Sustainable urban mobility planning • Quality and efficiency of green, urban public transport services • Smart traffic and mobility management, including commuting solutions • Green connections between urban and peri-urban areas • Sustainable multimodal urban freight and logistic solutions (including the “last mile”) • Urban traffic congestions • Greenhouse gas and pollutant emissions (air quality) from urban traffic • Accessibility of urban public transport for elderly and disabled people

Priority 4: A better governance for cooperation in central Europe	
<p>SO 4.1: Strengthening governance for an integrated territorial development in central Europe</p>	<p>Under this SO, Interreg CE will support transnational actions aimed at improving multi-sectoral governance processes on all territorial levels, in particular in view of complex challenges related to digitalisation, demographic change, public services of general interest (such as health, education, social services) and tourism including culture. Actions should also strengthen capacities of public authorities to prepare integrated territorial development strategies. Possible cooperation actions include the joint development and implementation of strategies, action plans, tools, training and pilot actions. Actions should focus on improving governance processes by better integrating policy sectors, by building consensus among relevant institutions and by better involving citizens and other stakeholders.</p> <p>More concretely, the programme will fund actions in the following thematic fields (non-exhaustive list):</p> <ul style="list-style-type: none"> • Reduction of administrative barriers, better policymaking and cooperation beyond borders • Participatory decision-making processes (e.g. citizen involvement) • Multi-level and multi-sector governance among areas with functional ties beyond borders • Integrated territorial development strategies (e.g. on demographic change, public services including health) • Digital governance

2.4 RELATIONSHIPS BETWEEN THE INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME AND OTHER RELEVANT PLANS OR PROGRAMMES

The Interreg CE programme proposal for 2021-2027 builds upon the approach followed by the Interreg CE programme for 2014-2020.

The Interreg CE 2021-2027 Programme will be implemented in line with the relevant regulatory framework. The programme thereby builds on the experience and expertise gained in the frame of the ongoing Interreg CE2014-2020 Programme. All actions supported will have to comply with the relevant national laws and legal requirements, including among others the respective land-use planning document of the respective territories.

3 ENVIRONMENTAL POLICY OBJECTIVES AND ISSUES FOR INTERREG CENTRAL EUROPE 2021-2027 PROGRAMME

This chapter outlines the relevant environmental protection objectives established at international, Community or Member State level, which are relevant to Interreg Central Europe 2021-2027 (as per the requirements of the SEA Directive, Annex 1, item e).

3.1 INTRODUCTION

The relevant environmental protection objectives for Interreg Central Europe Programme 2021-2027 include two types of objectives established at the European Union level:

- Legally binding commitments formulated through adopted policies and directives; and
- Aspirational objectives that are currently being developed and/or negotiated and put forward the Union’s long-term ambitions that may be of direct relevance to Interreg Central Europe programme.

Due to the rapidly evolving policy and development context associated with SARS-CoV-2 pandemic, the environmental policy objectives include also the relevant health concerns in accordance with the provisions of the UNECE SEA Protocol. The following text presents the key objectives and relevant issues and concerns identified.

Environmental policy topics	Key issues and concerns
Air	Impacts on human health and well-being
	Impacts on ecosystems
Climate	Mitigation (GHG emission reductions, renewable energy, energy efficiency)
	Adaptation (adaptive capacity and adaptation measures)
Water	Protection of water ecosystems and wetlands
	Hydro-morphological pressures
	Pollution pressures on water and links to human health
	Water abstraction and its pressures on surface- and groundwater
Soil	Ensuring sustainable use of land and soil
	Preventing loss of soil and soil pollution
Biodiversity and Natura 2000	Protection and preservation of biodiversity and natural ecosystems
	Promotion of green infrastructure and ecosystem-based management
	Protection and preservation of Natura 2000 species and habitats
Population and human health	Public health and environmental health
	Noise
Material assets	Resource use and efficiency
	Waste generation and management
	Buildings
Cultural heritage	Protection and preservation of cultural heritage
	Promotion of participatory management of cultural heritage
Landscape	Protection and preservation of landscapes
Resilience	Resilience to economic, social and environmental shocks
	Resilient agricultural and food production systems
	Resilient health systems
	Resilient infrastructure
	Resilience of urban systems

3.2 AIR

3.2.1 Context

Air pollution is a traditional environmental policy concern in EU since the late 1970s. The main instruments in EU-wide efforts to improve air quality were the Air Quality Framework Directive (EC, 1996) and its daughter Directives that established standards for a range of pollutants including ozone, particulate matter (PM10) and nitrogen dioxide (NO₂), in the period up to 2004. The Air Quality Framework Directive and the first three daughter directives were later consolidated into a single Ambient Air Quality Directive (EU, 2008) that aims to control the emissions from mobile sources, improving fuel quality and promoting and integrating environmental protection requirements into the transport and energy sector are part of these aims. The directive requires the Member States to divide their territory into zones and agglomerations where they need to undertake assessments of air pollution levels. Where air pollution levels are elevated above limit or target values, the Member States have to prepare air quality plans or programmes in order to address the sources responsible and attain the limit values before they formally enter into force. Information on air quality should be disseminated to the public.

The Clean Air Programme for Europe (EC, 2013a) reiterated the long-term EU objective for air pollution as: no exceedance of the World Health Organisation guideline levels for human health⁴ (which may also develop over time); and no exceedance of the critical loads and levels which mark the limits of ecosystem tolerance⁵. It stipulated new EU air policy objectives for 2030 as follows:

- Reduce health impacts (premature mortality due to particulate matter and ozone) by 52%, and
- Limit ecosystem area exceeding eutrophication to 35%

3.2.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Impacts on human health and well-being	Attain limit values for sulphur dioxide (SO ₂), nitrogen dioxide (NO ₂), benzen (C ₆ H ₆), carbon monoxide (CO), lead (Pb), and particulate matter (PM ₁₀ and PM _{2.5}). Achieve target values for PM _{2.5} , outdoor ozone (O ₃), arsenic (As), cadmium (Cd), Ni and benzo(a)pyrene (BaP); and the long-term objective for O ₃ .	2020 and 2030	Ambient Air Quality Directive (EU, 2008) Clean Air Programme for Europe (EC, 2013a) SDG 11 Sustainable cities (UN, 2015a)	Legally binding commitment
	By 2030, cut the health impacts of air pollution (in terms of premature mortality due to PM and O ₃) by 52 % compared with 2005.	2030	Clean Air Programme for Europe (EC, 2013a) SDG 11 Sustainable cities (UN, 2015a)	Aspirational objective

⁴ Strictly speaking, there is no known safe level of exposure for some pollutants such as particulate matter, but WHO guidelines are set at low risk levels and regularly revised.

⁵ Critical loads and levels, i.e. the maximum levels the ecosystem can tolerate without degrading

Impacts on ecosystems	Achieve the national exposure reduction target for SO ₂ and NO _x .		Ambient Air Quality Directive (EU, 2008) Clean Air Programme for Europe (EC, 2013a)	Legally binding commitment
	By 2030, reduce the ecosystem area exceeding eutrophication limits to 35%.	2030	Clean Air Programme for Europe (EC, 2013a), National Emissions Ceilings Directive (EU, 2016)	Aspirational objective

3.3 CLIMATE

3.3.1 Context

Climate change is a key environmental, economic and social challenge globally and in Europe. Mitigation and adaptation are both necessary to limit the risks related to climate change.

On the mitigation side, the EU has in 2008 adopted a set of regulatory measures known as the Climate and Energy Package (EU, 2008) which contained a revised EU Emissions Trading Directive, a Decision on effort sharing in non-ETS sectors, a directive on the promotion of renewable energy, and a directive on carbon capture and storage. The Climate and Energy Package was revised in 2014 (EU, 2014a) and specified the following EU-wide targets and policy objectives for the period from 2021 to 2030:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels);
- At least 32% share for renewable energy;
- At least 32.5% improvement in energy efficiency.

In December 2019, the European Commission announced its so-called European Green Deal (EC, 2019) that aims to make Europe “the first climate neutral continent” by 2050. In March 2020, the Commission has tabled a proposal for the European Climate Law (EC, 2020) that puts forward a legally binding target of net zero greenhouse gas emissions by 2050. The proposed European Climate Law requests:

- the relevant European Union institutions and the Member States to take the necessary measures at EU and national levels to enable the collective achievement of the climate-neutrality;
- the European Commission to review by September 2020 the EU’s 2030 target for climate in light of its proposed the climate-neutrality objective and explore options for a new 2030 target of 50 to 55% emission reductions compared to 1990; and
- the European Commission to assess by 30 June 2021 how the existing EU legislation implementing the Union’s 2030 target would need to be amended in order to enable the achievement of 50 to 55 % emission reductions compared to 1990 and to achieve the climate-neutrality-objective and empowers it to adopt delegated acts to supplement this Regulation by setting out a trajectory at Union level to achieve the climate-neutrality objective.

With regard to climate change adaptation, the policy targets at the global and European levels are less quantifiable, and most monitoring activities so far focus on the adaptation process rather than on quantitative outcomes. Of particular relevance are policies for disaster risk reduction (e.g. EU Civil Protection

Mechanism, EU action plan on the Sendai Framework for Disaster Risk Reduction), the common agricultural policy, the common fisheries policy, the Floods Directive, the Water Framework Directive, the forest policy, the nature directives, and policies related to public health (EEA, 2019).

3.3.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Climate change mitigation	At least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990 (with a proposal by the European Commission to increase the 2030 target for emission reduction to at least 55% ⁶)	2030	Climate and Energy Package (with update proposed through the State of the Union Address, Sept 2020)	Legally binding commitment
	EU-wide emissions and removals of greenhouse gases regulated in Union law shall be balanced at the latest by 2050, thus reducing emissions to net zero by that date.	2050	European Climate Law proposal (EC, 2020)	Aspirational objective
	At least 32% is set for the share of renewable energy consumed in the EU in 2030.	2030	Climate and Energy Package	Legally binding commitment
	At least 32.5% improvement in energy efficiency	2030	Climate and Energy Package	Legally binding commitment
Climate change adaptation	Strengthen resilience and the capacity to adapt to climate-related hazards and natural disasters in all countries.	2030	SDG target 13.1 (UN, 2015a); Paris Agreement (UNFCCC, 2015b)	Aspirational objective
	Climate-proofing EU action: mainstream adaptation measures into EU policies and programmes.	2030	EU strategy on adaptation to climate change (EC, 2013b; Council of the European Union, 2013)	Legally binding commitment

3.4 WATER

3.4.1 Context

Water represents a key resource for nature, agriculture, energy production, transport and human health. Availability and sustainable use of water is a key challenge globally and within Europe. Protection of water resources and of fresh and saltwater ecosystems is therefore one of the cornerstones of environmental protection in Europe.

EU started taking first steps towards water protection in 1991 with the adoption of the Urban WasteWater Treatment and Nitrates Directives (EU, 1991a, 1991b). With the directives reducing pollution pressures on water was addressed. With the adoption of the Water Framework Directive (2000/60/EC), a cornerstone of EU-wide water integrated protection efforts was laid. EU policies addressed in the Floods Directive

⁶ https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_20_1655

(2007/60/EC), the Nitrates Directive (91/676/EEC), the Bathing Water Directive (2006/7/EC), the Drinking Water Directive (98/83/EC) also contribute to water protection in the member states. Water and biodiversity are interconnected and addressed through the EU Biodiversity Strategy (EC, 2011a) and the priority objectives of the Seventh Environment Action Programme (EU, 2013a).

Key water protection needs in Europe include (EEA, 2019):

- Improved implementation and increased coherence between EU water-related policy objectives and measures is needed to improve water quality and quantity.
- In the future it will also become increasingly critical to address and monitor the climate-water-ecosystem-agriculture nexus and connection with energy needs.
- It is on the river basin scale that effective solutions for water management can be found and essential knowledge is being developed through the implementation of river basin management plans under the Water Framework Directive.

3.4.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Protection of water ecosystems and wetlands	Achieve good ecological status of all water bodies in Europe	2015	Water Framework Directive (2000/60/EC)	Legally binding commitment
	Protect, conserve and enhance freshwater as well as the biodiversity that supports this natural capital	2050	7th EAP, PO 1 (EC, 2013)	Aspirational objective
	Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	2020	SDG 6.6 (UN, 2016)	Aspirational objective
Hydro-morphological pressures	Assess and manage flood risks, aiming to reduce the adverse consequences for human health, environment and cultural heritage	2015	Floods Directive (2007/60/EC)	Legally binding commitment
	Good hydro-morphological status (quality element supporting good ecological status)	2015	Water Framework Directive (2000/60/EC)	Legally binding commitment
Pollution pressures on water and links to human health	Achieve good chemical status of all surface and groundwater bodies	2015	Water Framework Directive (2000/60/EC)	Legally binding commitment
	Reducing and further preventing water pollution by nitrates from agricultural sources	N/A	Nitrates Directive (91/676/EEC)	Legally binding commitment
	To protect the environment in the EU from the adverse effects of urban waste-water through collection and treatment of waste-water. Implementation period depends on year of accession	EU-15: 1998-2005 EU-13: 2006-2023	Urban Waste Water Treatment Directive (91/271/EEC)	Aspirational objective
	To preserve, protect and improve the quality of the environment and to protect human health	2008	Bathing Water Directive (2006/7/EC)	Legally binding commitment

	To protect human health from adverse effects of contamination of water for human consumption	2003	Drinking Water Directive (98/83/EC)	Legally binding commitment
	Eliminate challenges to human health and well-being, such as water pollution and toxic materials	2050	7th EAP, PO 3 (EC, 2013)	Aspirational objective
	Improve water quality by reducing pollution	2030	SDG 6.3 (UN, 2016)	Aspirational objective
Water abstraction and its pressures on surface- and groundwater	Achieve good groundwater quantitative status of all groundwater bodies	2015	Water Framework Directive (2000/60/EC)	Legally binding commitment
	Water stress in the EU is prevented or significantly reduced	2020	7th EAP; PO 2 (EC, 2013)	Aspirational objective
	Water abstraction should stay below 20 % of available renewable water resources	2020	Roadmap to a resource efficient Europe (EC, 2011b)	Aspirational objective
	Substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater	2030	SDG 6.4 (UN, 2016)	Aspirational objective
	Implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	2030	SDG 6.5 (UN, 2016)	Aspirational objective

3.5 SOIL

3.5.1 Context

Land and soils represent a universal natural capital - not only due to its food production capacities, but also due to many other ecosystem services they provide to nature and mankind. As the demand for food and the pressures on land and soil are increasing on a global scale, ensuring sustainable land-use management is becoming a major priority. This is reflected in UN set Sustainable Development Goals (UN, 2015a), where soil is recognized as a key natural resource.

Existing unsustainable use of soils is compromising the European Union's domestic and international biodiversity and climate change objectives. For all these reasons, the Commission adopted a Soil Thematic Strategy (COM(2006) 231) with the objective to protect soils across the EU. Although the Soil Framework Directive was never adopted, the 7th Environment Action Programme (EU, 2014), recognises that soil degradation is a serious challenge. It provides that by 2020 land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway.

The key issues of concern include (EEA, 2019):

- Prevention and restoration of land and soil degradation are addressed broadly in the European policy framework – binding targets are lacking at European level, soil is not subject to a comprehensive and coherent set of rules in the Union and not all soil threats and soil functions are covered.

- At the moment, only a few EU Member States have specific legislation on soil protection. According to a study by Frelih-Larsen et al. (2017), 671 policy instruments related to soil protection exist in the 28 EU Member States (EU-28), and 45 % of them are linked to EU policies.
- Existing EU policies in areas such as agriculture, water, waste, chemicals, and prevention of industrial pollution do indirectly contribute to the protection of soils. But as these policies have other aims and scope of action, they are not sufficient to ensure an adequate level of protection for all soils in Europe.
- The lack of a comprehensive and coherent policy framework for protecting Europe’s land and soil resources is a key gap that reduces the effectiveness of the existing incentives and measures and may limit Europe’s ability to achieve future objectives related to development of green infrastructure and the bioeconomy.

The European Green Deal offers a new opportunity not only to ensure proper land and soil protection policy mainstreaming into development planning processes in Europe.

3.5.2 Relevant policy objectives

Issues	Policy objectives and targets	Target year	Sources	Category
Ensuring sustainable use of land and soil	Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	2030	SDG Target 15.2 (UN, 2015a)	Aspirational objective
	Combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	2030	SDG Target 15.3 (UN, 2015a)	Aspirational objective
	Restore at least 15 % of degraded ecosystems; better integrate biodiversity into agriculture and forestry	2020	EU biodiversity strategy to 2020	Aspirational objective
	Ensuring long-term sustainability and potential of EU agriculture by safeguarding the natural resources on which agricultural production depends	N/A	Common agricultural policy (CAP)	Aspirational objective
	No net land take by 2050	2050	7 th EAP	Aspirational objective
Preventing loss of soil and soil pollution	Mitigate the effects of drought in countries experiencing serious drought and/or desertification	2030	SDG Target 3.9 (UN, 2015a)	Aspirational objective
	Reduce soil erosion, increase soil organic matter, and promote remedial work on contaminated sites	2020/2050	Roadmap to a resource efficient Europe (EU)	Aspirational objective
	Prevent further degradation of soil, preserve its functions and restore degraded soil	N/A	Thematic strategy on the protection of soil	Aspirational objective
	Ensure the monitoring of negative impacts of air pollution upon ecosystems (Article 9) (includes soils)	2030	National Emission Ceilings Directive (Article 9)	Legally binding commitment
	Identify and assess sites contaminated by mercury, and address risks (includes soil contamination)	N/A	Minamata Convention on Mercury (Article 15)	Aspirational objective

	Ensure that emissions do not exceed removals in the LULUCF sector (no-debit rule)	2025, 2030	LULUCF regulation (2018/841)	Legally binding commitment
Land and soil protection policy mainstreaming	Integrate soil protection into relevant EU policies	N/A	Thematic strategy on the protection of soil	Aspirational objective

3.6 BIODIVERSITY, NATURA 2000 AND ECOSYSTEM SERVICES

3.6.1 Context

Nature protection and maintaining biodiversity have long been policy goals of the EU. The Birds Directive adopted in 1979 and amended in 2009 (EU, 2009) laid down the basic requirements for the protection of all naturally occurring wild bird species in EU. The Habitats Directive (CEC, 1992) established the comprehensive arrangements for protection of over 1000 animals and plant species and over 200 types of habitat, as well as the EU-wide Natura 2000 network.

The EU Biodiversity Strategy to 2020 (EC, 2011) aimed to “halt the loss of biodiversity and ecosystem services by 2020, to restore ecosystems in so far as is feasible, and to step up the EU contribution in averting global biodiversity loss”. The Seventh Environment Action Programme fully embraces the objectives of the EU biodiversity strategy and states that, by 2020, the loss of biodiversity and the degradation of ecosystem services should be halted and that by 2050 biodiversity is protected, valued and restored in ways that enhance our society’s resilience.

However, EEA (2019) emphasize that, although there has been some progress in some areas, such as designation of protected areas, many agreed targets are not achieved by 2020. The crucial change should be made in the implementation and funding of existing measures in all European environmental policies as well as greater policy coherence with respect to biodiversity in agricultural and other sectoral policies. Also, the wider application of ecosystem-based and adaptive management in combination with increased public awareness of society’s dependency on biodiversity and nature would be important steps forward.

In May 2020, the EC adopted new EU Biodiversity Strategy for 2030 – the core part of the European Green Deal, and an associated Action Plan. It sets ambitious EU targets and commitments for 2030 to achieve healthy and resilient ecosystems. But also reflects the fact that protecting and restoring nature will need more than regulation alone. It will require action by citizens, businesses, social partners and the research and knowledge community, as well as strong partnerships between local, regional, national and European level. (EC, 2020c).

3.6.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Biodiversity and natural ecosystems				
Protection and restoration of biodiversity and well-functioning ecosystems	Establish a larger EU-wide network of protected areas on land and at sea, building upon existing Natura 2000 areas, with strict protection for areas of very high biodiversity and climate value	2030	EU biodiversity strategy to 2030	Legally binding commitment
	Effectively manage all protected areas, defining clear conservation	2030	EU biodiversity strategy to 2030	Legally binding commitment

	objectives and measures, and monitoring them appropriately			
	Combat invasive alien species	2020	Regulation on invasive alien species; EU biodiversity strategy to 2030, Targets 4, 5 and 6; 7th EAP	Legally binding commitment
	Maintain and restore ecosystems and their services ⁷	2030	EU biodiversity strategy for 2030	Legally binding commitment
Promotion of green infrastructure and ecosystem-based management	Integrate green infrastructure (GI) into key policy areas, improving the knowledge base and encouraging innovation in relation to GI, improving access to finance including supporting EU-level GI projects.	2020	Green infrastructure – Enhancing Europe’s natural capital (GI strategy)	Aspirational objective
Enabling the necessary transformative change	Strengthen governance framework to ensure better implementation and track progress, improving knowledge, financing and investments and better respecting nature in public and business decision-making	2030	EU biodiversity strategy for 2030	Legally binding commitment
Natura 2000				
Protection and preservation of Natura 2000 species and habitats	Protect species and habitats under the nature directives	2020	Birds Directive, Habitats Directive (EU, national); EU biodiversity strategy to 2020, Target 1; Action plan for nature, people and the economy	Legally binding and aspirational objective

Besides above mentioned policies directly connected to the topic of biodiversity and nature, there are also other sectoral and territorial policies that have an important role for biodiversity and nature protection, e.g. Water Framework Directive, Floods Directive, Marine Strategy Framework Directive, Common Fisheries Policy (CFP), Common Agricultural Policy (CAP), National Emission Ceilings Directive, climate change-related policies, Europe’s Bioeconomy Strategy and Cohesion Policy.

⁷ By, among others, bringing nature back to agricultural land, increasing the quantity of forests and improving their health and resilience, restoring marine and freshwater ecosystems, greening urban and peri-urban areas, addressing invasive alien species

3.7 POPULATION & HUMAN HEALTH

3.7.1 Context

A clean environment is essential for human health and well-being. At the same time, the local environment can also be a source of stressors - for example air pollution, noise, hazardous chemicals - that negatively affect health. The health of the EU population is also adversely affected by climate change, through heatwaves, floods and changes in the distribution of vector-borne diseases. At a broader level, climate change, loss of biodiversity, and land degradation can also impact on human well-being by threatening the delivery of ecosystem services, such as access to freshwater and food production.

EU countries hold primary responsibility for organising and delivering health services and medical care. To support EU countries at their efforts to ensure health protection, EU adopted EU Health Programme 2014-2020 (EU, 2014b) that aims to ensure health protection in all EU policies.

The 7th Environment Action Programme forms the basis for dealing with the problems of environmental health in EU. Other policies for managing environmental health issues in EU are indirectly all the environmental directives that target the protection and management of Europe's environment. EU Environmental Noise Directive (EC, 2002) should be specifically mentioned here, while other important directives are presented in other subchapters.

The key health-related policy concerns in Europe include (EEA, 2019):

- Air pollution represents the single largest environmental health risk in Europe, exposure to air pollution is estimated to result in over 400 000 premature deaths in the EU each year. EU's actions to protect citizens from air pollution had not yet delivered the expected impact.
- Climate change has serious health consequences. Further development of policies is needed through e.g.: including climate change, to a greater degree, in public health programmes and planning, improving the social and environmental determinants, building climate resistant infrastructure, improving interagency coordination mechanisms.
- The effectiveness of health-related policies in Europe varies geographically, environmental risks are also not evenly distributed across society.
- Intersectoral and inclusive approach towards improving environmental health is necessary.
- Times of economic crisis and shrinking budgets put environment and health in jeopardy of being perceived as luxury, secondary to other priorities. It is therefore important to achieve enhanced understanding and use of economic arguments to support action on environment and health issues.

3.7.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Public health (general)	Reduce premature mortality, increase life expectancy, reduce inequities in health, enhance well-being of the European population, universal coverage and "right to health"	2100	Health 2020: a European policy framework and strategy for the 21 st century	Aspirational objective
	Contributing to innovative and sustainable health systems, increasing access to better and safer healthcare for citizens, promoting good health and preventing diseases,	2020	EU Health for Growth Programme (2014-2020) (COM (2011) 709)	Aspirational objective

	protecting citizens from cross border health threats			
Environmental health	Safeguard the Union's citizens from environment-related pressures and risks to health and well-being	2050	7 th EAP (EU)	Aspirational objective
Noise	Define a common approach intended to avoid, prevent, or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise	N/A	EU Environmental Noise Directive (END) (2002/49/EC)	Legally binding commitment

3.8 MATERIAL ASSETS

3.8.1 Context

The SEA Directive includes ‘material assets’ as one of the assessment topics without defining what this term might encompass. In various EU member states, different interpretations for this term can be found (SEPA, 2019), covering a wide variety of asset- and resource-management issues related to:

- infrastructure (energy, heat generation and distribution, flood protection, water supply and wastewater management, transport, telecommunications, waste management and pipelines);
- buildings and facilities (such as housing, healthcare facilities, schools, greenspace, core paths, cycle paths; manufactured goods); and
- natural assets such as minerals (such as sand, gravel, rock, and slate), agricultural land, etc.

Material assets addressed within this SEA focus primarily on resource management uses (particularly on the natural resource use and efficiency; and waste generation and management) and buildings (energy efficiency and renovation). Other infrastructure-related considerations are addressed under related topics (water management, cultural heritage, climate change).

3.8.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Resource use and efficiency	Create more with less, delivering greater value with less input, using resources in a sustainable way and minimising their impacts on the environment.	2050	7 th EAP (EU, 2013); European Green Deal (EC, 2019) and new Circular Economy Action Plan (EC, 2020)	Aspirational objective
	Achieve the sustainable management and efficient use of natural resources	2030	SDG 12.2 (UN, 2015a); 7 th EAP (EU, 2013)	Aspirational objective
Waste generation and management	55 %/60 %/65 % of municipal waste is prepared for reuse or recycled	2025, 2030, 2035	Waste Framework Directive (EU, 2018)	Legally binding commitment
	Strengthen and extend obligations for separate collection of hazardous household waste (by end 2022), bio-waste (by end 2023), textiles (by end 2025)	2022, 2023, 2025	Waste Framework Directive (EU, 2018b)	Aspirational objective / Legally binding commitment

	Meeting the targets for the collection, recycling and/or recovery of packaging waste, construction and demolition waste, WEEE, end-of-life vehicles, batteries, single-use plastics	2035	Waste Framework Directive (EU, 2008, 2018b), Packaging Waste Directive (EU, 2018c), WEEE Directive, ELV Directive (EU, 2000), Batteries Directive (EU, 2006); Single-use Plastics Directive (EU, 2019b))	Legally binding commitment
	All plastics packaging should be recyclable	2030	EU plastics strategy (EC, 2018a)	Aspirational objective
	Halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	2030	SDG 12.3 (UN, 2015a)	Aspirational objective
Buildings	Establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings.	2050	SDG 11.B (UN, 2015a)	Aspirational objective

3.9 CULTURAL HERITAGE

3.9.1 Context

Cultural heritage is not limited to material objects, but also includes intangible aspects, such as traditions, music, dance, rituals, knowledge, and skills. All of these aspects of cultural heritage, both tangible and intangible, represent the systems of values, beliefs, traditions and lifestyles that characterise past and present societies (Eurostat, 2019).

The Convention Concerning the protection of the World Cultural and Natural Heritage adopted in 1972 (UNESCO, 1972) established the basic framework for the protection and preservation of cultural heritage at the international level. It was later followed by other policies, dealing with specific segment of cultural heritage: The European Convention on the Protection of the Archaeological Heritage (Council of Europe, 1992), Convention on the Protection of the Underwater Cultural Heritage (UNESCO, 2001) and Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO, 2003) that address the need for protection and conservation of cultural heritage. Recently the issue of the participatory management of cultural heritage is being as well supported by European policies.

Key cultural heritage related challenges in EU are:

- Effectiveness of the policies and their integration in practice depends on the level of intersectoral cooperation, thus it is necessary to promote it.
- Good governance, especially on the local level, depends on the locals and their willingness for the protection and management of cultural heritage, which is strongly connected to awareness and cultural identity. Awareness rising on the importance of cultural heritage is crucial.
- For effective protection of cultural heritage it is crucial to provide financial resources for management and to set the protection measures in a way they do not incur unreasonable costs.

3.9.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Protection and preservation of cultural heritage	Protection and preservation of cultural and natural heritage at the international level.	N/A	Convention Concerning the protection of the World Cultural and Natural Heritage, 1972 (UNESCO, 1972)	Legally binding commitment
	Protection and preservation of underwater Cultural Heritage.	N/A	Convention on the Protection of the Underwater Cultural Heritage, 2001 (UNESCO, 2001)	Legally binding commitment
	Protection and preservation of intangible Cultural Heritage.	N/A	Convention for the Safeguarding of the Intangible Cultural Heritage, 2003 (UNESCO, 2003)	Legally binding commitment
	Conservation and enhancement of the archaeological heritage.	N/A	The European Convention on the Protection of the Archaeological Heritage (COE 1992)	Legally binding commitment
Promotion of participatory management of cultural heritage	Heritage as a resource for human development, the enhancement of cultural diversity and as part of an economic development model based on the principles of sustainable resource use.	N/A	The Framework Convention on the value of Cultural Heritage for Society (COE, 2005)	Legally binding commitment
	Promotion of good governance based on participatory management.	21 st century	European Cultural Heritage Strategy for the 21 st Century (COE, 2017)	Non-binding aspirational objective
	Participation and access for all, smart solutions for a cohesive and sustainable future, safeguarding endangered heritage.	2020	European Framework for Action on Cultural Heritage (European Commission, 2018)	Non-binding aspirational objective

3.10 LANDSCAPE

3.10.1 Context

The richness and diversity of landscapes is a distinctive feature of the European continent. There is probably nowhere else where the signs of human interaction with nature in landscape are so varied, contrasting and localised. Despite the immense scale of socio-economic changes that have accompanied this century's wave of industrialisation and urbanisation in many parts of Europe, much of this diversity remains, giving distinctive character to countries, regions and local areas (EEA, 2016).

The most important EU policy addressing the protection and preservation of landscapes is the European Landscape Convention (COE, 2000) that was adopted in 2000 with aim to achieve a balanced and harmonious relationship between social needs, economic activity and the environment. The convention emphasises the need for general framework for landscape preservation that authorities of the member states have to establish and implement.

Key landscape-related challenges in EU are:

- Generally, differences of the spatial planning system and landscape planning do not originate from different membership (EU) or ratification of any convention (European Landscape convention) but rather from the different traditions of administration, government and importance of nature and landscape protection (Kovács et al, 2013).
- The main problem because of which the measures and activities cannot be efficient is that the landscape issues are mostly divided among different bodies but also between different spatial levels.

3.10.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Protection and preservation of landscapes	Protection and preservation of cultural and natural heritage at the international level.	N/A	Convention concerning the protection of the World Cultural and Natural Heritage, 1972 (UNESCO, 1972)	Legally binding commitment
	Protection and preservation, sustainable management, and planning of European landscapes, assuring higher cooperation between the EU Member States.	N/A	The European Landscape Convention (COE, 2000)	Legally binding commitment
	Framework for the conservation of biological and landscape diversity.	N/A	Pan-European Biological and Landscape Diversity Strategy (COE, 1996)	Non-binding aspirational objective

3.11 INTERACTIONS BETWEEN THE ASSESSMENT TOPICS 1-9: CROSS-CUTTING CONCERNS RELATED TO RESILIENCE

3.11.1 Context

The SARS-CoV-2 pandemic brings about unprecedented impacts on public health and well-being as well as a multitude of longer-term economic and development implications that will be fully apprehended only in the months to come. The breadth of diverse stress factors nevertheless raises an importance of resilience which may - either explicitly or under different terms – arise as a new crosscutting development concern in future development interventions within EU programmes in 2021-2027.

The European Commission (EC, 2012) defines resilience as the ability of an individual, a household, a community, a country or a region to withstand, to adapt, and to quickly recover from stresses and shocks. It calls for a long-term approach to enhancing resilience and its integration into different sector policies, in particular Food Security, Climate Change Adaptation and Disaster Risk Reduction.

Similarly, the UN 2030 Agenda for Sustainable Development (UN, 2015a) recognizes the need to prepare for emerging shocks and stresses, and postulates several Sustainable Development Goals (SDGs) that aim to advance resilience. Key SDGs explicitly addressing this need include SDG 11 ‘Make cities and human settlements inclusive, safe, resilient and sustainable’; and SDG 9 ‘Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation’. Resilience is also addressed in targets detailing other SDGs, such as the SDG Target 1.5 ‘Build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters’; and SDG Target 13.1 ‘Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries’.

The European Union has committed to implement the UN Agenda 2030 and the Sustainable Development Goals both in its internal and external policies. As the resilience regards, the European Commission (EC, 2017) promotes its own strategic approach to promoting resilience in external actions through:

- strengthening the adaptability of states, societies, communities and individuals to political, economic, environmental, demographic or societal pressures, in order to sustain progress towards national development goals;
- strengthening the capacity of a state - in the face of significant pressures to build, maintain or restore its core functions, and basic social and political cohesion, in a manner that ensures respect for democracy, rule of law, human and fundamental rights and fosters inclusive long-term security and progress; and
- strengthening the capacity of societies, communities and individuals to manage opportunities and risks in a peaceful and stable manner, and to build, maintain or restore livelihoods in the face of major pressures.

Although EC (2012) and EC (2017) focus on development activities outside the EU territory, their recommendation for deploying a multifaceted strategy and a broad systems perspective for both ‘reducing the multiple risks of a crisis and at the same time improving rapid coping and adaptation mechanisms at local, national and regional levels’ may be also relevant for the future activities aimed at transforming the social and economic systems within EU towards more resilient ones for external and internal shocks and stresses. One could almost argue that the EU’s goals for advancing sustainable development would benefit from positioning the EU institutions and programmes on the cutting edge of the resilience-based development agenda. Such activities could well synergize with many other calls to better manage strategic risks in diverse

policy-making domains, ranging from narrow ‘prevention, detection, and rapid response to public health threats’ (WHO, 2018) to broad ‘risk-based strategic planning’ (NATO, 2018, SACT, 2017).

3.11.2 Relevant policy objectives

Issue	Policy objectives and targets	Target year	Sources	Category
Resilience to economic, social and environmental shocks	Build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.	2030	SDG 1.5 (UN, 2015a)	Aspirational objective
Resilient agricultural and food production systems	Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	2030	SDG 2.4 (UN, 2015a)	Aspirational objective
Resilient health systems	Strengthen the capacity of all countries for early warning, risk reduction and management of national and global health risks ⁸ .	2030	SDG 3.d (UN, 2015a)	Aspirational objective
Resilient infrastructure	Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	2030	SDG 9.1 (UN, 2015a)	Aspirational objective
Resilience of urban systems	Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels.	2020/2030	SDG 11.b (UN, 2015a)	Aspirational objective

⁸ Or ‘develop country capacity to prevent, detect, and rapidly respond to public health threats independently of whether they are naturally occurring, deliberate, or accidental’ (WHO, 2018).

4 DESCRIPTION OF THE RELEVANT ASPECTS OF THE CURRENT STATE OF THE ENVIRONMENT AND ITS LIKELY EVOLUTION WITHOUT IMPLEMENTATION OF INTERREG CENTRAL EUROPE 2021-2027

This chapter presents:

- **environmental baseline trends** which describe relevant aspects of the current state of the environment (SEA Directive, Annex 1, item b); environmental characteristics of areas likely to be significantly affected (SEA Directive, Annex 1, item c);
- drivers of these trends;
- the likely **expected future trends** without implementation of the Interreg Central Europe 2021-2027 programme (SEA Directive, Annex 1, item b); and
- relevant environmental problems for the Interreg Central Europe 2021-2027 programme (SEA Directive, Annex 1, item d).

The description focuses on key issues identified in environmental framework for IP (see previous chapter).

4.1 AIR QUALITY

Air pollution may directly affect vegetation and fauna and the quality of water and soils as well as the ecosystem services that they support. The atmospheric deposition of nitrogen as nitrate and ammonium compounds can disrupt terrestrial and aquatic ecosystems by introducing excessive amounts of nutrient nitrogen, which can lead to changes in species diversity and to invasions of new species. When this happens, the so-called critical load for eutrophication by nitrogen is exceeded. NH₃ and NO_x, together with SO₂, also contribute to the acidification of soil, lakes and rivers, causing biodiversity loss (EEA, 2019).

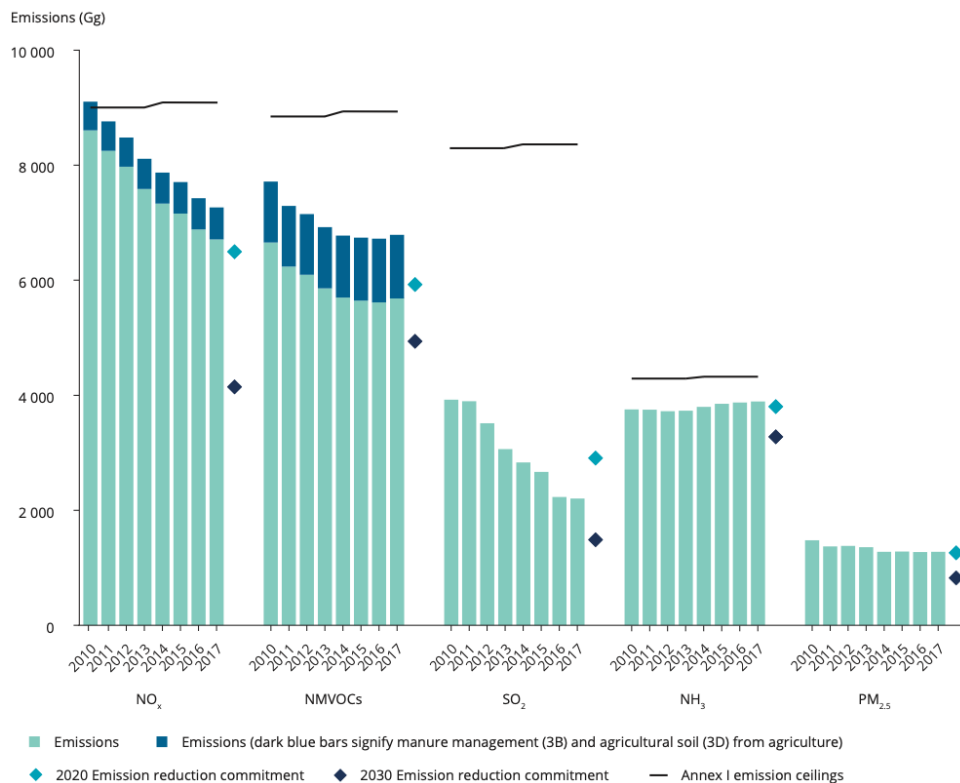
Air pollution is also a major cause of premature death and disease, and is the single largest environmental health risk in Europe. Heart disease and stroke are the most common reasons for premature death attributable to air pollution, followed by lung diseases and lung cancer. The effects of air pollution on health depend not only on exposure but also on the vulnerability of people. Vulnerability to the impacts of air pollution can increase as a result of age, pre-existing health conditions or particular behaviours. A large body of evidence suggests that people of lower socio-economic status tend to live in environments with worse air quality (EEA, 2020a).

4.1.1 Air quality impacts on ecosystems

Overall trend in EU

Emissions of all primary and precursor pollutants contributing to ambient air concentrations of the main air pollutants decreased between the years 2000 and 2017 in the EU-28. In 2017, the total emissions for the EU as a whole of four important air pollutants —SO₂, NO_x, ammonia (NH₃), and non-methane volatile organic compounds (NMVOCs) — were below the respective ceilings stipulated under the National Emission Ceilings Directive for a period ending in 2019 (EEA, 2019).

Figure 6 EU progress towards meeting the 2010 emission ceilings set out in the NEC Directive and the 2020/2030 reduction commitments (EEA, 2019)

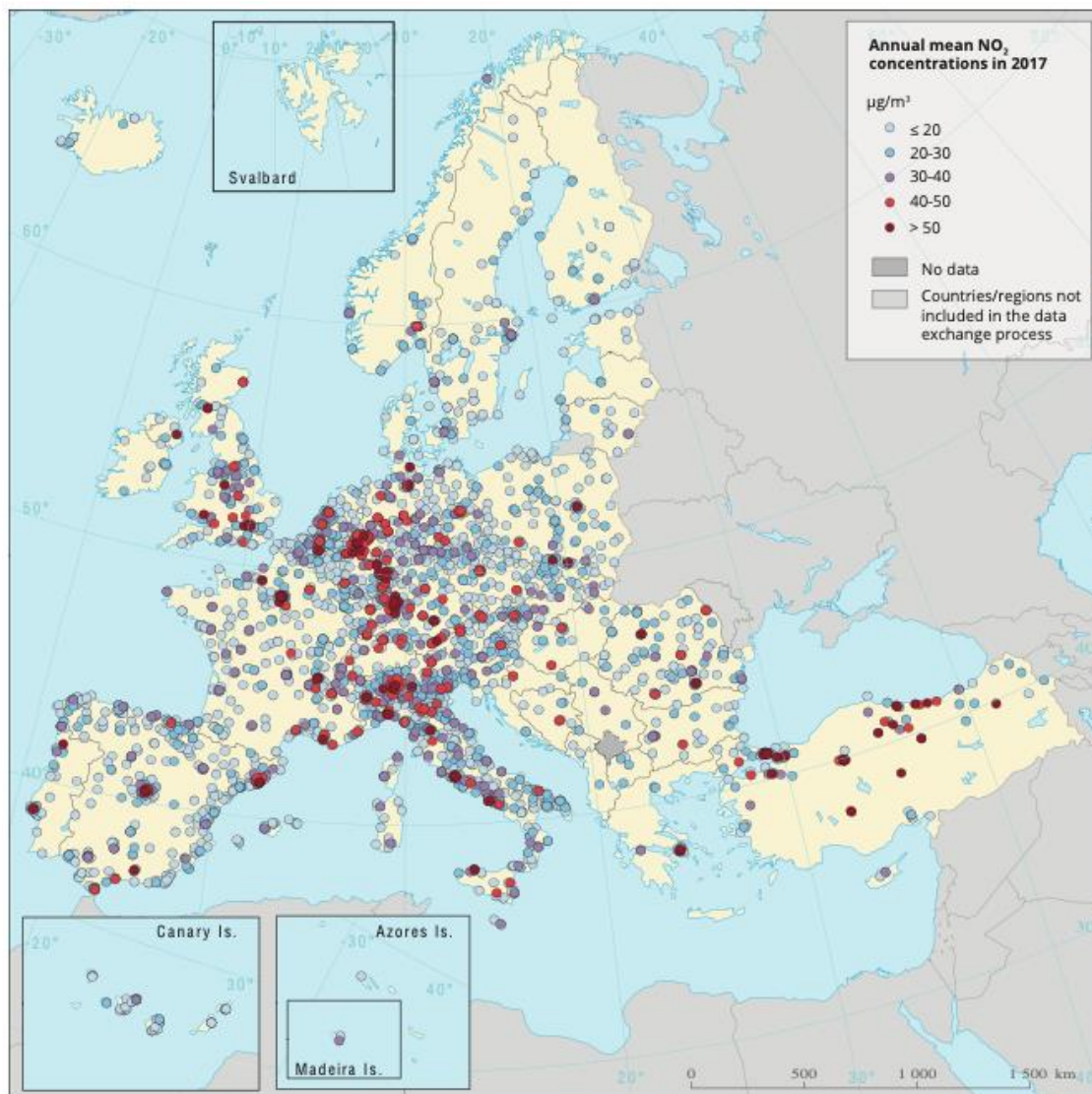


The emission reductions were uneven - while sulphur dioxide emissions declined by 62 % since 2000, ammonia emissions decreased by only 4 % in the EEA member countries (EEA, 2019). The substantial reduction in SO₂ emissions were driven by the changes in the energy production, distribution and use sectors. Reductions in nitrogen oxides (NO_x) emissions resulted from the legislative European emission standards fitting three-way catalytic converters to petrol-fuelled cars. NH₃ emissions however remain high and have even increased in recent years, favouring the formation of secondary PM in the air, which contributes to episodes of high PM concentrations and exceedances of air quality standards. NH₃ is also the main reason why a few hot spots in Europe still exceed the critical loads for ecosystem acidification.

Situation in Central Europe

As of 2017, no member state in Central Europe exceeded its SO₂ and NO_x ceilings. However, several countries in the region report elevated NO₂ emissions in urban areas and along the main transport routes (see Figure 7 and next section for details). Austria, Croatia and Germany also continued to exceed their national emission ceilings for NH₃.

Figure 7 Annual mean NO₂ concentrations in 2017 (EEA, 2019)



Note: Observed concentrations of NO₂ in 2017. Dots in the last two colour categories correspond to values above the EU annual limit value and the equal WHO air quality guidelines (40 µg/m³). Only stations with > 75 % of valid data have been included in the map. The French overseas territories' stations are not shown in the map but can be found at EEA (2019j).

Expected future trends

After 2019, new commitments to reduce emissions for 2020 onwards, and later for 2030 onwards, are applicable under the National Emission Ceiling Directive. However, EEA (2019) expects that the existing legislative commitments, including the 2016 NEC Directive, would allow the EU – including the Central European states - not only meet the emission reduction commitments for SO₂ and NO_x but also attain the 2030 commitments for primary PM_{2.5} and volatile organic compounds (VOCs) - see more details in the next section. The only challenges to the existing commitments are foreseen for NH₃, where some Central European countries (Germany and Poland) are expected to face difficulties.

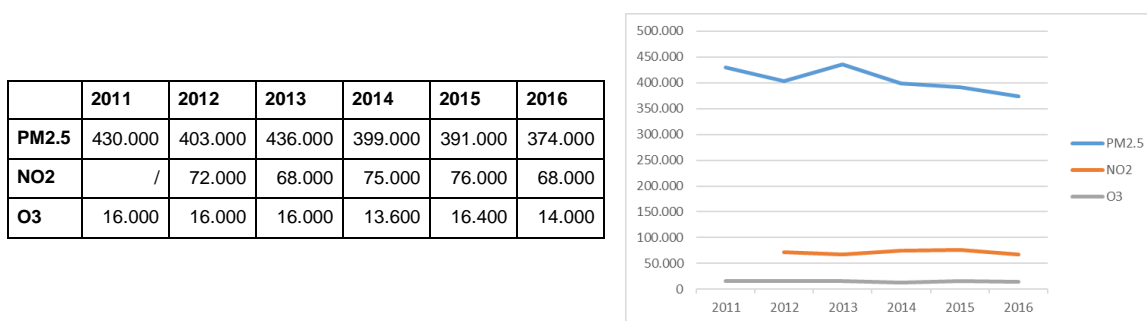
However, the compliance with these existing commitments to reduce emissions will actually not reduce the excessive exposition of ecosystems to critical loads of nitrogen deposition (78 % of the protected Natura 2000 areas). Amann et al. (2018b) suggest that biodiversity in 58 % of all Natura 2000 areas is expected to still be at risk in 2030 due to excessive atmospheric nitrogen deposition.

4.1.2 Air quality impacts on human health and well-being

Overall trend in EU

Even if the overall trends indicate reductions in traditional air quality pollutants, there remain persistent exceedances of the regulated standards especially for PM, NO₂, O₃ and benzo[a]pyrene (BaP) – which are particularly important from the public health perspective. The highest health impact of air pollution in EU-28 is related to exposure to PM_{2.5} that caused 82% of the total of 456 000 EU-28 premature deaths associated with exposure to PM_{2.5}, NO₂ and O₃ in 2016 (Figure 8: Trend of premature deaths attributable to PM_{2.5}, NO₂ and O₃ exposure in the EU-28 (2011-2016)Figure 8) . Health impacts due to air pollution in previous years however show a declining trend of premature deaths attributable to PM_{2.5} exposure and barely any variation in premature deaths attributable to NO₂ and O₃.

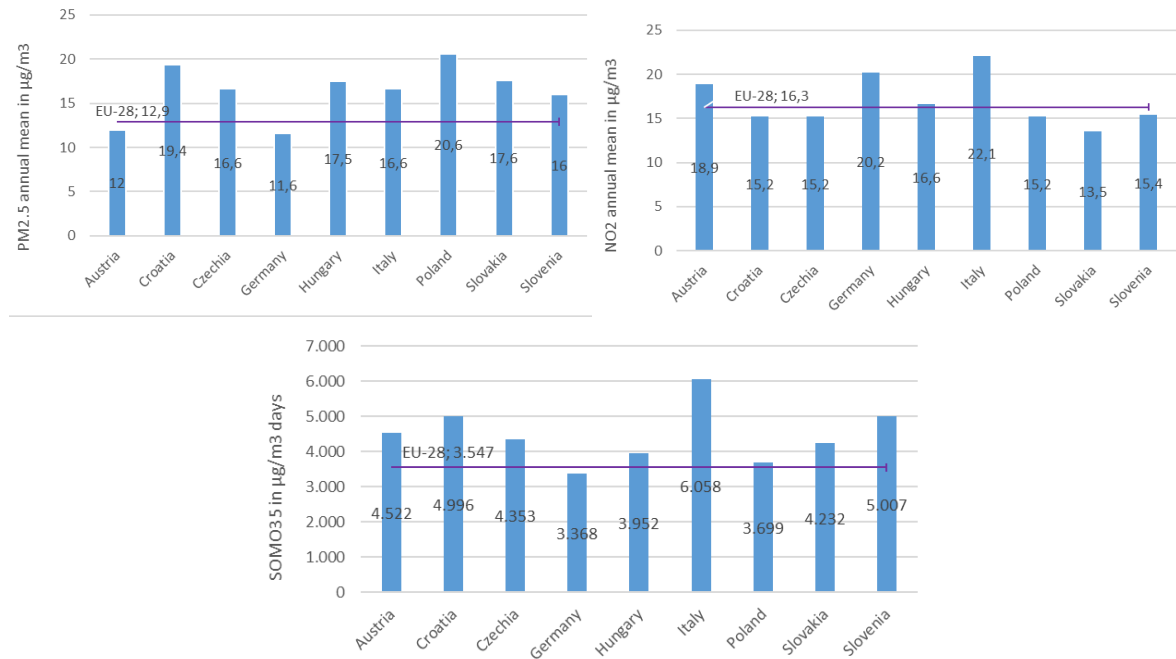
Figure 8: Trend of premature deaths attributable to PM_{2.5}, NO₂ and O₃ exposure in the EU-28 (2011-2016) (EEA, 2014, 2015, 2016, 2017, 2018, 2019b)



Situation in Central Europe

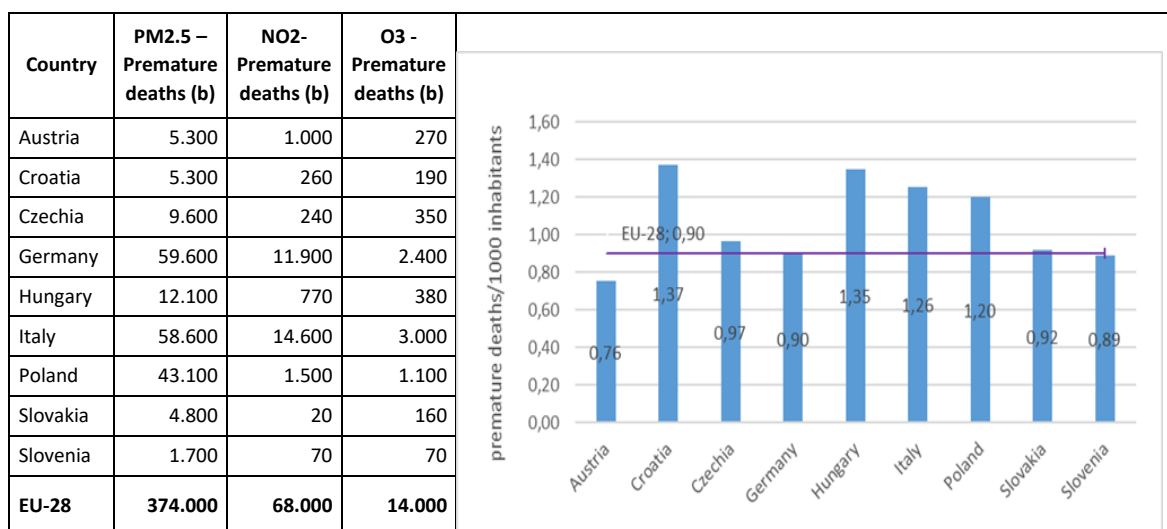
Member states in Central Europe are above the EU average in terms of exposure to PM_{2.5}, with the exceptions of Germany and Austria (Figure 9). The situation is swapped in case of NO₂ exposure, where Austria, Germany, Italy, and Hungary perform worse than the EU-28 average. In case of exposure to O₃ all Central European countries except Germany perform worse than EU average. In general, the exposure of population to air pollutants seems to be the highest in Italy which achieves above-average exposure for all three types of pollutants. In parts of Central Europe (particularly eastern Europe and northern Italy) burning of wood, coal and other solid fuels in domestic stoves, especially during winter-time, leads to locally or regionally high fine particulate matter (PM_{2.5}) emissions.

Figure 9: Exposure to PM 2.5, NO₂ (annual mean in µg/m³) and O₃ (SOMO35 in µg/m³ days) in EU 28 and Central European countries in 2016 (EEA, 2019b)



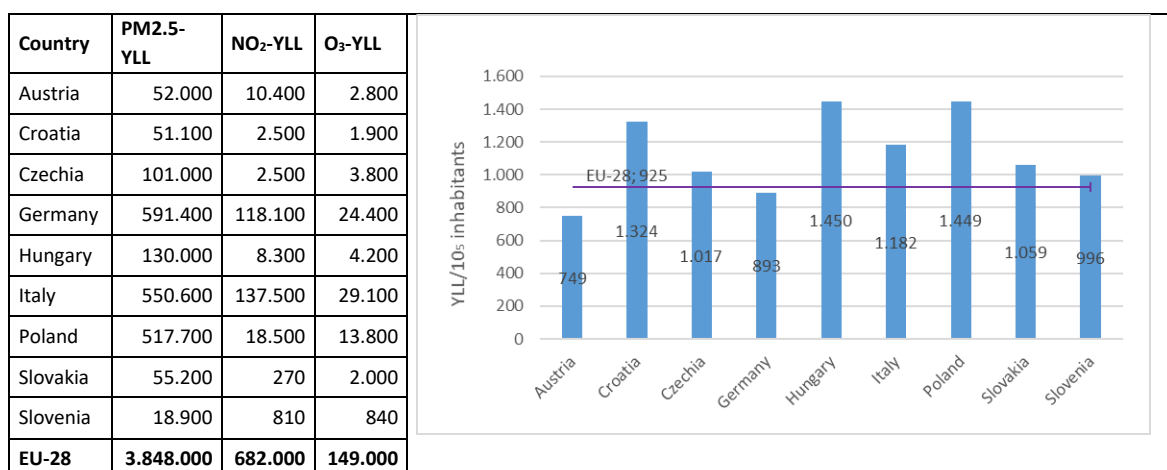
The absolute number of premature deaths attributable to air pollution is of course dependant also of the population number in individual country. The highest numbers of absolute premature deaths related to air pollution among member states in Central Europe is therefore characteristic for Germany, Italy and Poland (Figure 10). The situation is slightly different when considering the number of premature deaths per 1000 inhabitants. In this case, only Austria and Slovenia perform better than EU-28 average, Germany reaches EU-28 average. Croatia, Hungary, Italy and Poland exceed the EU average.

Figure 10: Premature deaths – absolute numbers (left) and premature deaths/1000 inhabitants (right) attributable to PM2.5, NO2 and O3 exposure in the EU-28 and Central European countries in 2016 (EEA, 2019b)



Additional estimates of lost years of life show almost 4 million years of life is lost in the EU per year. All the Central European countries except Austria and Germany perform worse than EU -28 average. Absolute numbers show the most lost years of life in Germany, Italy and Poland (Figure 11), while the relative numbers (years of life lost per 100.000 inhabitants) show the worst situation in Poland, Hungary and Croatia (EEA, 2019b).

Figure 11: Years of life lost (YLL) - absolute numbers (left) and years of life lost per 100.000 inhabitants (YLL/105) (right) attributable to PM2.5, NO2 and O3 exposure in the EU-28 and Central European countries in 2016 (EEA, 2019b)



Expected future trends

With the full implementation of the current emission abatement policies, air pollutant concentrations above the WHO guidelines are expected to be almost completely eliminated in EU by 2030. The current number of more than 400 000 premature deaths attributable to air pollution in the 28 EU Member States is expected to decline by more than a half by 2030, while the reduction in the impacts on ecosystems is expected to be

smaller. Nevertheless, there is still a need to substantially reduce the impacts of air pollution on human health and ecosystems (EEA, 2019).

4.2 CLIMATIC FACTORS

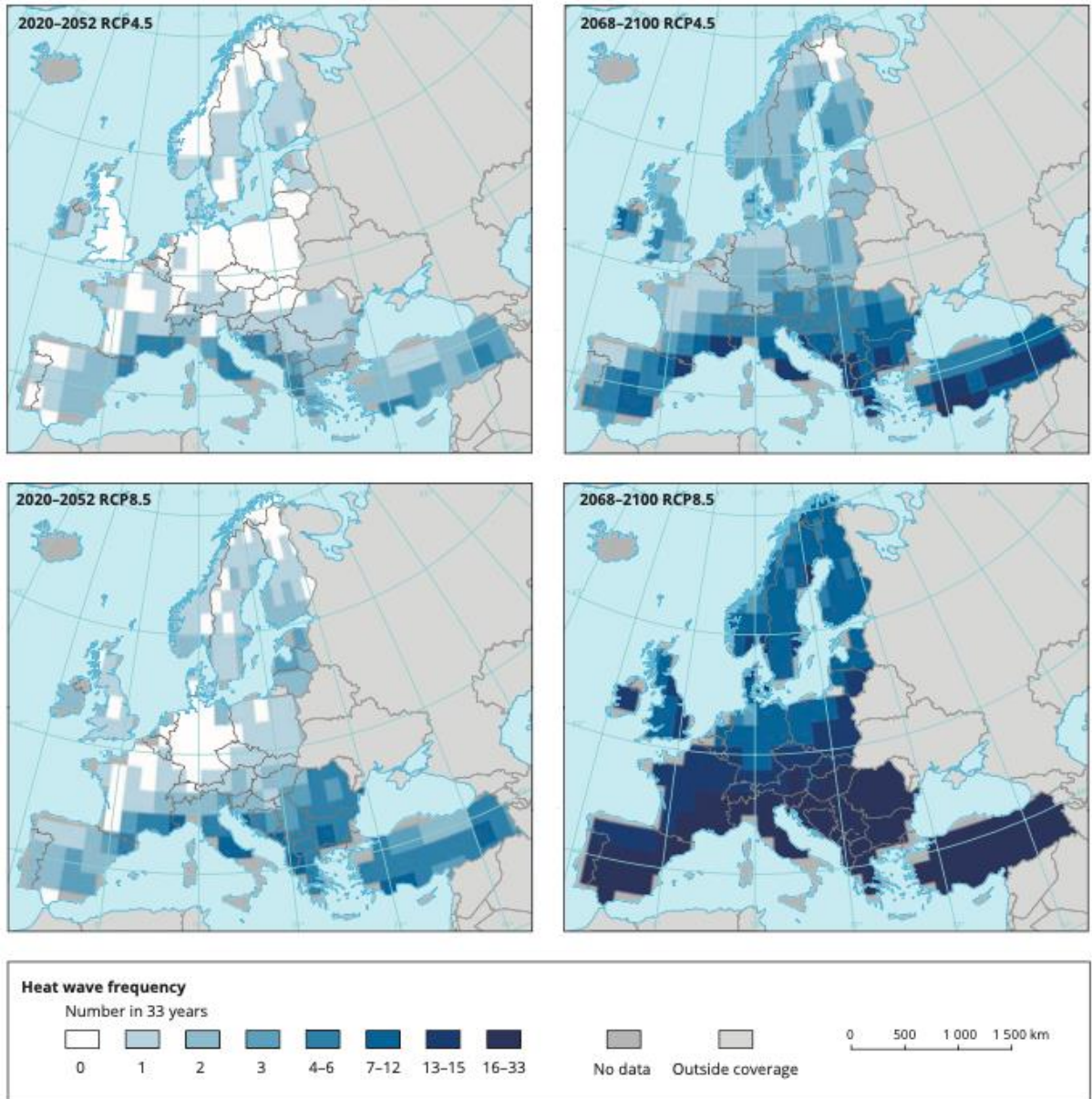
The accelerating and increasingly visible rate of climate change in Europe requires ambitious mitigation and adaptation actions that are well integrated with other environmental actions. A comprehensive study undertaken by the European Commission Joint Research Centre (Ciscar et al, 2014) indicates if no further action is taken and global temperature increases by 3.5°C, climate damages in the EU could amount to at least €190 billion, almost 2% of EU GDP. More than half of the overall EU damages are estimated to be due to additional premature mortality (€120 billion). Moving to a 2°C world would reduce climate damages by €60 billion, to €120 billion (1.2% of GDP).

Annually averaged land temperatures in Europe have increased considerably faster than global temperature and daily maximum temperatures in Europe have increased much faster than annually averaged temperatures. This means that a given increase in global mean temperature is associated with a much larger increase in heat extremes in Europe.

The issue is directly relevant for Central Europe. Heat extremes and heat waves in Europe have increased considerably since the 1950s, and in particular after 2000. Since 2015, all-time national temperature records were broken in eight EEA member countries (incl. Poland in 2015, Germany in 2019) and the national records for the warmest night, which is particularly relevant from a human health perspective, were broken in nine countries including (Austria in 2015 and Slovenia in 2017).

Heat waves are projected to become even more frequent and longer lasting in Europe. Under a high-emissions scenario, very extreme heat waves (more severe than the 2003 heat wave affecting southern and central Europe or the 2010 heat wave affecting eastern Europe) are projected to occur as often as every 2 years in the second half of the 21st century. The most severe economic and health risks from heat waves are projected for low- altitude river basins in southern Europe and for the Mediterranean coasts, where many densely populated urban centres are located. See Figure 12 for details.

Figure 12 Future extreme heat waves predicted under two high-emission scenarios (EEA, 2019)

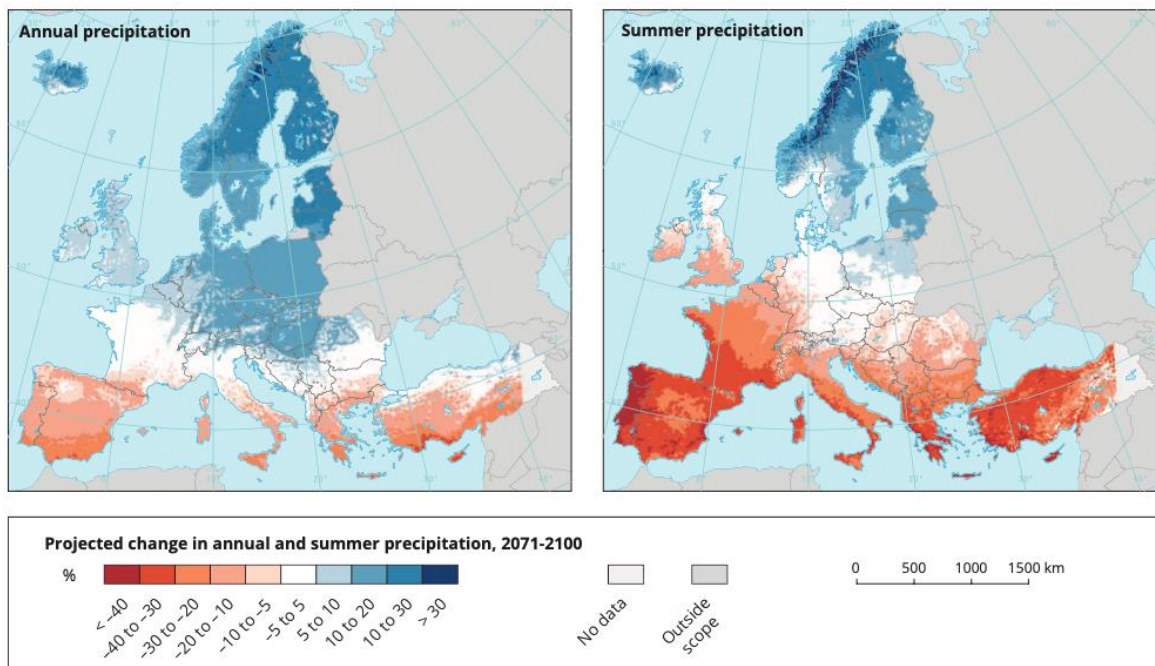


Note: RCP 4.5 corresponds to a medium-emissions scenario, whereas RCP 8.5 refers to a high-emissions scenario. Neither of these scenarios is compatible with the stabilisation target of the Paris Agreement.

Current and predicted trends in rainfall variations and extremes

Observed and projected changes in precipitation in Europe vary substantially. Generally, annual precipitation has increased in most parts of northern Europe and decreased in parts of southern Europe and these changes are projected to exacerbate in the future with continued climate change. Figure 13 illustrates the predicted annual trends and trends in summer growing season.

Figure 13 Projected changes in annual and summer precipitation (EEA, 2019)



Note: Projected changes in annual (left) and summer (right) precipitation (%) in the period 2071-2100 compared with the baseline period 1971-2000 for the forcing scenario RCP 8.5, which corresponds to a high-emissions scenario, based on the average of a multi-model ensemble of regional climate models.

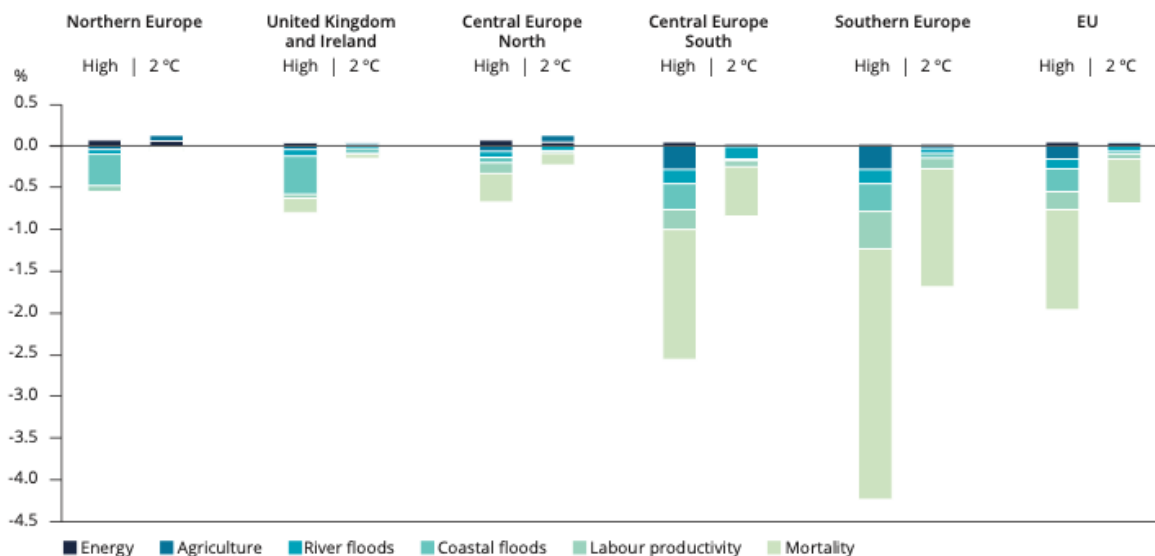
The projected rainfall patterns suggest two changes in extreme rainfall conditions in Central Europe. Firstly, river flooding is expected to become more frequent in north-western and central-western parts of Europe (Kundzewicz et al., 2018). This trend will be accompanied by more frequent pluvial (rain/related) floods and flash floods throughout Europe, including Central Europe.

At the same time, EEA (2019) expects decreased summer precipitation in southern Europe. As far as the Interreg CE region is concerned, northern Italy, Croatia and Slovenia may be particularly affected by meteorological droughts especially during the summer periods.

Economic impacts of climate change

A changing climate is affecting a wide range of economic sectors and human activities, including agriculture, forestry, fisheries, water management, coastal and flood protection, energy, transport, tourism, construction, and human health and wellbeing (e.g. an increase in heat-related mortality and vector- and waterborne diseases has been observed across Europe). The overall economic impacts of climate change on Europe are primarily negative but there is substantial variation across regions and economic activities.

Figure 14 Projected welfare impacts of climate change for different EU regions and sectors for two warming scenarios



Note: The country grouping is as follows. Northern Europe: Denmark, Estonia, Finland, Latvia, Lithuania and Sweden. UK & Ireland: Ireland and United Kingdom. Central Europe North: Belgium, Germany, Luxembourg, Netherlands and Poland. Central Europe South: Austria, Czechia, France, Hungary, Romania and Slovakia. Southern Europe: Bulgaria, Croatia, Cyprus, Greece, Italy, Malta, Portugal, Slovenia and Spain.

Source: Ciscar et al. (2018)

Ciscar et al. (2014) have estimated that southern and central-southern Europe are projected to suffer by far the highest losses as a percentage of GDP in Europe – amounting to 4 percent reductions in GDP in southern European countries (Croatia, Italy) and 2,5 percent of GDP loss in Austria, Czechia, Slovakia and Hungary. Economic and welfare losses in southern and central Europe are dominated by health-related impacts - an increased mortality from heat waves in particular, but also reduced labour productivity.

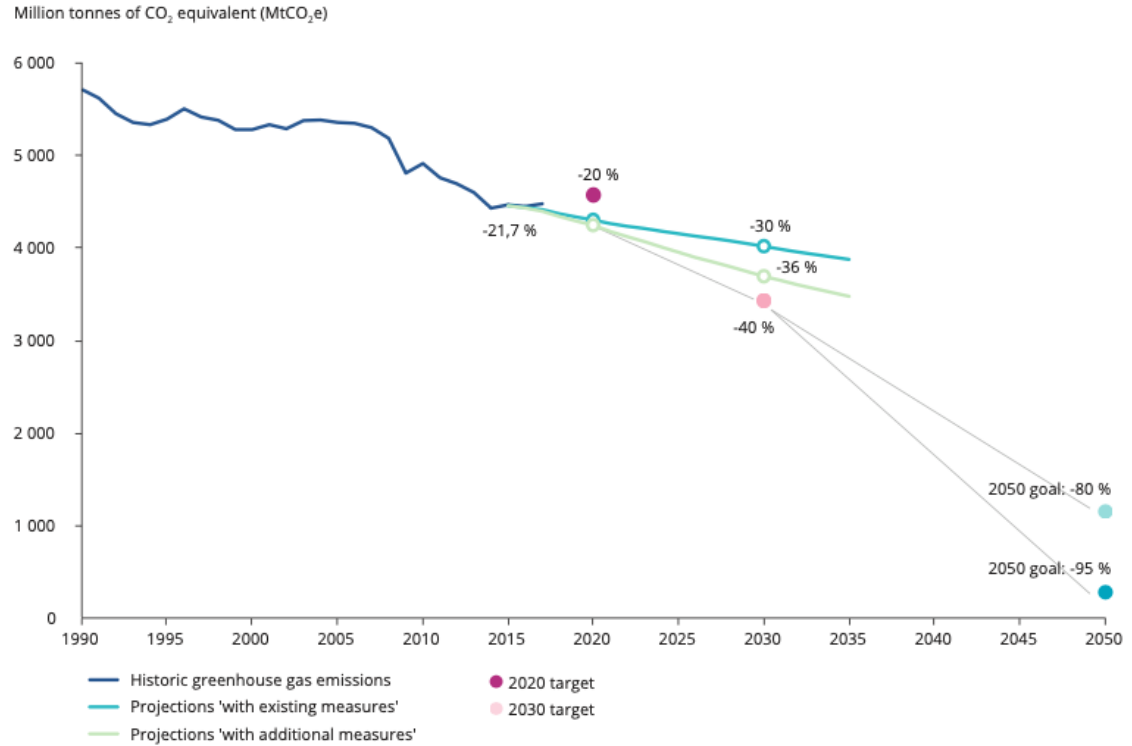
4.2.1 Efforts to mitigate the climate change

Overall trend in EU

Greenhouse gas emissions in the European Union have decreased by about 22 % during 1990-1997 period (Figure 15) mainly due to the following factors:

- structural changes in the economy, with a higher share of total GDP accounted for by services and a lower share by more energy-intensive industry;
- the use of less carbon-intensive fossil fuels (e.g. the switch from coal to gas);
- improvements in energy efficiency;
- the growing use of energy from renewable sources;
- the milder winters experienced in Europe on average since 1990, which has reduced the demand for energy to heat building.

Figure 15 Greenhouse gas emission trends and projections in the EU-28, 1990-2050

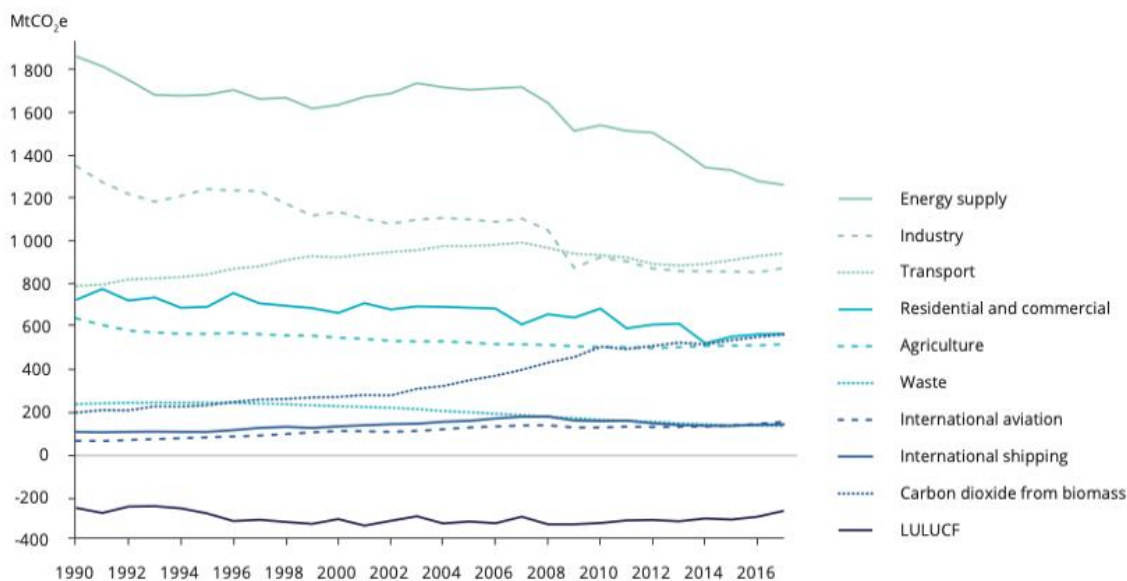


Note: The GHG emission trends, projections and target calculations include emissions from international aviation, and exclude emissions and removals from the LULUCF sector. The 'with existing measures' scenario reflects existing policies and measures, whereas the 'with additional measures' scenario considers the additional effects of planned measures reported by Member States.

Source: EEA, based on the final 2019 EU GHG inventory submission to the United Nations Framework Convention on Climate Change and projections reported by EU Member States under the EU Monitoring Mechanism Regulation.

The largest emission reductions occurred in manufacturing industries and construction, electricity and heat production, and in residential combustion. GHG emissions from biomass use and from road transportation increased substantially over the period 1990-2017 (Figure 16).

Figure 16 Greenhouse gas emissions by main sector in the EU-28, 1990-2017



Note: The sectoral aggregations are:
 Energy supply CRF 1A1 (energy industries) + 1B (fugitives); industry CRF 1A2 (manufacturing industries and construction) + CRF 2 (industrial processes); transport CRF 1.A.3; residential and commercial CRF 1A4a (commercial) + CRF 1A4b (residential); agriculture CRF 1A4c (agriculture, forestry and fishing) + CRF 3 (agriculture); waste CRF 5 (waste); land use, land use change and forestry CRF 4 (LULUCF).
 International aviation, international shipping and CO₂ biomass are memorandum items according to UNFCCC reporting guidelines and are not included in national GHG totals. International shipping is not included in any targets under the UNFCCC or the Kyoto Protocol. International aviation is included in the EU's 2020 and 2030 GHG targets. CO₂ from biomass is reported separately to avoid any double-counting of emissions from biomass loss in the LULUCF sector.

Situation in Central Europe

Interestingly, the new EU member states in Central Europe, despite their accidental climate change mitigation achievements that stemmed from the market-driven restructuring of emission heavy economies after the collapse of socialism, still operate more GHG intensive economies than the European Union average. Specifically, Poland and Czechia are positioned significantly below the EU averages in performance in both GHG emissions per GDP unit and GDG emissions per capita. The economy of Germany is also less GHG efficient than EU average in both GDP and per capita indexes. The remaining new member states in the region - Croatia, Slovakia and Slovenia generate higher than EU average GHG emissions per GDP unit but their GDG emissions per capita are better than EU average. Austria faces the opposite situation – its per capita GHG emissions are higher than EU averages but it scores better than EU average in terms of GHG emissions per GDP. Within the region, only Italy performs better than EU averages on both indicators.

Figure 17 Climate mitigation variables and indicators: trends and projections for Central Europe

	Total GHG emissions in 2017 (Mt CO _{2e})	Change in total GHG emissions, 1990-2017 (Mt CO _{2e})	Change in total GHG emissions, 1990-2017 (%)	GHG emissions per GDP in 2017 (PPS, EU-28=100)	GHG emissions per capita in 2017, (tCO _{2e} per person)	Change in the carbon intensity of energy 1990-2017 (%)	Change in the total energy intensity of the economy 1990-2017 (%)
Austria	84.5	5.0	6.2	87	9.6	-20.0	-18.3
Croatia	25.5	-6.9	-21.3	114	6.2	-13.0	-20.5
Czechia	130.5	-69.3	-34.7	157	12.3	-28.9	-48.4
Germany	936.0	-327.2	-25.9	105	11.3	-16.3	-40.1
Hungary	64.5	-29.7	-31.5	111	6.6	-25.5	-38.5
Italy	439.0	-83.1	-15.9	86	7.3	-22.8	-10.8
Poland	416.3	-58.7	-12.4	178	11.0	-11.6	-61.7
Slovakia	43.5	-29.9	-40.8	120	8.0	-35.2	-63.6
Slovenia	17.5	-1.2	-6.2	114	8.5	-19.0	-31.1
EU-28	4 483.1	-1 239.8	-21.7	100	8.8	-20.5	-36.3

Source: EEA, 2019

Future trends

With regard to future trends, the EU-wide progress on the energy efficiency target remains insufficient (see next item addressed) primarily due to the rising energy consumption trends and difficulties in meeting a more ambitious energy efficiency targets (EEA, 2019). While further improvements in energy efficiency are expected, the increasing trend in energy consumption since 2014 indicates that reversing this trend will require increased efforts and additional national policies and measures to address energy demand in all sectors, especially transport. This statement is amplified for the Central Europe since the economies in the region are less energy efficient than the EU average.

Transport will represent one of the biggest challenges ahead to decarbonising the region's economy. Measures aimed at lowering the demand for carbon-intensive fuels within the transport sector could support meeting the EU's decarbonisation targets and offer multiple health and environmental benefits. Additionally, substantial investment into uptake of renewable power sources within all sectors, including in industry and the residential sector (by e.g. facilitating decentralised production and empowering renewable energy self-consumers and renewable energy communities) are needed.

4.3 WATER

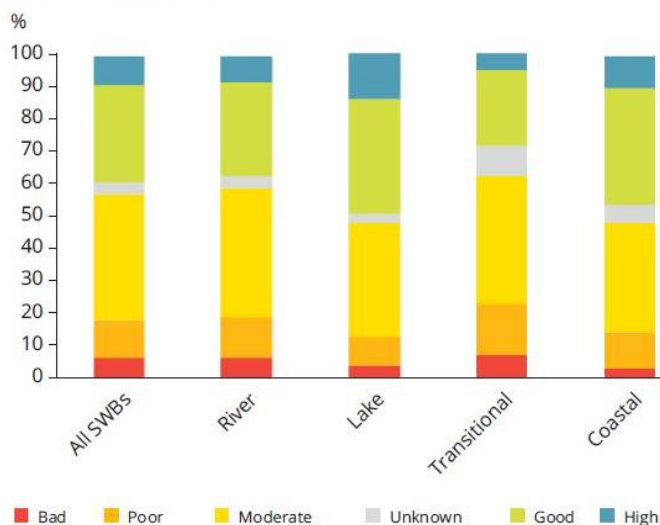
4.3.1 Qualitative status of water

The quality of surface water ecosystems is assessed as ecological status under the Water Framework Directive. It is performed on the basis of biological quality elements that manifests itself in ecological status or potential and supporting physico-chemical and hydro-morphological quality elements.

Ecological status of surface water

On a European scale, around 40 % of the surface water bodies are in good or high ecological status or potential (EEA 2018). This represents no improvement of the overall ecological status in the period 2009 – 2017, though biological quality elements have improved. Lakes and coastal waters are still in better status than rivers and transitional waters (Figure 18).

Figure 18 Ecological status /potential of rivers, lakes, transnational and coastal waters in all Member States (EEA, 2018).



The main significant pressures on surface water bodies are hydro-morphological pressures (40 %), diffuse source pollution (38 %), particularly from agriculture and atmospheric deposition (38 %), particularly related to mercury, followed by point sources (18 %) and water abstraction (7 %). The main impacts on surface water bodies are nutrient enrichment, chemical pollution and altered habitats due to morphological changes. Diffuse source and point source pollution affect 38 % and 18 % of surface water bodies, respectively. A relatively higher proportion of transitional and coastal waters than rivers and, in particular, lakes are affected by pollution pressure. The main driver of point source pollution pressures is urban waste-water treatment, followed to a lesser degree by industrial plants and storm overflow (EEA 2018).

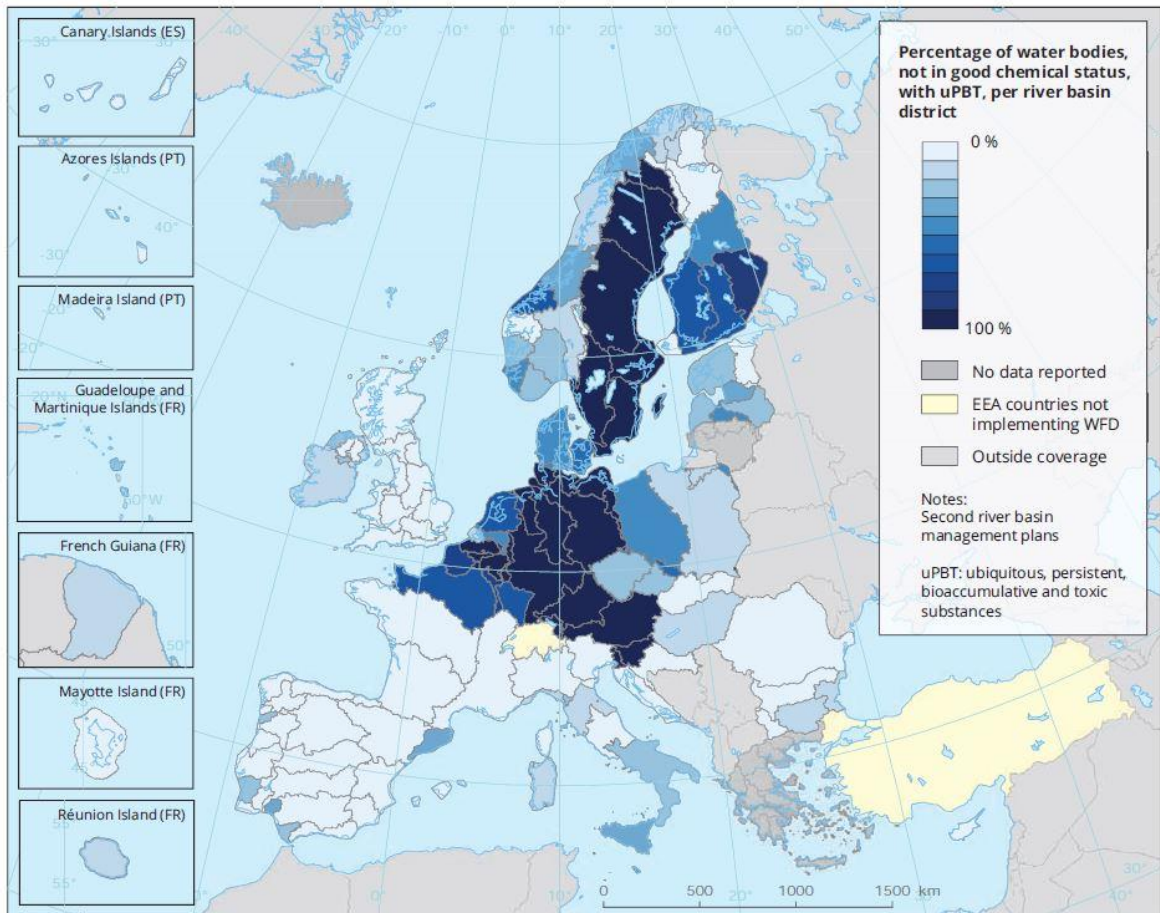
After the exclusion of the unassessed sections of rivers, the ecological status/potential for benthic invertebrates in rivers of Austria, Italy, Slovakia and Slovenia is similar to the EU – 25 average (EU – 25 includes all the member states that reported the status for the 2018 report). Germany, Croatia, Hungary and the Czech Republic the ecological status/potential for benthic invertebrates in rivers is lower than in the EU – 25. Whilst the overall status in Poland is comparable to the EU-25 with a lower proportion of rivers that achieve high ecological status/potential. In Slovakia and Croatia, the percentage of unassessed sections of rivers is unproportionally high.

Continued progress is expected as implementation of the Water Framework Directive, Floods, Habitats and Birds Directives proceeds. (EEA 2019).

Chemical status of surface water

38 % of surface water bodies in the EU are in good chemical status, while 46 % do not achieve good chemical status and for 16 % their status is unknown (EEA 2018). In many Member States, relatively few substances are responsible for failure to achieve good chemical status. Mercury accumulates in a large number of water bodies. If the widespread pollution by ubiquitous priority substances, including mercury, is omitted, the proportion of water bodies in good chemical status increases to 81 %, with 3 % that have not achieved good status and 16 % whose status is unknown (Figure 19.). The main reasons for failure to achieve good status are atmospheric deposition and discharges from urban waste-water treatment plants. Since the publication of the first RBMPs, Member States have made progress in tackling priority substances, leading to a reduction in the number of water bodies failing to meet standards for substances such as priority metals (cadmium, lead and nickel) and pesticides.

Figure 19: Member States with a not good chemical status with uPBT (EEA, 2019).

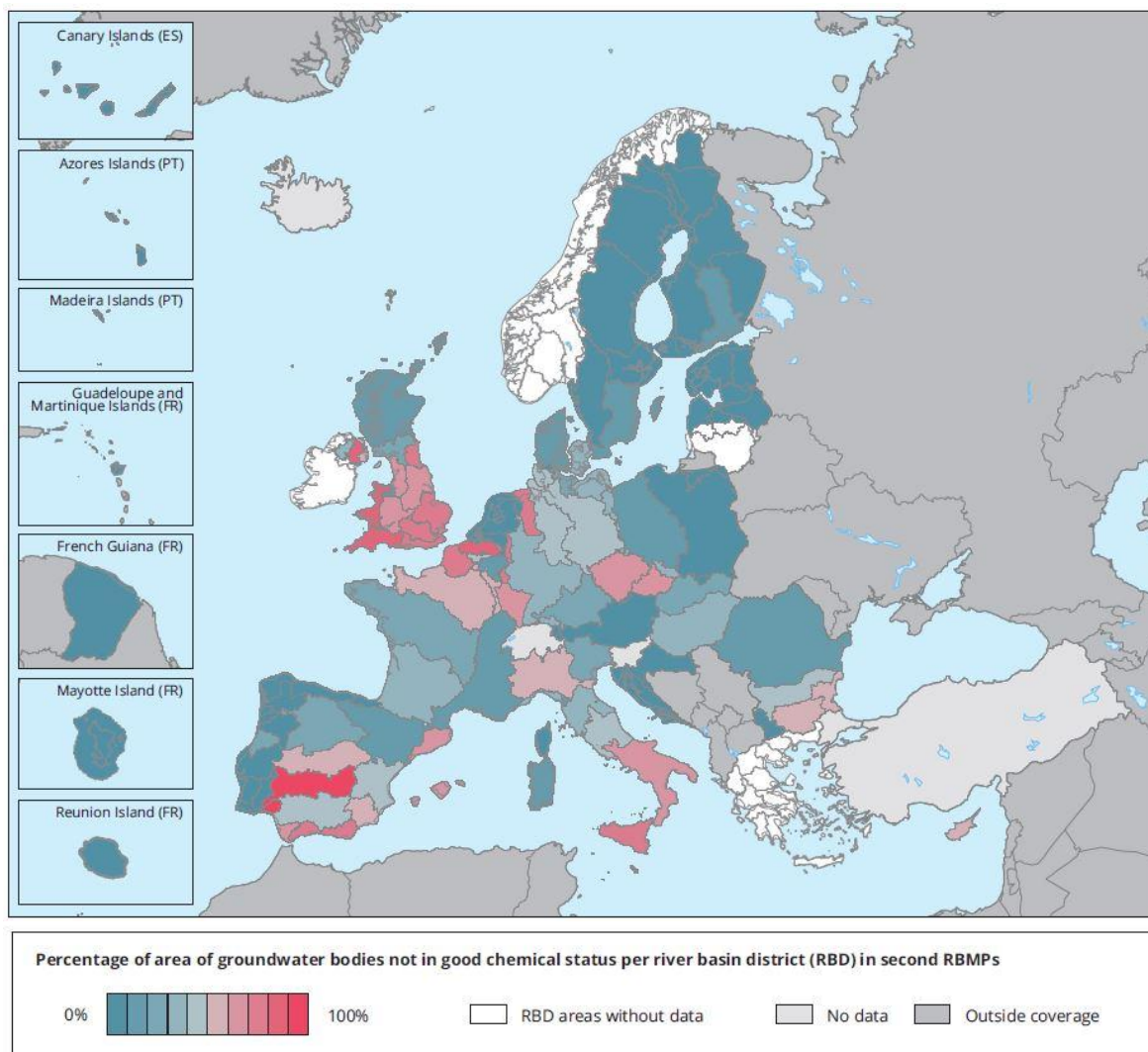


Continued progress in improving the chemical status of surface water is expected as implementation of the Water Framework Directive continues. Improvements in urban waste-water treatment and industrial pollution will deliver improvements in pollution control, but diffuse pollution is expected to remain problematic. It is likely that pressures from newly emerging pollutants and mixtures of chemicals will intensify (EEA, 2019).

Groundwater chemical status

In the EU, 74 % of the area of groundwater bodies is in good chemical status. This is a small improvement in status from the first river basin management plans (Figure 20). Nitrates are the main pollutant, affecting over 18 % of the area of groundwater bodies. In total, 160 pollutants resulted in failure to achieve good chemical status. Most of these were reported in only a few Member States, and only 15 pollutants were reported by five or more Member States. (EEA 2018).

Figure 20: River basin groundwater chemical status (EEA 2018, Results are based on the WISE-SoW database including data from 24 Member States (EU-28 except Greece, Ireland, Lithuania and Slovenia).



In the EU, agriculture is the main cause of groundwater's failure to achieve good chemical status, as it leads to diffuse pollution from nitrates and pesticides. Other significant sources are discharges that are not connected to a sewerage system and contaminated sites or abandoned industrial sites. Of the different water bodies recognised by the Water Framework Directive (WFD) across Europe, groundwaters generally have the best status. Good chemical status has been achieved for 74 % of the groundwater area, while 89 % of the area achieved good quantitative status (EEA, 2018).

Improvements in urban waste-water treatment, industrial pollution and agriculture are expected to deliver improvements in pollution control, but diffuse pollution will remain problematic. It is likely that pressures from newly emerging pollutants and mixtures of chemicals will be identified (EEA, 2019).

4.3.2 Quantitative status

Quantitative status of surface water

Europe’s surface water abstraction of 184.680 million cubic metres can be split among four main sectors: (1) household water use (14 %); (2) industry and mining (18 %); (3) cooling water for electricity production (28 %); and (4) agriculture (40 %). Most of the water is abstracted from rivers, followed by artificial reservoirs and lakes.

Quantitative status of groundwater

In 2017 around 90 % of the area of groundwater bodies in EU was reported to be in good quantitative status (Figure 21). In Central Europe, only Hungary and Slovakia had problems with the quantitative status of groundwater bodies, however that situation been changing in some CE countries (e.g. Czechia) in the past years due to significantly reduced rainfall and increased evapotranspiration. The main pressures causing failure to achieve good quantitative status are water abstraction for public water supply, agriculture and industry (EEA, 2018) and the climate change.

Figure 21: Percentage of groundwater bodies in good quantitative status by Member State (bold CE Member States)

% of groundwater bodies in good quantitative status, by area	Member States
100 %	Austria , Latvia, Luxembourg, Netherlands, Romania, Slovenia
75-100 %	Croatia , Denmark, Estonia, Bulgaria, Portugal, Germany , Poland , Finland, Sweden, Czech Republic , France, United Kingdom, Spain, Italy
50-75 %	Hungary , Slovakia , Belgium
< 50 %	Cyprus, Malta

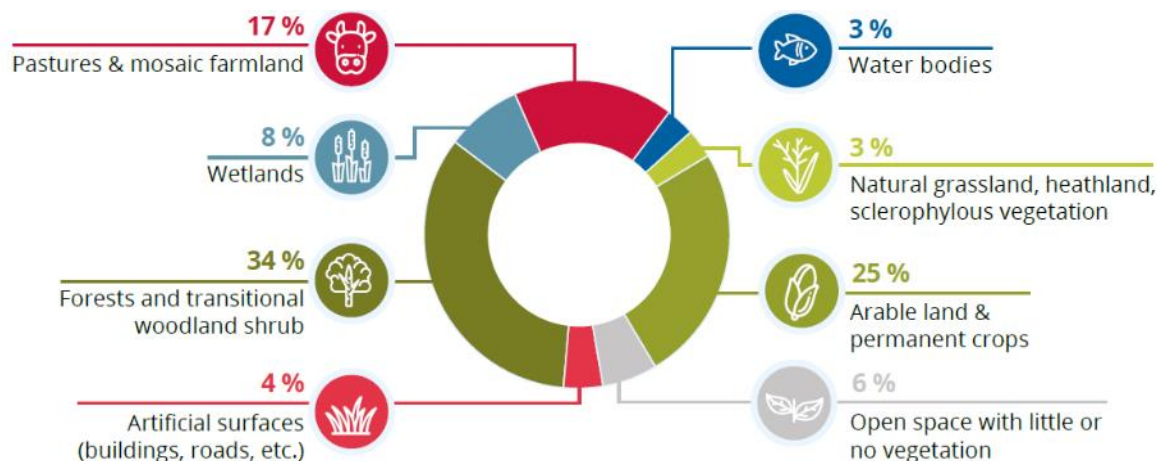
Water abstraction is decreasing. A continued focus on maintaining and improving the quantitative status of groundwater is expected as implementation of the Water Framework Directive continues. However, water stress remains a concern in some regions and the future availability of water will be affected by climate change (EEA, 2019).

4.4 SOIL

4.4.1 Land use

In general, Europe’s land use (Figure 22) has remained relatively stable since 2000. However, long-term changes show that land take in Europe continues, as artificial surfaces increased by 7 % over the period 2000-2018. This change came mostly at the expense of agricultural areas (EEA, 2019).

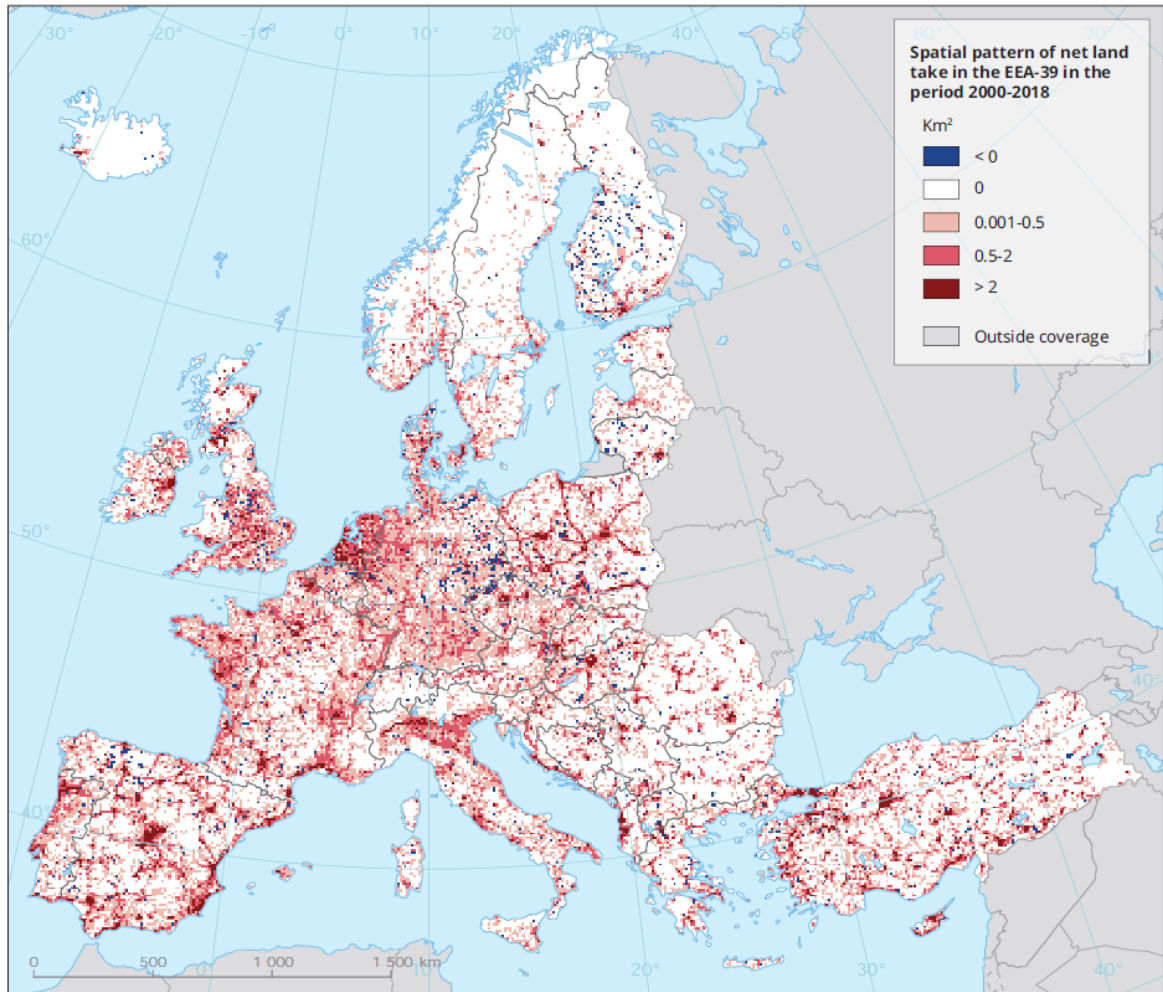
Figure 22 Land cover in Europe according to Copernicus Corine Land Cover classification (EEA, 2019a)



In 2000-2018 period, land take concentrated around larger urban agglomerations. Despite the fact that land recultivation (so called “brown field” investments) shows a growing trend, the rate of reuse of developed land remained low – 11 times more land was taken than recultivated (14.049 km² land take vs 1.269 km² recultivated land). Furthermore, landscape fragmentation has also increased, impacting mostly uninhabited or dispersed rural areas and suburbs — areas with relatively greater potential to supply ecosystem services. Main drivers behind this trend were expansion of urban areas and transport networks (EEA, 2019).

Although the yearly rate shows a tendency to slow down, net land take in EU28 still amounted to 440km²/year between 2012-2018 (Figure 23) The main drivers of land take during 2000-2018 period were expansion of urban areas (especially industrial and commercial land use, as well as extension of residential areas and construction sites), unsustainable agricultural and forestry practices and climate change (EEA, 2020).

Figure 23: Spatial pattern of net land take in the EEA-39 in the period 2000-2018 (EEA, 2019)



Source: EEA.

Central Europe undergoes similar trends as the EU28 (Figure 24 and Figure 25) especially if we compare net land take based on % of total area. Although CE countries show evident net land take reduction trend, the overall share of net land take contributed to CE countries within total EU28 net land take shows a growing trend of over 10% in the 2000-2018 period. Thus, we can conclude that the stated land take reduction trend is notably slower than on average within EU28. Land take in CE is also predominantly concentrated around larger urban agglomerations, just as in EU 28. Especially in Poland, Hungary and Croatia land take trends can also be contributed to development of new transport corridors and urbanization alongside them.

Figure 24: Net land take – trends in CE countries (EEA, 2020)

	2000-2006		2006-2012		2012-2018		2000-2018	
	km ²	% of total area	km ²	% of total area	km ²	% of total area	km ²	% of total area
Slovenia	10,65	0,05	5,26	0,03	6,06	0,03	21,97	0,11
Austria	76,21	0,09	53,09	0,06	66,72	0,08	196,02	0,23
Slovakia	30,87	0,06	67,79	0,14	35,37	0,07	134,03	0,27
Czechia	84,93	0,11	93,39	0,12	51,29	0,07	229,61	0,29
Germany	460,16	0,13	335,61	0,09	260,35	0,07	1056,12	0,29
Hungary	148,21	0,16	74,61	0,08	51,59	0,06	274,41	0,30
Italy	483,09	0,16	338,53	0,11	99,90	0,03	921,52	0,31

Croatia	93,34	0,17	45,09	0,08	39,51	0,07	177,94	0,32
Poland	111,98	0,04	488,89	0,16	401,53	0,13	1002,40	0,32
Total EU28	5.530,26	0,13	4.609,32	0,10	2.639,64	0,06	12.779,22	0,29
Total CE	1.499,44		1.502,26		1.012,32		4.014,02	
% of CE land take in EU28	27,11%		32,59%		38,35%			

Unsustainable agricultural and forestry practices are mostly linked to high societal demand for agriculture and forestry outputs, land abandonment and fragmentation. In CE countries, the largest losses of arable land and permanent crops in 2000-2018 period were observed in Czechia (due to extension of non-tilled agricultural land and pastures) and Hungary (due to withdrawal of farming and subsequent woodland creation).

According to FAO and its [Global Soil Organic Carbon Map](#), soil is the second largest natural carbon sink (after oceans), surpassing forests and other vegetation in its capacity to capture carbon dioxide from air (EEA, 2019a). Loss of fertile land caused by urban development decreases the potential of land to produce food, bio-based materials and fuels, as well as to support biodiversity and a low-carbon bioeconomy. Climate change themselves, already impact soil and its characteristics and subsequently land use. At the same time droughts, forest fires and floods present increasing threats for soil erosion, also driven by climate change (EEA, 2019).

With regard to future trends, Europe’s land resources are exposed to intensive use at an accelerated rate. With over 70% of already existing urban population and expected further growth of urban agglomerations by 11%, artificial surfaces are predicted to increase by 0.71 % by 2050. This urban expansion is expected to be accompanied by a greater need for infrastructure (transport, water, waste and electricity), which decreases the long-term availability of productive land resources. Farming is expected to retreat further from marginal, biodiversity-rich areas and the intensive use of productive farmland is likely to increase, impacting the quality and ecosystem services of agricultural areas. Logging and consumption of wood for fuel will increase, which, together with increasing droughts, fires and storms, is expected to reduce forest ecosystem services (EEA, 2019).

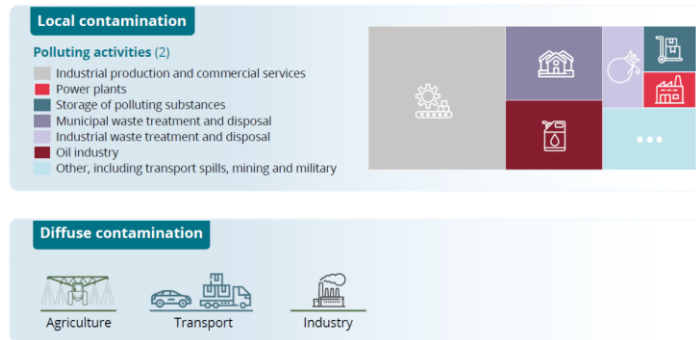
Taking into account already identified lack of a comprehensive and coherent policy framework for protecting Europe’s land and soil resources, Europe in general is at risk of not meeting the 7th EAP objective of managing land sustainably and reaching no net land take by 2050. However, slowing trends in the expansion of urban and transport infrastructure areas indicate that, if appropriate measures are taken, the targets could be reached.

4.4.2 Condition of soil

Soils all over EU28 are threatened by increasing competition for land, unsustainable practices and inputs of pollutants, causing their degradation in various forms. Exposure to chemicals (mineral fertilisers, plant protection products, industrial emissions), tillage and compaction, as well as soil loss through sealing from urban expansion, erosion and landslides, degrade soils physically, chemically and biologically (EEA, 2019).

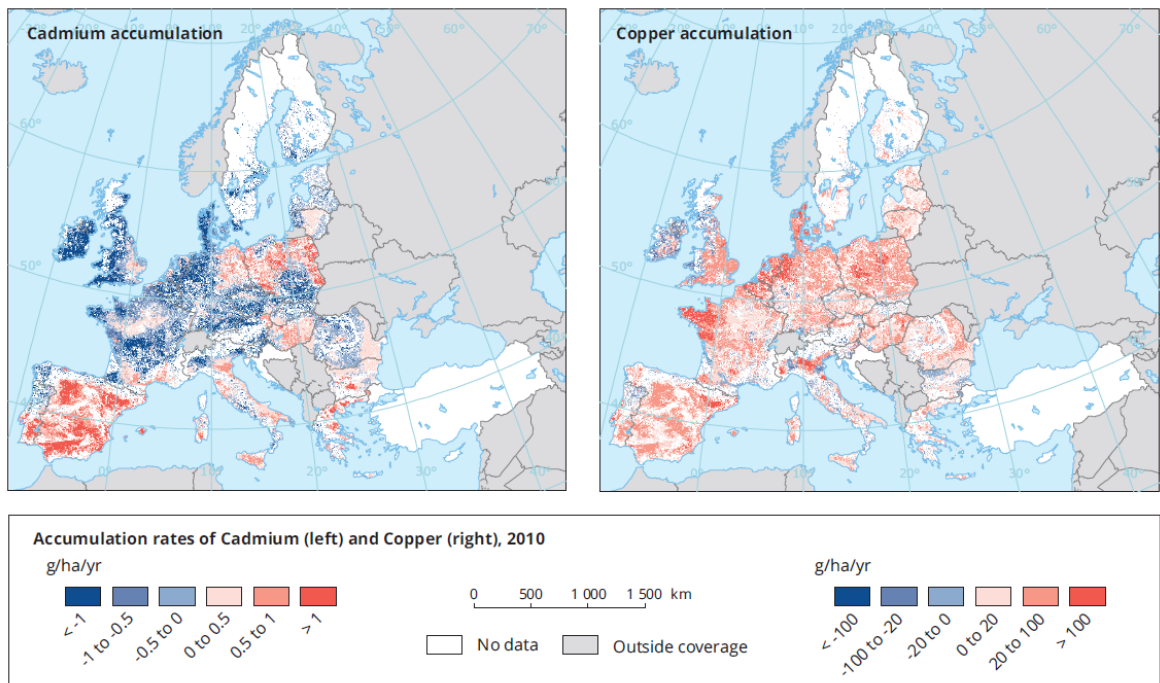
In the EU28, localized potentially polluting activities (predominantly linked to industrial production and commercial services, oil industry and municipal and industrial waste) took place on an estimated 2.8 million sites, but only 24 % of the sites are inventoried. Furthermore, only 28 % of the registered sites are being investigated – making progress in the remediation of polluted soils slow. However, many of stated sites can be contributed to former industrial activities, thus in part representing a historical burden of Europe’s industrialization.

Figure 25: Soil contamination (EEA, 2019a)



On the other hand, diffuse contamination in EU28 is predominantly linked to contamination with heavy metals (like cadmium and copper presented in Figure 26), pesticides and herbicides, as well as – all predominantly linked to agriculture (EEA, 2019).

Figure 26: Accumulation rates of cadmium (left) and copper (right) in EU soils (EEA, 2019)

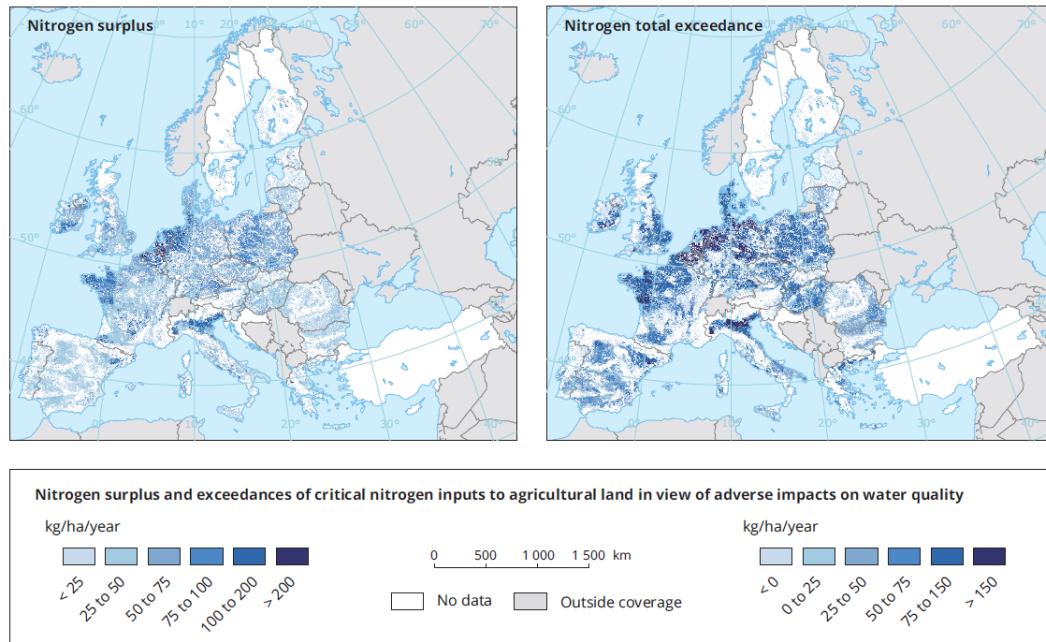


Sources: Ballabio et al. (2018) (top); De Vries et al. (forthcoming) (lower left and lower right).

If pollution with cadmium can be considered a regional environmental issue for CE countries (according to Figure 26 linked only to parts of Germany, Poland, Hungary and Italy), copper pollution can be characterized as widespread environmental issue in CE countries (Figure 26), which occurs on all agriculturally significant areas in CE countries.

Nitrogen surplus pollution closely follows the patterns of the cadmium and copper. According to some estimations, about a 40 % reduction in nitrogen inputs on average across Europe, would be needed to prevent this exceedance (EEA, 2019).

Figure 27: Calculated nitrogen surplus (inputs vs outputs) (left) and exceedances of critical nitrogen inputs to agricultural land in view of adverse impacts on the environment (right) (EEA, 2019)



Note: Statistical data refer to 2010 inputs; areas shown in white are non-agricultural soils.

Source: De Vries et al. (forthcoming).

Estimated soil erosion rate in EU28 by water alone (without wind erosion and soil loss due to crop harvesting) is 1.6 times higher than the average rate of soil formation. Furthermore, erosion rates in EU28, as well as in CE countries can be expected to further increase in the future as a result of climate change and subsequent more extreme weather events.

Looking ahead, EU is currently not on track to protect its soil resources based on the existing strategies. There is a lack of binding policy targets. Harmonised, representative soil monitoring across Europe is needed to develop early warnings of exceedances of critical thresholds and to guide sustainable soil management. As key drivers of soil degradation are not projected to change favourably, there is a high risk that the EU will fail some of its own and international commitments such as land degradation neutrality (EEA, 2019).

4.5 BIODIVERSITY, NATURA 2000 AND ECOSYSTEM SERVICES

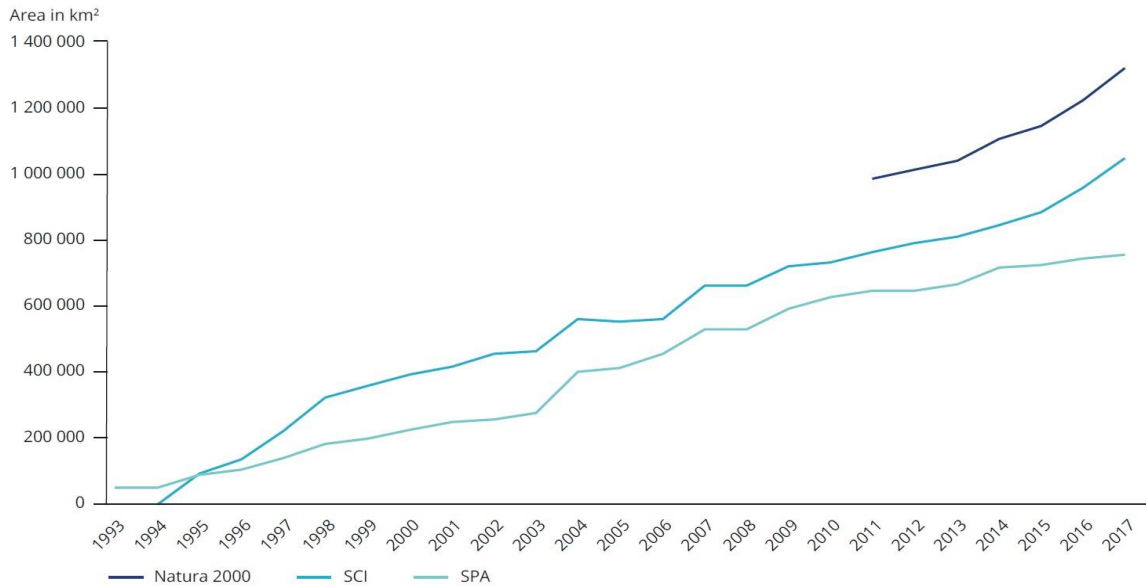
The following text describes the basic trends and their drivers in the ongoing decline of biodiversity in the Central Europe.

4.5.1 Protected areas and Natura 2000 network

There are two types of protected areas in EU: (1) a “nationally designated protected areas” protected by national legislation and (2) Natura 2000 – aiming to safeguard Europe’s most valuable and threatened species and habitats, listed under the Birds and Habitats Directives.

Natura 2000 network which includes around 28.000 sites and covers approx. 18% of the 28 Member States’ terrestrial area, has stimulated a remarkable increase in the area protected in Europe (EEA, 2019). There has been a steady increase in the cumulative area of the Natura 2000 network in EU Member States in the last 10 years (Figure 28).

Figure 28. Area of Natura 2000 sites designated under the EU Habitats and Birds Directives by 2017 (EEA, 2019)

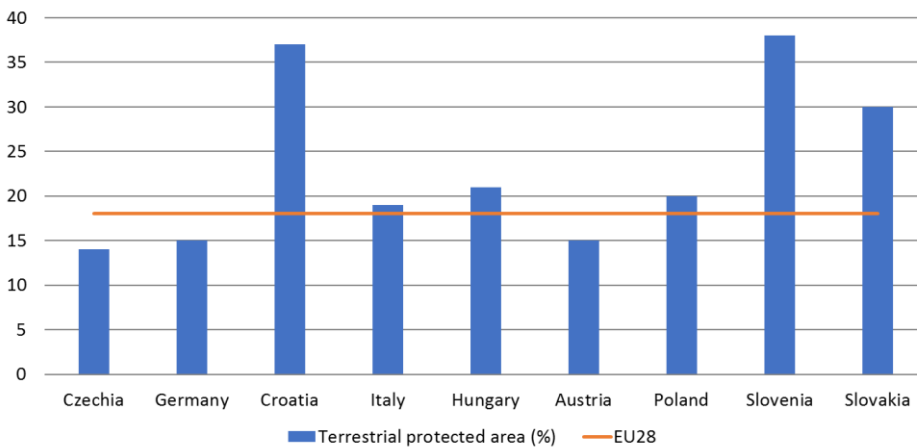


Note: The Natura 2000 network is composed of SPAs and SCIs. SPAs are Special Protection Areas, designated under the Birds Directive. SCIs include sites and proposed Sites of Community Importance and Special Areas of Conservation, designated under the Habitats Directive. Many sites are designated under both directives (as both an SCI and an SPA). The calculation of the Natura 2000 area taking this overlap into account is available only from 2011 onwards.

Source: EEA (2018c).

Many Central European countries exceed EU averages in proportion of terrestrial protected area. Croatia and Slovenia had the highest rate of terrestrial Natura 2000 designations covering over the 35% of their land area. Slovakia designated approx. 30% of its territory to Natura 2000 protection regime, Hungary, Italy and Poland approx. 20%. Only Austria, Czech Republic and Germany scored below EU averages, having only 15% of land area under terrestrial Natura 2000 network. (EEA, 2020) (Figure 29).

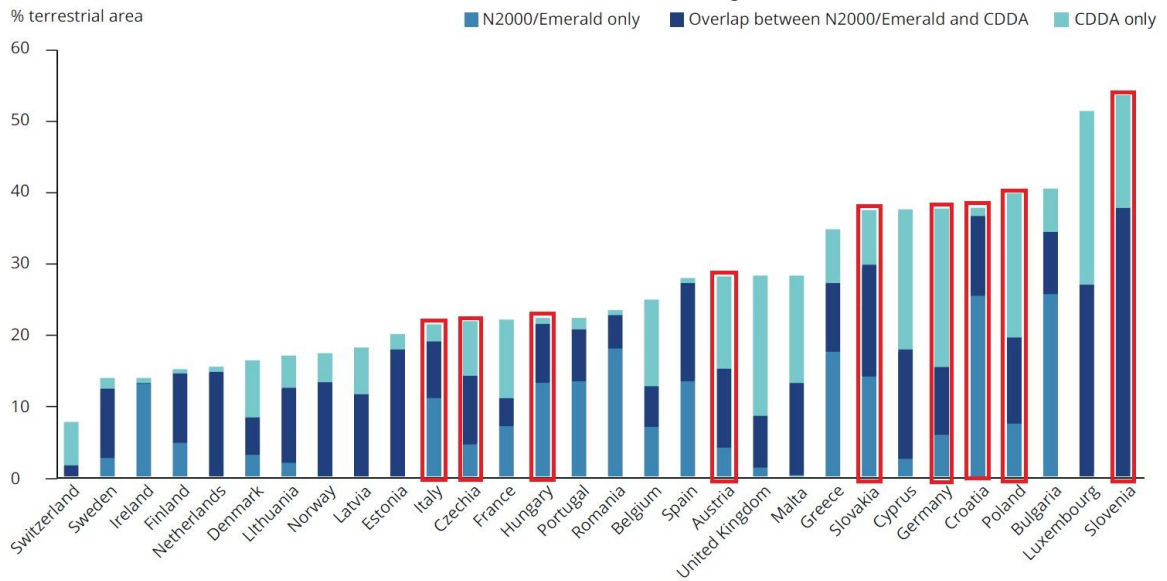
Figure 29. Percentage of land area covered by terrestrial Natura 2000 network in CE countries (EEA, 2020)



Source: Eurostat

When comparing the Natura 2000 network with nationally designated protected areas, it is clear that Italy, Hungary, Slovakia and Croatia significantly expanded their territory under some sort of protection (Figure 30).

Figure 30. Country comparison — share of country designated as terrestrial protected area and the overlap between Natura 2000 or Emerald sites and national designations (EEA, 2019)

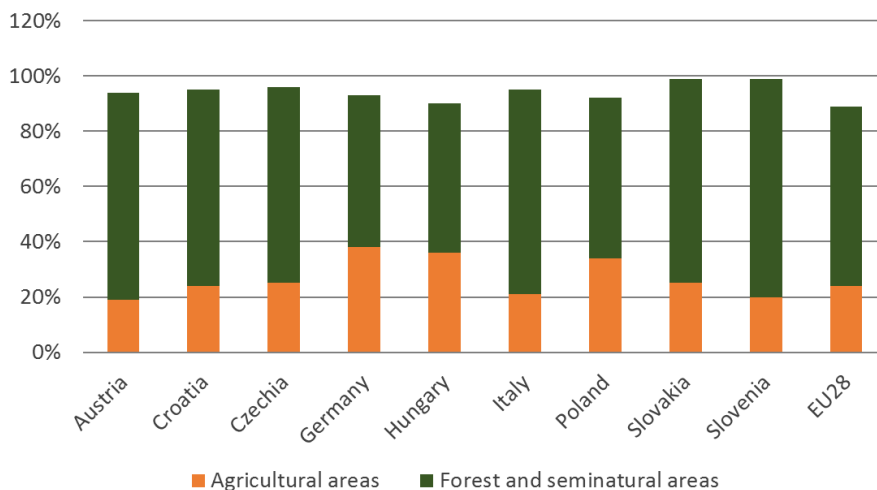


4.5.2 Trends in key protected species (Natura 2000)

Although the progress of designation of protected areas is evident, we currently lack comprehensive information on how well the Natura 2000 sites are managed (EEA, 2019).

The Natura 2000 network (EC, 2020) is, as a whole, made up mostly of forest and semi-natural areas (68% in average) followed by agricultural areas (27%), while the other 5% are wetlands, water bodies and artificial areas (Figure 31).

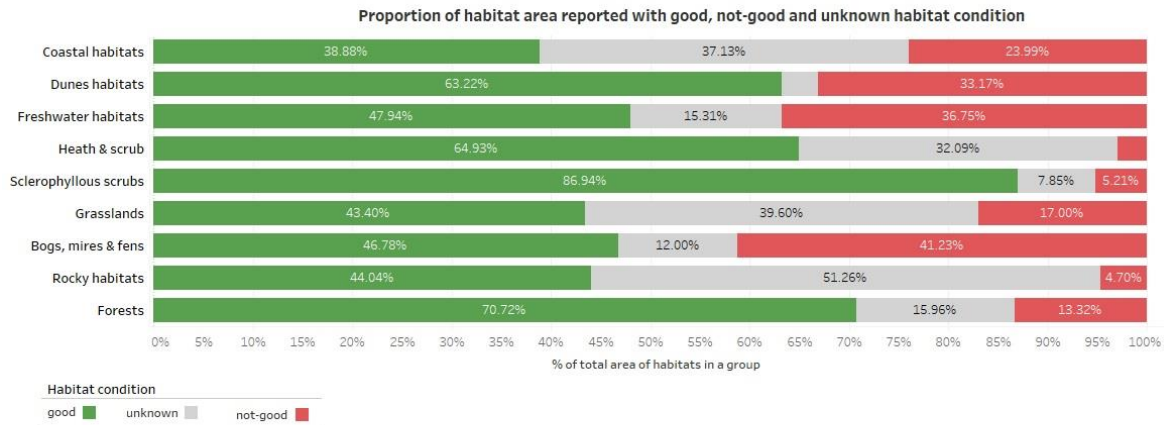
Figure 31. Land cover within the Natura 2000 network in CE countries (EC, 2020)



Assessments of species and habitats protected under the Habitats Directive in the period 2007-2012 showed predominantly unfavourable conservation status - at the EU level, only 23% of the assessments of species were reported to have favourable conservation status, while 60% of species assessments had unfavourable status (EEA, 2015b). Outcomes of the next round of EU-wide reporting (2013-2018) will be available in 2020.

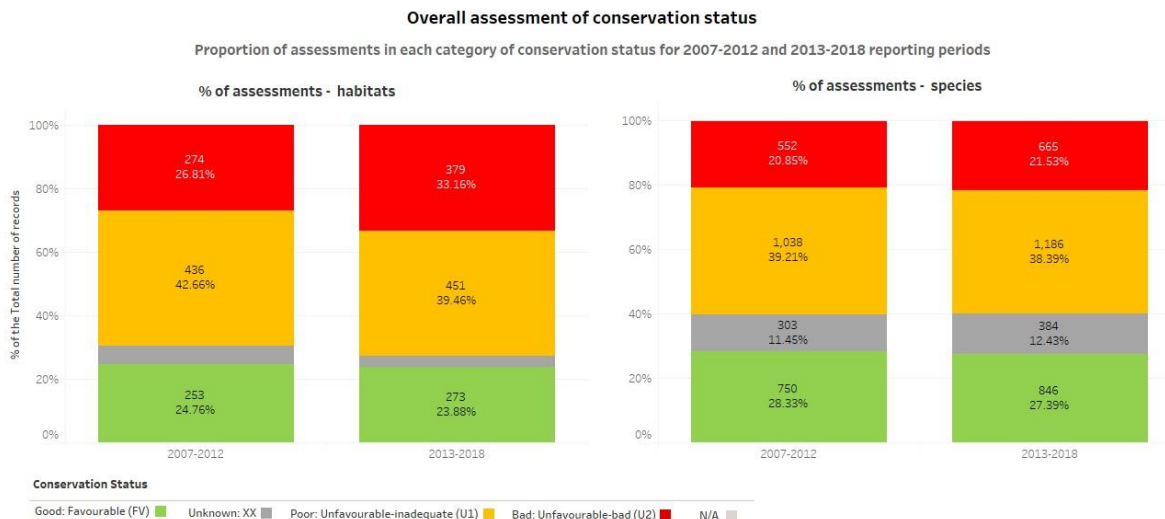
Central Europe shows similar situation in the status of the species and habitats protected under the Habitats Directive as in the whole EU28. Natura 2000 sites have predominantly unfavourable conservation status although some limited improvements have been visible in the last 10 years (Figure 32 and Figure 33).

Figure 32. Proportion Natura 2000 network with good, not good and unknown habitat condition in CE countries (EEA, 2019 – State of Nature - draft)



Note: The habitats groups correspond to groups as defined in Annex I of the Habitats Directive. 'Unknown condition' should not be interpreted solely as a lack of information on the habitat. It is acknowledged that monitoring may take place but the habitat condition may not be concluded.

Figure 33. Overall assessment of conservation status of the Natura 2000 network in CE countries (EEA, 2019 – State of Nature - draft)



Note: The figures shown for 2007-2012 and 2013-2018 are not necessarily directly comparable because changes in Member State's conservation status may be due to changes of methods or to better data rather than reflecting genuine changes.

The unit shown (number of assessments) refers to single assessments made by a Member State in one biogeographical region. Therefore, one species or habitat type that occurs in more than one biogeographical regions in one Member State can have more than one assessment.

Only habitats & species assessments flagged as 'Use for statistics=yes' in '3.3. Features reported' are included.

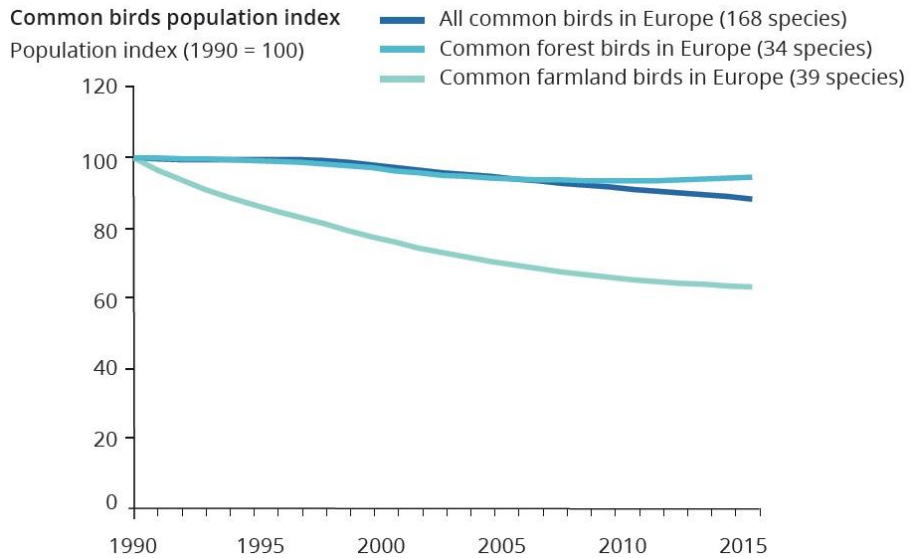
4.5.3 State of other headline bio-indicator species

Common birds

The biodiversity loss is not confined to rare or threatened species. Long-term monitoring (over 25 years) shows a continuing downward trend in populations of common birds and butterflies with no sign of recovery. The most pronounced declines in farmland birds and grassland butterflies (EEA, 2019a). Serving as important bio-indicators, these species can reflect changes in ecosystems as well as in other animal and plant populations. Trends in bird and butterfly populations are, therefore, very good barometers of the health of the environment (EEA, 2020).

Figure 34 shows that, between 1990 and 2016, there was a decrease of 9% in the index of common birds in the 26 EU Member States that have bird population monitoring schemes⁹. The decline in numbers of common farmland bird over the same period was even more pronounced, at 32%, while the common forest bird index decreased by 3%. (EEA, 2019).

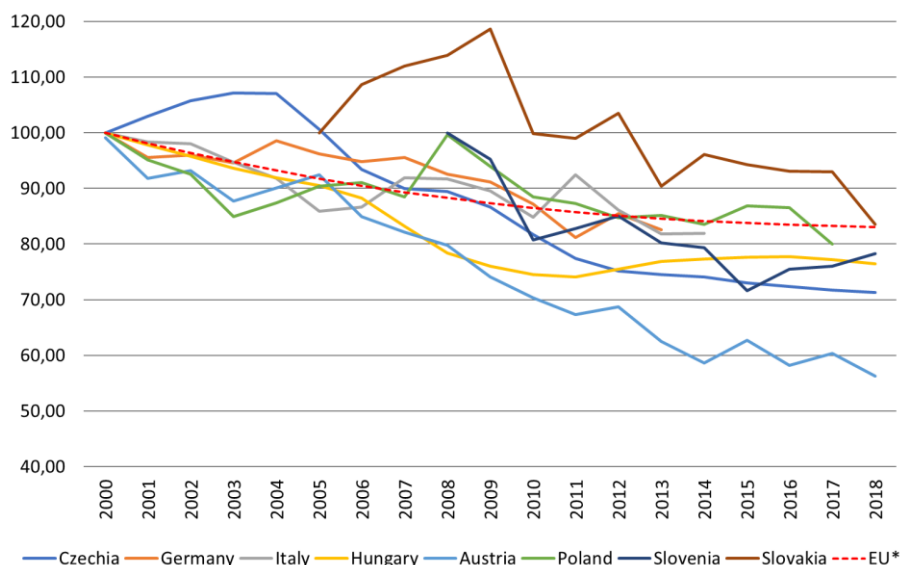
Figure 34. Common birds population index, 1990 – 2016 (source: EEA, 2019)



Reductions in the population of common farmland birds in CE8 countries (Croatia is not included) appear to be even faster than overall trends in EU. As illustrated on Figure 35, all eight countries witnessed significant declines with the most severe reductions (of 40%) occurring in Austria, followed by Czechia (nearly 30%).

⁹ Croatia and Malta are not included. This decrease is slightly greater (11 %) if figures for Norway and Switzerland are included.

Figure 35. Common farmland birds population index in Central Europe countries (except Croatia) (source: EEA, 2019)



Population index (2000=100); * Data coverage has increased from 9 to 22 EU Member States over the period 1990 to 2010, with 25 countries covered as of the reference year 2011

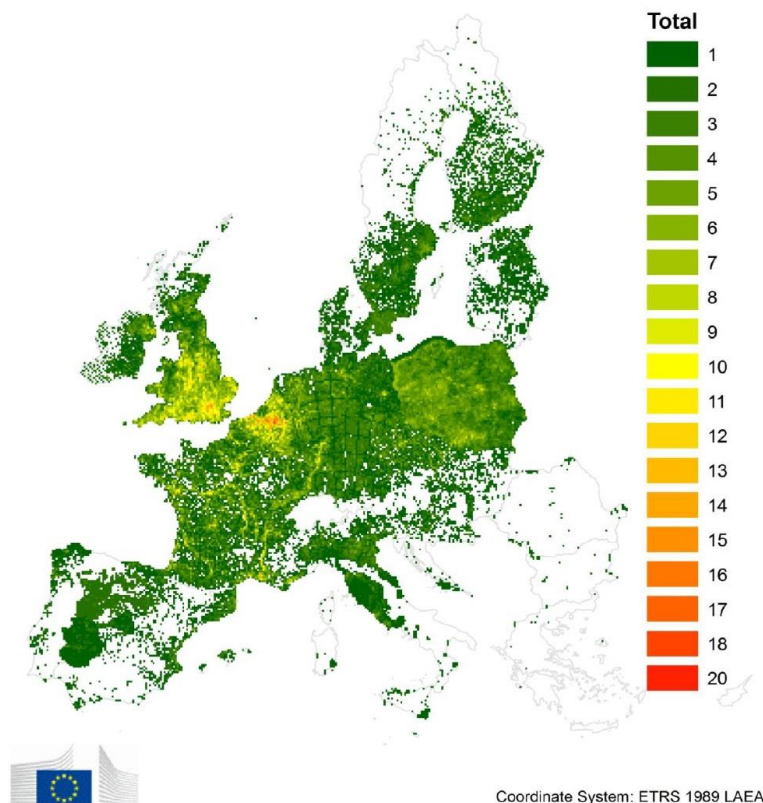
It is difficult to forecast how soon biodiversity, as illustrated by the abundance of bird populations, will recover, as their state is influenced by a complex combination of environmental factors and policy measures. Potential positive impacts of Common Agricultural Policy (CAP) reform and the measures anticipated under the multiannual financial framework 2014-2020 on common species associated with farmland may become apparent only in the period 2020-2030, as long as these policies are implemented thoroughly and on a large scale throughout the EU (EEA, 2019a).

Invasive alien species (IAS)

Invasive alien species (IAS) are animals and plants that are introduced accidentally or deliberately into a natural environment where they are not normally found, with serious negative consequences for ecosystem services and can increase the incidence of livestock diseases (EEA, 2019). For example, IPBES notes that invasive alien insects alone have been estimated to cost US\$2-3.6 billion per year in Western and Central Europe, mostly due to impacts on forestry and agriculture, while IAS can have significant impacts also on human health (i.e. via disease transmission and allergens). However, such impacts are considered to be grossly underestimated because of the limited number of studies available within and across Europe and Central Asia.

There are 48 invasive alien species distributed within EU (Figure 36). According to IPBES (2019), the highest numbers of reported introductions for most species' groups in Europe and Central Asia have occurred in Western Europe, but this is expected to increase in Central Europe and Eastern Europe. The overall rate of introduction of alien species shows on average no sign of slowing and will most likely remain high or even accelerate due to increasing trade and changing climate. This high rate is very likely to continue in the short-term, but long-term trends are less clear because they depend on the success of management and policy interventions. Management of invasive alien species is receiving increasing attention, but little remains understood about which factors affect the likelihood of successful management.

Figure 36. Cumulative number of 48 IAS of Union concern per EU MS at grid 10x10 km level in EU (source: JRC, 2019)



Based on the available georeferenced information for each MS. *Nyctereutes procyonoides* has not been considered since its inclusion in the Union list took place in February 2019.

4.5.4 Ecosystem services and green infrastructure

Ecosystem condition and its services

Ecosystems are defined in the Convention on Biological Diversity (CBD) as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit' (UN, 1992) and they are multi-functional. Each system provides a series of services for human well-being such as provisioning services (food, fresh water, medicinal resources), regulating services (regulates local climate and air quality), supporting services (supporting habitats for species) or cultural services (tourism, recreation and mental health). The ability of ecosystems to deliver these services is inherently linked to their condition.

Sub-regions western Europe and central Europe have witnessed decreasing trends in biodiversity status for almost all terrestrial ecosystem types and the majority of non-provisioning ecosystem services such as regulation of freshwater quality or pollination show declining trends during the period from 2001 to 2017 (IPBES, 2018).

Green infrastructure

The green infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features that are designed or managed to deliver a wide range of ecosystem services. It

incorporates green and blue natural¹⁰ and semi-natural areas¹¹ in urban and rural areas as well as terrestrial, freshwater, coastal and marine areas.

The Natura 2000 network is a central part of the European green infrastructure as it harbours many of Europe’s remaining healthy natural and semi-natural ecosystems and biodiversity, and provides a legal and organisational framework, which can contribute to long-term efficiency and cost-effectiveness of investments in green infrastructure.

Green infrastructure has until recently been developed on ad hoc basis, responding to independent initiatives, which nevertheless need to be up scaled to deliver their full potential to restore natural capital. Analysis of green infrastructure in Europe (EEA, 2014) suggested opportunities for improvements, many of which are located in Central Europe (Figure 37 and Figure 38).

Figure 37. Distribution of green infrastructure elements, based on its capacity to deliver ecosystem services (source: EEA, 2014)

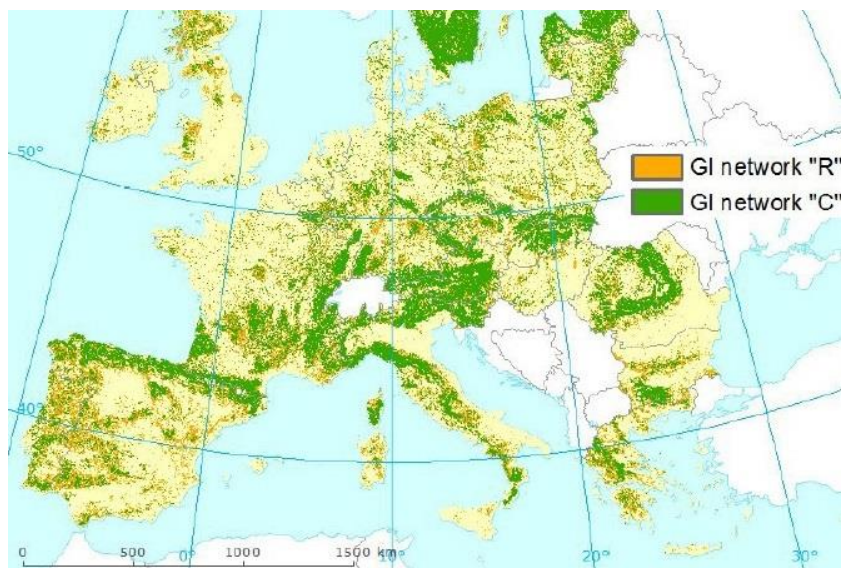


“Key service areas” hold the maximum capacity to deliver regulating ecosystem services and, therefore, they should be protected and conserved to maintain natural capital. In the “limited service areas” ecosystem functioning is providing ecosystem services at a moderate rate that could be boosted by restoring or enhancing those natural habitats. The “low service areas” are zones with relatively low capacity to deliver the selected ecosystem services, either owing to their functional roles or due to the intensity of human use.

¹⁰ that are rich in biodiversity and lead to the delivery of ecosystem services

¹¹ those which directly enhance biodiversity and ecosystem services such as green bridges and ecoducts

Figure 38. Mapping of potential European GI networks (source: EEA, 2014)



The GI network 'C' consists of areas to be conserved because they perform key ecological roles for both wildlife and human well-being. The GI network 'R' performs important ecological functions, but its capacity could be improved with some protection or restoration.

4.5.5 Expected future trends in biodiversity

Europe is currently not on track to meet the biodiversity target of maintaining and enhancing ecosystems and their services by establishing green infrastructure and restoring at least 15% of degraded ecosystems. While Natura 2000 areas have a positive effect on ecosystem condition and biodiversity in surrounding areas, pressures remain high and the conservation measures undertaken are still insufficient EEA (2019).

The underlying drivers of the loss of biodiversity and its services are not changing favourably and are still deteriorating due to increasing pressures from land use change, pollution, extraction of natural resources, climate change and invasive alien species. Deterioration of the ecosystem conditions and services are expected to continue until Europe manages key drivers of biodiversity decline – unsustainable use of agrochemicals and the loss, fragmentation and degradation of natural and semi-natural ecosystems – that are caused mainly by the agricultural intensification, intensive forest management, land abandonment, and urban sprawl. The ongoing adverse trends are expected to be partly offset by the green infrastructure investments, the Pollinators initiative and restoration projects.

On the other hand, other factors that could adversely impact the outlook beyond 2020 include the negative impact of climate change on biodiversity and ecosystems, particularly on those specialist species groups that are dependent on non-intensive agriculture and forest ecosystems (EEA, 2019a).

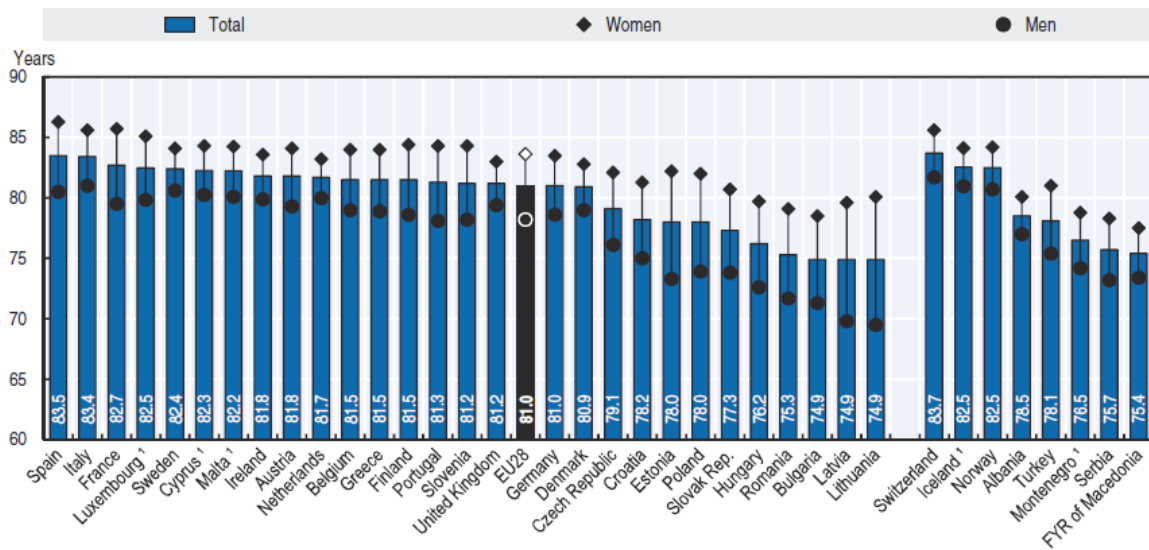
The new *EU Biodiversity Strategy to 2030* recognize this problem and points out there is currently no comprehensive governance framework to steer the implementation of biodiversity commitments agreed at national, European or international level. To this end, the strategy aims to put in place a new European biodiversity governance framework that will help map obligations and commitments and set out a roadmap to guide their implementation. The framework (initially non-binding but possibly formalized later on) will ensure co-responsibility and co-ownership by all relevant actors in meeting the EU's biodiversity commitments and support administrative capacity building, transparency, stakeholder dialogue, and participatory governance at different levels and.

4.6 POPULATION & HUMAN HEALTH

4.6.1 Public health

Public health can be presented through a several number of indicators. Some of the most general are life expectancy at birth and healthy life years at birth. Life expectancy at birth reached 81 years across the 28 EU member states in 2016. Life expectancy at birth now exceeds 80 years in two-thirds of EU countries. Among CE countries only Italy, Austria and Slovenia perform better than EU average (Figure 39).

Figure 39: Life expectancy at birth, by gender, 2016 (OECD/EU, 2018)

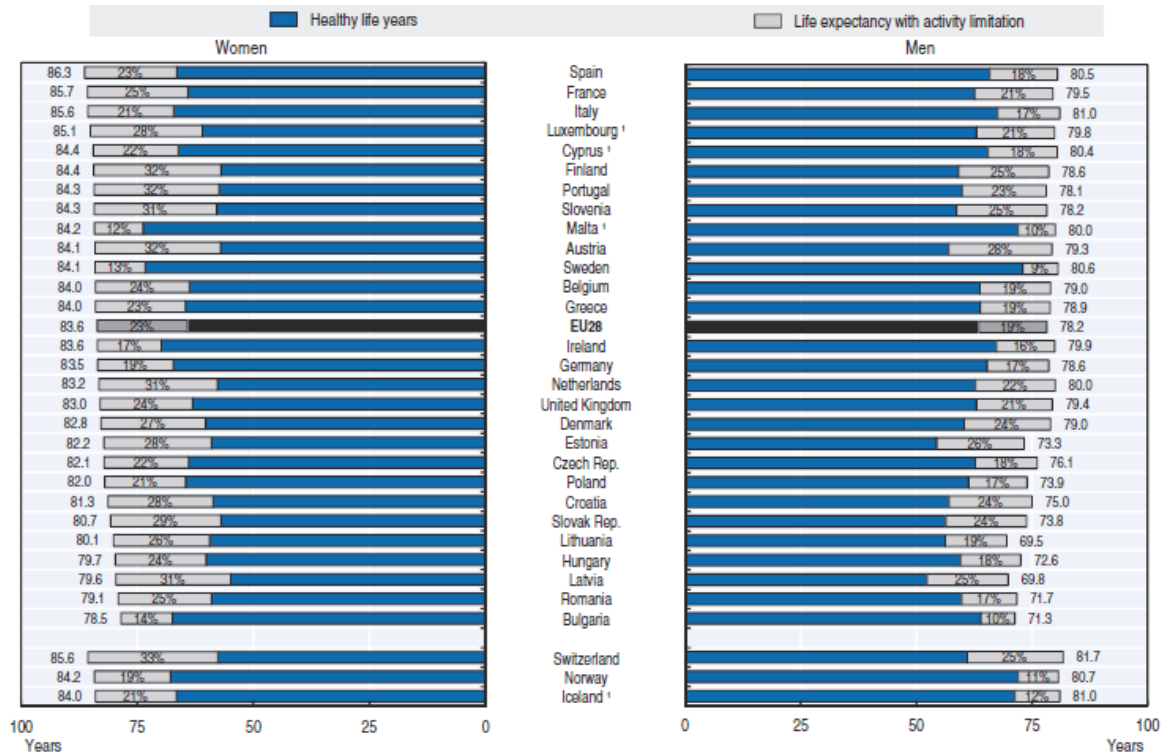


¹ Three-year average (2014-16).

Until recently, life expectancy was rising fairly rapidly and steadily across EU countries, by about 2½ years per decade on average. However, since 2011, the gains in life expectancy have slowed down markedly, particularly in some Western European countries. Life expectancy actually decreased in 8 EU countries in 2012 and in 19 countries in 2015, including in France, Germany, Italy and the United Kingdom (OECD/EU, 2018).

Healthy life expectancy is an important indicator of population health. A greater number of healthy life years generally means a healthier workforce, fewer early retirements due to health problems, and reduced long-term care needs (OECD/EU, 2018).

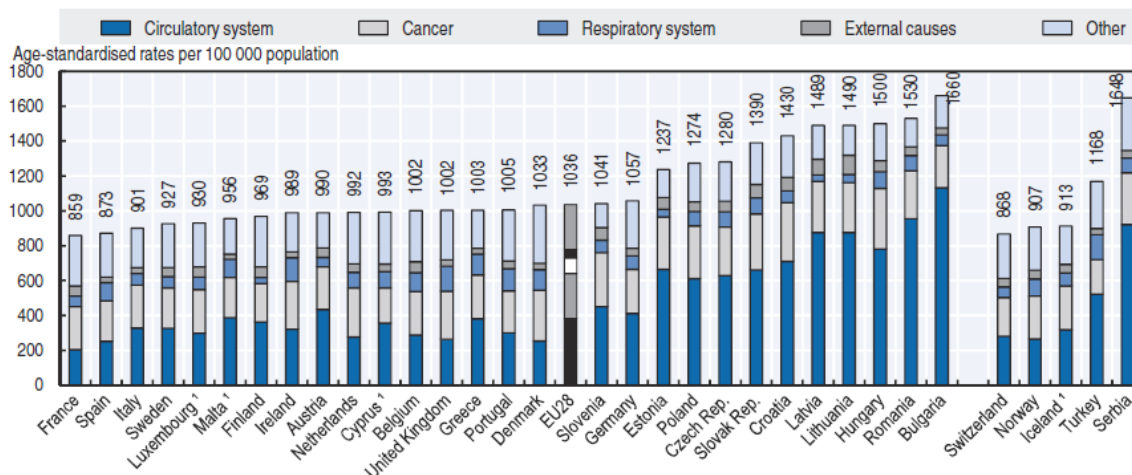
Figure 40: Life expectancy and healthy life years at birth, by gender, 2016 (or nearest year)



In average terms, across EU countries, people can expect to live about 80% of their lives free of disability. In 2016, Italy, Germany, Czech Republic, Poland and Hungary were the CE countries with the healthy life expectancy around EU average among both women and men (except for Germany performing a little better among men) (Figure 39). Slovenia, Austria Croatia and the Slovak Republic have more substantial share of life lived with some disability (OECD/EU, 2018).

The main causes of death in EU countries are circulatory diseases and various types of cancer, followed by respiratory diseases and external causes of death. Overall mortality rates vary widely across countries. Italy has the lowest death rate among CE countries, with age-standardised rate 900 deaths per 100 000 population in 2015 due to relatively low mortality rates from circulatory diseases, followed by Austria, Slovenia, Poland, Czech Republic, Slovakia, Croatia (Figure 41). Mortality rate is the highest in Hungary, with age-standardised rates at least 50% higher than the EU average in 2015. In Hungary, higher mortality rates from cancer explain a large part of the difference with the EU average (OECD/EU, 2018).

Figure 41: Main causes of mortality by country, 2015 (OECD/EU, 2018)



4.6.2 Environmental health

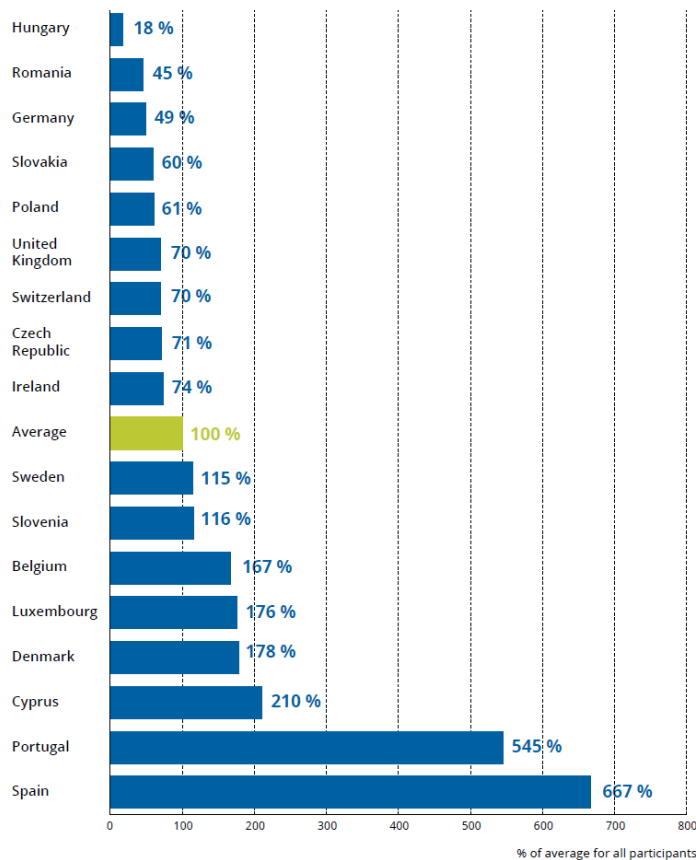
Hazards in the environment are a major determinant of health. Air pollution as the single largest environmental health risk is presented in chapter 1.1.1. Noise as the second most important environmental health issue is presented in the chapter 1.6.2. Two other important environmental issues affecting health in Europe and worldwide are related to chemical pollution and climate change and are presented below.

Chemical pollution impacts on human health

Hazardous chemicals, whether naturally occurring or man-made, can reach the human body through different routes (such as food, air and water) and cause a variety of health effects, including respiratory and cardiovascular diseases, allergies and cancer. (WHO, 2020). Health effects of some of the most dangerous chemicals and groups of chemicals are explained below.

Mercury is well known neurotoxicant with severe effects on the developing brain. According to the latest survey, within the European Union more than 200 000 children born every year are exposed to methylmercury above the safety limit of 2.5 µg/g (in hair) recommended by WHO. In Europe mercury pollution exacts a toll of €5.1 billion/year (WHO, 2020). Mercury’s properties mean that once it is released into the environment it can remain in circulation for thousands of years. Furthermore, once in the air it can travel long distances, meaning that emissions have a global impact (around 50 % of the anthropogenic mercury deposited annually in Europe originates from outside Europe). The mercury levels of children and their mothers in 17 European countries were assessed by analysing hair samples. The results indicate that women in countries with higher average fish intake have higher levels in their bodies. Among CE countries included in the study Hungary, Germany, Slovakia, Poland, Czech Republic ranked below the average and Slovenia above the average (Figure 42) (EEA, 2018b).

Figure 42: Mercury levels in hair of mothers as a percentage of the Europe-wide average (EEA, 2018b)



Endocrine-disrupting chemicals realize their effects, either alone or in mixtures, during fetal and postnatal life and have a strong and often irreversible effect on developing organs. In the WHO European Region a recent analysis estimated the costs of the burden of disease attributable to endocrine-disrupting chemicals at €163 billion per year (WHO, 2020).

Comprising more than 4 700 chemicals, per and polyfluorinated alkyl substances (PFAS) are a group of widely used, man-made chemicals that accumulate over time in humans and in the environment. Of the relatively few well-studied PFAS, most are considered moderately to highly toxic, particularly for children’s development. Human biomonitoring has detected a range of PFAS in the blood of European citizens. Though the levels for the most prevalent, studied and regulated PFAS, PFOA and PFOS are decreasing, levels of more ‘novel’ PFAS are increasing. In some areas, concentrations of PFOA and PFOS in the most exposed citizens were above proposed benchmark levels for adverse effects in humans. Considerable proportion of the European population is expected to exceed the ‘tolerable weekly intake’ - TWI due to intake of PFAS from food and drinking water. Costs to society arising from PFAS exposure are high, with the annual health-related costs estimated to be EUR 52-84 billion across Europe in a recent study. The study notes that these costs are likely underestimated, as only a limited range of health effects (high cholesterol, decreased immune system and cancer) linked to exposure to a few specific PFAS were included in the estimates (EEA, 2019d).

The impact of accumulated chemicals, and continued emissions of hazardous and persistent chemicals, suggests that human exposure to complex mixtures of chemicals will continue to increase. Increased imports of articles and recycling of materials may increase exposure to chemicals of concern. Current policies lag behind in assessing and regulating the risks of exposure to the large majority of chemicals in use. It is therefore unlikely that the negative effects of chemicals on human health will decrease (EEA, 2019b).

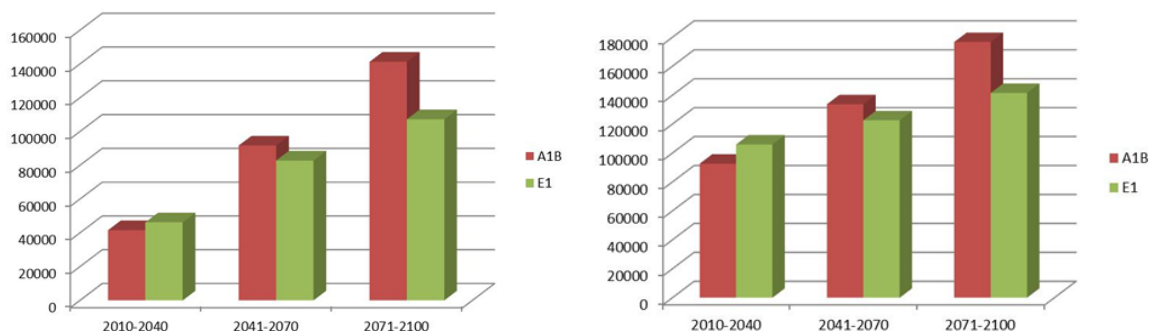
Climate change and health

The adverse effects of climate change on health are also growing. The effects of climate change on health include direct impacts, such as temperature-related illness and death, and the impacts of extreme weather events. They also include more indirect impacts as those that cause water- and food-borne diseases; vector-borne diseases; or food and water shortages.

According to EEA (EEA, 2012) 150 000 deaths worldwide were caused by climate change in 2000. Different types of extreme weather events affect different regions. Heatwaves are mostly a problem in southern Europe and the Mediterranean, but they are also a problem in other regions. According to estimates, the heatwave of 2003 caused 70 000 excess deaths in 12 European countries, mostly among older people. Other extreme weather events — such as high precipitation events that might cause floods — also affect public health. Higher temperatures facilitate forest fires. Around 70 000 forest fires occur every year on the European continent.

The model estimated that climate change-attributable deaths will increase significantly over the next 90 years (Figure 43). At European level, on average, the climate change-attributable deaths are expected to increase from 41.556 additional annual deaths in the period between 2010 and 2040 to more than 140.000 in the latest 30 years of the century (JRC, 2014).

Figure 43: EU total climate change-attributable mortality (all causes, per year) (left) and change-attributable hospital admissions (all causes, per year) (right)¹²(JRC, 2014)



4.6.3 Noise

According to the findings of the World Health Organisation (WHO), noise is the second largest environmental cause of health problems, just after the impact of air quality (particulate matter) (EC, 2020). Road traffic is the most widespread source of environmental noise, with more than 70 million people affected by harmful levels in the EU member countries. Noise from railways, air traffic and industry are also important sources of noise (EEA, 2019c).

¹² Long term climatic forecasts (up to 2100) from four different climate models referred to two alternative scenarios (A1B, with high emissions and E1, with low emissions) are used as input in the health model.

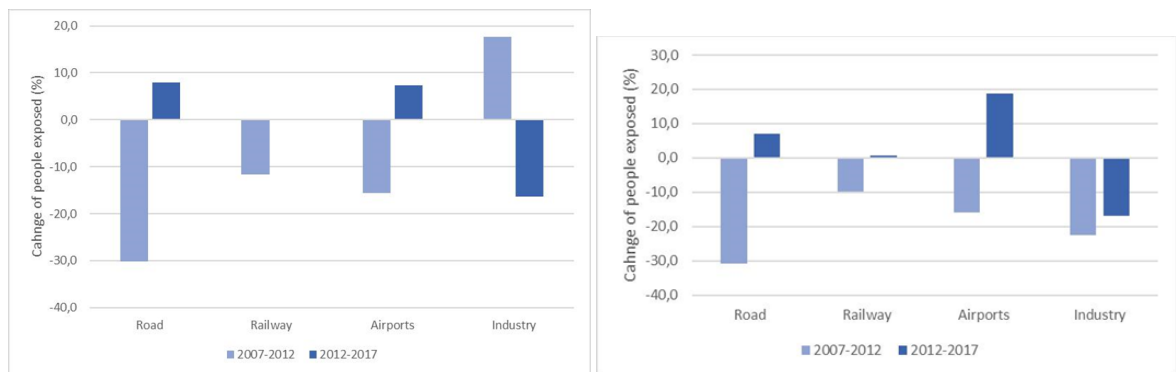
Figure 44: Number of people exposed to average day-evening-night noise levels (L_{den}) ≥ 55 dB and night-time noise (L_{night}) ≥ 50 dB in EU-28 inside agglomerations (left) and outside agglomerations (right) in 2017 (EEA, 2019c)



In the period 2007-2012, people exposed to L_{den} noise decreased in all sources (Figure 45), except industry. The larger decrease, in relative terms, occurs on people exposed to road, followed by aircraft and railway sources. In the period 2012-2017, the number of people exposed to $L_{den} \geq 55$ dB decreased only for industrial noise source. For the rest of sources there were no changes (railway) or an increase of 8 % (road and aircraft noise sources)¹³.

In the period 2007-2012, people exposed to L_{night} noise increased in all sources, except industry (Figure 45). The larger increase, in relative terms, occurs on people exposed to aircraft noise, followed by road and railway.

Figure 45: Percentage of change of people exposed to different noise sources inside agglomerations, L_{den} (left) and L_{night} (right) (2007-2012, 2012-2017) (ETC/ATNI, 2019)



Road traffic is the most widespread noise source in Europe and is the source that causes the largest number of people to be exposed to noise levels above END threshold levels for L_{den} and L_{night} . This is true at the European scale, at country scale and both inside and outside urban areas. A wide variation can be identified between countries in the number of people exposed to road traffic noise in urban areas. This is significantly influenced by factors such as the number of urban areas per country, the total number of inhabitants per urban area, and differences in the methods countries have used to estimate noise exposure (EEA, 2019d).

¹³ The trends shown in this report may not be strictly related to a real increase/ decrease in population exposed to noise: the use of different modelling methodologies across years by countries can lead to changes that are not related to changes in the number of people exposed to noise.


Comparison of Central European countries and EEA-33 shows that the greatest percentage of population exposed to excessive noise from roads inside urban areas is in Austria, Czechia and Hungary (above the EEA-33 average) (Figure 46). Exposure to excessive noise from roads outside urban area is the highest in Italy and Austria, while the other CE countries perform around EEA-33 average.

Figure 46: Percentage of countries' total population exposed to $L_{den} \geq 55$ dB in areas covered under the END 2017 (EEA, 2020b)

	Inside urban areas				Outside urban areas		
	Road	Rail	Air	Industry	Road	Rail	Air
Austria	24,2	6,6	0,1	0,1	8,2	5,7	0,1
Croatia	7,7	0,6	0,0	0,0	2,8	0,0	
Czechia	16,7	0,7	0,1	0,0	6,9	1,8	0,1
Germany	6,9*	3,7	0,7	0,1*	3,3	4	0,4
Hungary	16,4	1,3	0,0	0,0	1,8	0,9	0,3
Italy	13,7*	0,9*	0,7*	0,1*	12,0*	3,3	0,3*
Poland	11,6	0,6*	0,1	0,1*	5,7	0,5	0,0
Slovakia	6,7*	2,4*	0,0*	0,0*	2,9*	2,0*	
Slovenia	9,8	1,2		0,0	5,5	1,1	
EEA-33	15,5*	2,0*	0,6*	0,2*	5,9*	2,1*	0,2*

* Data totally or partially estimated; ** Could not be estimated

Percentage of the population exposed to $L_{den} \geq 55$ dB



Notes: EEA-33 average excludes Turkey.

Although the levels of noise generated by transport sources are generally too low to cause biological damage to the ear, it is well established that, if exposure is long term and exceeds certain levels, noise can lead to non-auditory health effects such as annoyance, sleep disturbance, negative effects on the cardiovascular and metabolic system as well as cognitive impairment in children (EEA, 2020b)).

The impacts of noise pollution in Europe are highly significant. It is estimated that around 22 million adults living in agglomerations or near major noise sources with levels starting at 55 dB L_{den} are highly annoyed by noise from road traffic, railways, aircraft and industry (Figure 47). Moreover, it is estimated that 6.5 million adults suffer severe sleep disturbance because of night-time noise levels equal to or above 50 dB L_{night} . The exposure to environmental noise from road traffic, railways, aircraft and industry is estimated to contribute every year to about 48 000 new cases of ischaemic heart disease and 12 000 premature deaths. Aircraft noise has also been associated with a decrease in children's cognitive performance in schools that are affected by flight paths. As a result, it is estimated that around 12 500 children in Europe between the ages of 7 and 17 years have a reading impairment due to exposure to aircraft noise (EEA, 2020b)

Figure 47: Estimated number of people suffering from various health outcomes due to environmental noise in 2017, EEA-33 (Turkey not included) (EEA, 2020b)

		High annoyance	High sleep disturbance	Ischaemic heart disease	Premature mortality (a)	Cognitive impairment in children
Inside urban areas	Road	12 525 000	3 242 400	29 500	7 600	
	Rail	1 694 700	795 500	3 100	800	
	Air	848 300	168 500	700	200	9 500
	Industry	87 200	23 400	200	50	
Outside urban areas	Road	4 625 500	1 201 000	10 900	2 500	
	Rail	1 802 400	962 900	3 400	900	
	Air	285 400	82 900	200	50	2 900
Total (b)		21 868 500	6 476 600	48 000	12 100	12 400

Even if the objectives outlined in the 2011 *White Paper, Roadmap to a single European transport area: towards a competitive and resource efficient transport system*, of halving conventionally fuelled cars in urban areas by 2030 are achieved, the number of people exposed to road noise, the most prevalent source, is set to increase. Likewise, it is likely that noise outside urban areas will increase by 2030, in particular for road and rail traffic, due to an increase in the number of passenger and freight road and rail vehicles. Aviation noise will be stabilised only if the anticipated technology improvements stated in the European aviation environmental report (EASA et al., 2016) are met by 2030 (EEA, 2019b).

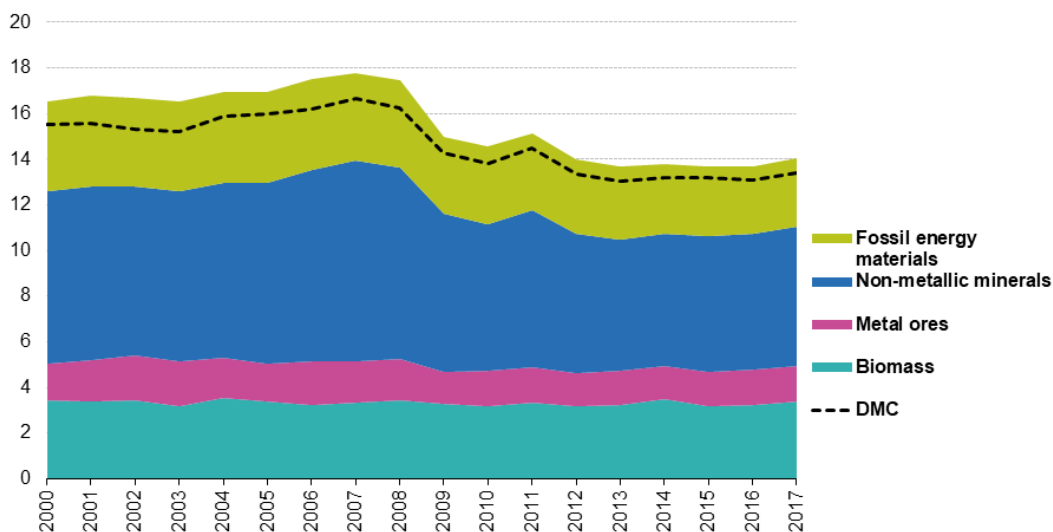
4.7 MATERIAL ASSETS

Increasing resource efficiency, preventing waste generation and using waste as a resource are at the core of the circular economy, and have considerable potential to reduce environmental pressures both within Europe and outside Europe's borders. These strategies may also contribute to alleviating the growing concern over Europe's dependency on imported resources and over securing access to critical raw materials, some of which play a fundamental role in deploying low-carbon, renewable energy technologies (EEA, 2019).

4.7.1 Material resource efficiency

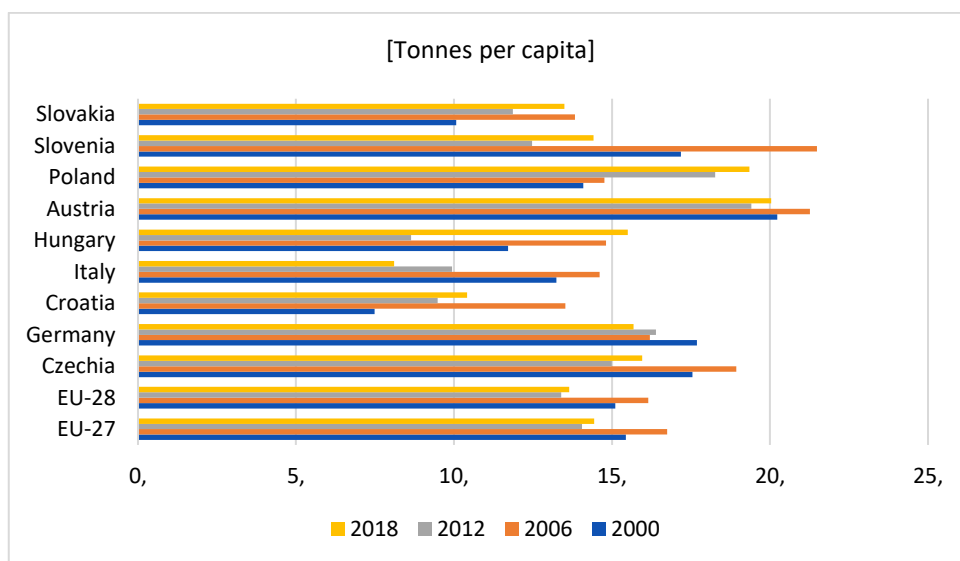
Europe continues to use a large amount of material resources. EU-28 domestic material consumption that measures the total amount of materials directly used by an economy (see dotted line in the graph below, Figure 48) has decreased by 9 % (from 15.5 tonnes/capita in 2000 to 13.64 t/capita) between 2000 and 2018. However, much of this decline was caused by the financial crisis of 2008 and the resulting drop in construction activities, accompanied by a shift in the economy towards a higher share of services (Eurostat, 2020). The domestic consumption is mainly driven by extraction of non-metallic minerals. An increasing share of the resource input to the EU-28 economy comes from abroad (23 % in 2017). Reliance on imports is particularly high for metals and fossil fuels (EEA, 2019).

Figure 48: Raw material consumption by main material categories in EU-28 (tonnes per capita, Eurostat, 2019)



There are large differences between individual CE countries in domestic material consumption. Italy and Croatia have lower consumption rates than EU average values, other countries exceed the EU averages (with Austria and Poland having consumed nearly 50% more material per capita than EU average in 2018).

Figure 49: Domestic material consumption in Central European countries (Eurostat, 2020)



4.7.2 Waste management

EU Context

Waste management in the EU-28 is improving but rather slowly. In 2016, 53.7 % of total waste, excluding major mineral wastes, was recycled, 23.5 % disposed in landfill and 20.5 % incinerated; backfilling and other disposal accounted for the remainder. Nearly all countries have increased their shares of municipal waste recycled since 2004, but differences among countries are still high (EEA, 2019).

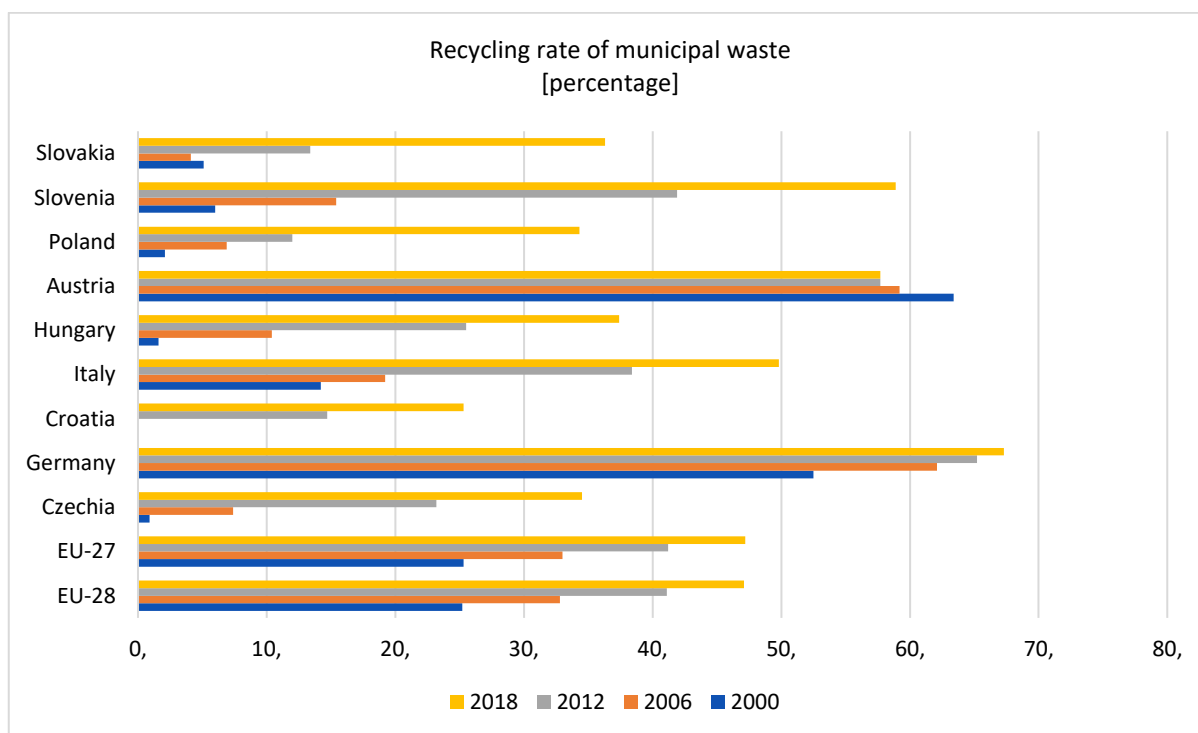
Across European countries, key measures that aim to increase recycling have included bans or restrictions on landfilling, mandatory separate collection; landfill and incineration taxes, and waste collection fees designed

to incentivise separate collection (such as pay-as-you-throw schemes) (EEA, 2016b). In particular, the targets to reduce landfilling of biodegradable municipal waste have triggered investments in incineration and pre-treatment of mixed waste such as mechanical-biological treatment. While these technologies have lower environmental pressures than landfill, high treatment capacities might discourage separate collection and waste prevention and can create lock-ins to less favourable waste management options

Trends in Central Europe

On average, Central Europe is moving closer to the EU’s target to reuse or recycle 50 % and 55 % of municipal waste by 2020 and 2025. Germany, Austria and Slovenia have already exceeded such targets in 2018 and Italy nearly reached it (Figure 50). However, several CE countries – Hungary, Poland, Slovakia, Czechia and most notably Croatia - are still lagging behind EU average. The situation appears to be particularly complicated in Croatia in this regard and the country may difficulties reaching these targets.

Figure 50 Recycling rate of municipal waste in Central European countries (Eurostat, 2020)



Future trends

Policies adopted before 2018 are expected to deliver an increase of only 6 percentage points in municipal waste recycling. Full implementation of the targets under the new EU waste legislation adopted in 2018 is expected to result in a 26% increase by 2035. Key influencing factors include prices for virgin materials and energy (competing with recycled materials and energy from waste), developments in sorting and recycling technologies and the composition and recyclability of new products and novel materials (EEA, 2019).

4.8 CULTURAL HERITAGE

4.8.1 Cultural heritage protection and preservation

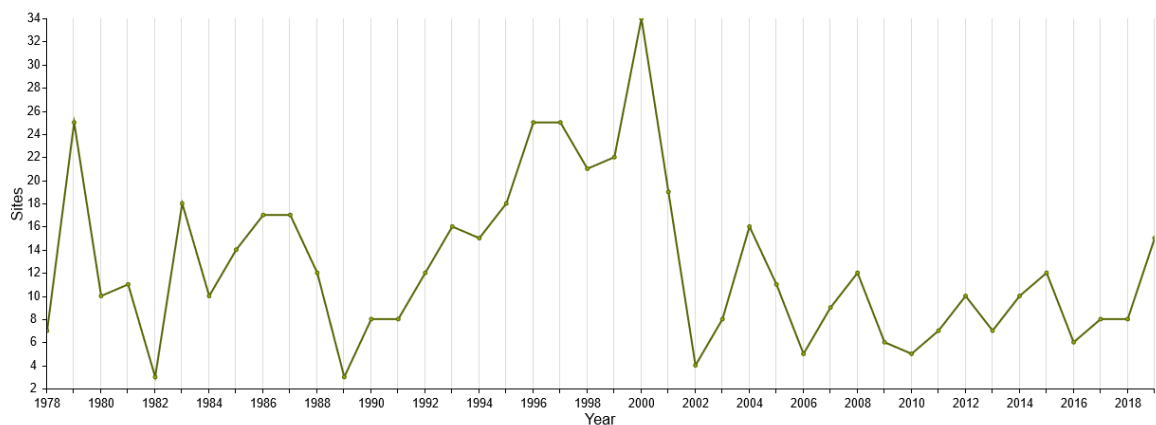
The cultural heritage is primarily protected on a local (municipal) and national level. EU as such does not have specific protection regimes or registers of cultural heritage, thus international level of cultural heritage protection is secured by UNESCO World Cultural and Natural Convention. The list allows monitoring of the cultural heritage status, increase and decrease of the inscribed properties and overview of the trends and number of properties inscribed on List of World Heritage in Danger.

In Europe and North America region 592 properties are inscribed, which represent 47% of all the inscribed properties in the world. Inscribed properties located in CE countries in 2020 represent almost 22% of all inscribed properties of the Europe and North America region – making CE countries one of the richest cultural heritage areas in the world. (UNESCO, 2020)

Figure 51: Number of inscribed features within programme area of CE 2020 compared to regional data (UNESCO, 2020; UNESCOa, 2020; UNESCOb, 2020)

	Cultural sites	Natural sites	Mixed sites	Total sites
Region of the Europe and North America	453	65	11	529
Programme area of CE 2020	105	11	0	116
Share of inscribed properties within programme area of CE 2020	23,2%	16,9%	0%	21,9%

Figure 52: Number of World Heritage properties inscribed each year in Europe and North America region (UNESCO, 2020)

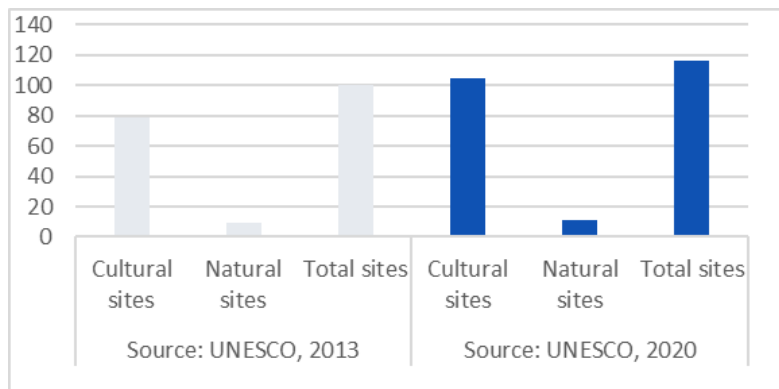


116 cultural and natural sites, including cross-border properties exist within the CE 2020 programme area. The majority of them (105) are defined as a cultural site, while only 11 are protected as natural properties. Since 2013, 16 new properties were inscribed within the CE 2020 programme area out of which only two are natural sites. The highest number of inscribed properties in the period 2013 – 2020 can be seen in Germany (4), followed by Poland (3) and Croatia (3).

Figure 53: Number of UNESCO World Heritage Sites within the programme area of CE 2020, compared with 2013 data (UNESCO 2020a; UNESCO, 2020b)

OP CE 2020 Member State	Source: UNESCO, 2013			Source: UNESCO, 2020		
	Cultural sites	Natural sites	Total sites	Cultural sites	Natural sites	Total sites
Czech Republic	12	-	12	14	0	14
Participating regions from Germany	19	1	20	24	0	24
Participating regions from Italy	19	2	21	21	2	23
Hungary	7	1	8	7	1	8
Austria	9	-	9	9	1	10
Poland	12	1	13	15	1	16
Slovenia	2	1	3	2	2	4
Slovak Republic	5	2	7	5	2	7
Croatia	6	1	7	8	2	10
Total	79	9	100	105	11	116

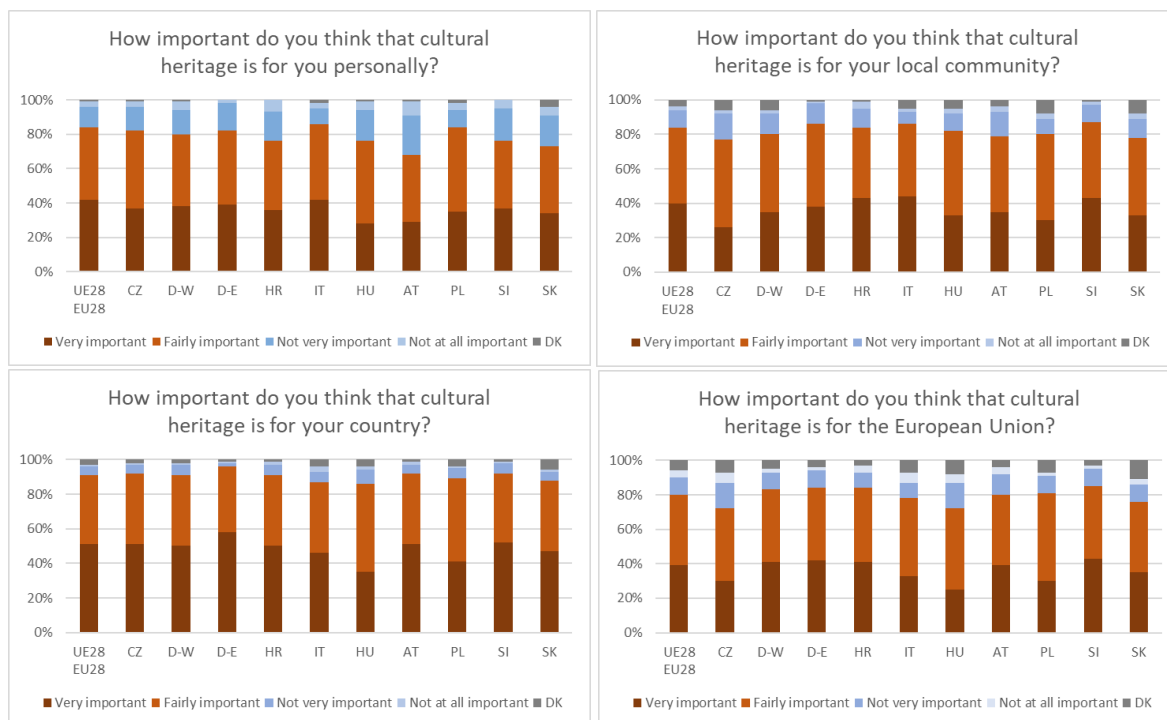
Figure 54: Comparison of the number of sites within the Interreg CE in year 2014 and 2020 (UNESCO 2020)



In 2017 the cultural site Historic Centre of Vienna was inscribed on the List of World Heritage in Danger due to high-rise projects in the middle of the Austrian capital. It is the only site within the programme area of Central Europe, inscribed on the list. (UNESCOc, 2020)

There are two main aspects very important for protection and preservation of the cultural heritage. On one hand, we have policies and protection regimes, but on the other hand, it is the identity and perception of cultural heritage by citizens that also plays an important role in the management of the cultural heritage. Data on people's personal involvement with cultural heritage and the perceived importance and values they attach to Europe's cultural heritage provides a Eurobarometer survey that was conducted in 2017. In the figures below, opinion on importance of cultural heritage in the countries within Interreg CE is presented.

Figure 55: Perceived importance and values attached to Europe's cultural heritage (EU Open Data Portal, 2019)



The highest importance of cultural heritage was attributed to the national level, followed by community and personal level. The share of respondents claiming that cultural heritage is very important for them personally and for the local community is the highest in Italy, followed by Germany and Slovenia. The highest share claiming it is not important at all is in Croatia and Austria. On the other hand, the highest share of respondents attributed high importance of cultural heritage on the national level in Germany, Slovenia, Czech Republic and Austria. The highest share of respondents claiming it is not important at all, appears in Italy.

Regardless of the level, cultural heritage seems to be an important part of Central European identity, which is why its preservation and proper management are important. It is hard to predict the trends in cultural heritage protection. The facts are showing that new properties are inscribed on UNESCO list on yearly basis. There are still areas that are on tentative lists and will probably be inscribed in the future. On the other hand, data on actual state of cultural heritage sites is very limited.

4.9 LANDSCAPE

4.9.1 Landscape protection

There is no list provided for the landscapes on the European level that could offer an overview on the state of landscapes, their protection, preservation and sustainable management and planning as prescribed in the European Landscape Convention. However, in some countries, landscapes are protected within the cultural heritage (cultural landscapes) or are under protection of natural parks that enable their protection and management, usually indirectly. Those landscapes that are not protected by any of the protection regimes are especially under increasing pressures of different interests, frequently neglecting the negative impacts they might have on the landscape.

Data provided by European Environmental Agency that enables monitoring of the state of landscape is the landscape fragmentation. The Effective Mesh Density (seff) is a measure of the degree to which movement between different parts of the landscape is interrupted by a Fragmentation Geometry (FG). FGs are defined as the presence of impervious surfaces and traffic infrastructure, focusing only on major roads. The more FGs fragment the landscape, the higher the effective mesh density hence the higher the fragmentation (EEA, 2020).

There was less of an increase in fragmented landscape elements and in the area of strongly fragmented landscape between 2012 and 2015 than between 2009 and 2012 (1.4 and 0.18 percentage points, respectively). Arable lands and permanent croplands (around 42.6 %) and pastures and farmland mosaics (around 40.2 %) were most affected by strong fragmentation pressure in 2015 in the EU. Between 2009 and 2015, however, the largest increase in the area of strongly fragmented landscape was in grasslands/pastures and in farmland mosaics (EEAb, 2019).

Figure 56: Increase in landscape fragmentation in Europe between 2009 and 2015 (EEA, 2019)

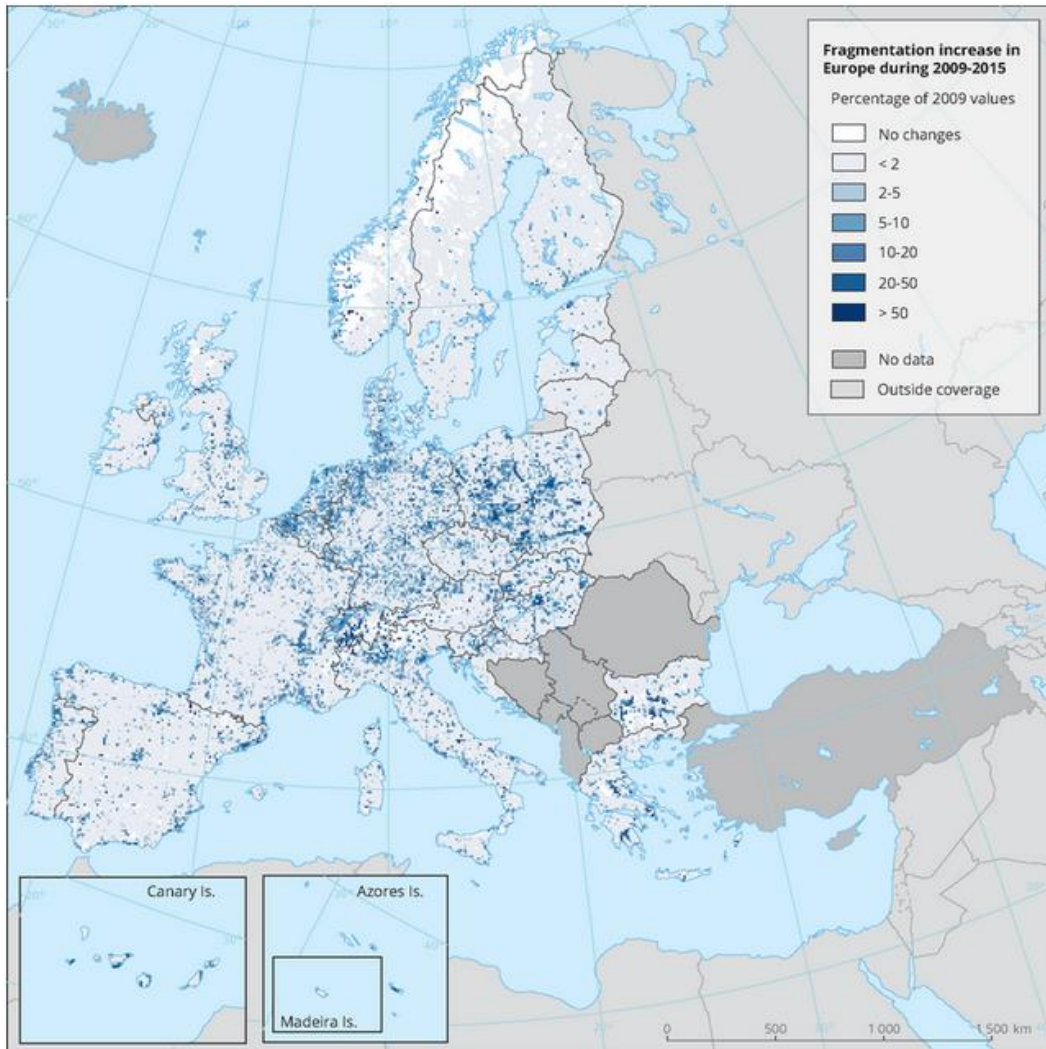
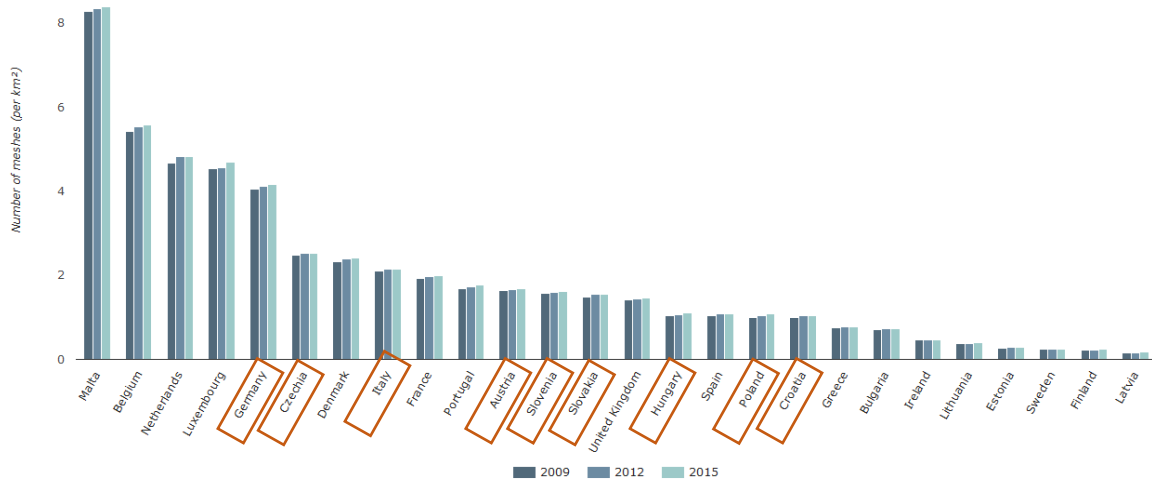


Figure 57: Average number of meshes per km² - Landscape fragmentation status and trends, 2009 - 2015: country comparison (source: EEA, 2020)



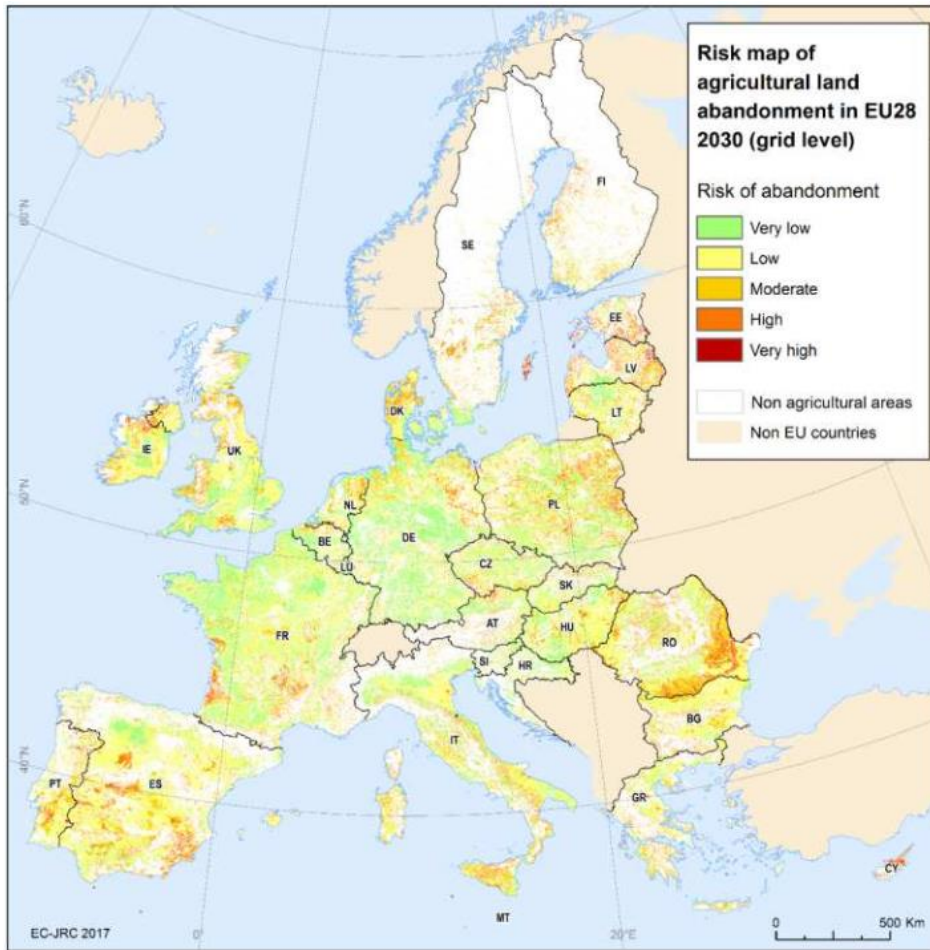
The highest number of meshes per km² within the Central Europe programme area is recorded in Germany and Czechia, while the lowest is recorded in Poland and Croatia. Considering only the area of strongly fragmented landscape during the period 2009-2012, Croatia increased the area of very strongly fragmented landscape the most. The area of very strongly fragmented landscape increased by almost 70%, from 6.627 km² to 11.192 km² in absolute terms. In Hungary the areas of strongly fragmented landscape also increased more than in other countries, especially during 2009-2012. This amounted to an 8 % increase in the size of the strongly fragmented area in Hungary compared with 2009 values. (EEA, 2019) These trends can be explained by the fact that all three stated countries undertook important traffic infrastructure investments in the stated period.

The expansion of urban areas and transport networks transforms large habitat patches into smaller, more isolated fragments, leading to habitat fragmentation. However, fragmentation also impacts human communities, agriculture, recreation and overall quality of life, as well as decreases landscape quality and changes the visual perception of landscapes. (EEA, 2020)

Although the EU biodiversity strategy 2020 has a target to ‘restore at least 15% of degraded ecosystems in the Union and to expand the use of Green Infrastructure’, there are only a few signs that pressure of land fragmentation has reached its peak. On the contrary, landscape fragmentation continues to increase, especially in rural and less populated areas. Although, the increase is lower in and around Natura 2000 sites than in unprotected areas. Despite the fact that biodiversity remains at the core of green infrastructure, it provides many other benefits such as increased resilience to climate change, improved human health and well-being, flood regulation, as well as improved landscape quality. (EEA, 2019)

On the other hand, the LUISA Territorial Modelling Platform simulates that in the period 2015-2030 about 11% of agricultural land in the EU are under high potential risk of abandonment due to factors, related to biophysical land suitability, farm structure and agricultural viability, population and regional statistics (see figure below). By far the greatest agricultural land abandonment within the CE 2020 programme area is projected in Poland, in the Chelmsko-zamojski region. (JRC, 2018) That would have a major impact on the landscape too as the traditional land use would be abandoned.

Figure 58: Estimated potential risk of agricultural land abandonment in 2030 in the EU (source: JRC, 2018)



The past trends are showing that the landscape fragmentation has increased, impacting mostly inhabited or dispersed rural areas and suburbs – areas with relatively greater potential to supply ecosystem services.

Land take and resulting landscape fragmentation are projected to increase in forthcoming decades too. Moreover, logging and consumption of wood for fuel will increase, which, together with climate change impacts, is expected to reduce forest ecosystem services and also have importance impact on the landscapes.

Expansion of urban and transport infrastructure has important negative impacts on the state of landscape. The fact that increase in landscape fragmentation is lower within and in the areas surrounding Natura 2000 sites shows that protection policies seem to be effective in partially reaching the target set by the EU biodiversity strategy to 2020 to restore 15% of degraded ecosystem. (EEA, 2019)

5 POTENTIALLY SIGNIFICANT IMPACTS OF PROPOSED INTERREG CENTRAL EUROPE 2021-2027 ON ENVIRONMENT AND ENVIRONMENTAL POLICY OBJECTIVES

This chapter offers an analysis of the way the relevant environmental considerations have been taken into account during preparation of the Interreg CE 2021-2027 Programme (Annex 1, item e); and the assessment of the likely significant positive or negative effects of this programming document on the environment (Annex 1, item f).

5.1 LINKAGES BETWEEN INTERREG CENTRAL EUROPE 2021-2027 PROPOSAL AND THE EU ENVIRONMENTAL OBJECTIVES

The IP has multiple linkages with the relevant EU environmental policy objectives. Figure 59 presents key areas where the IP may have positive or adverse impacts of key EU environmental including health policy objectives and concerns. The specific impacts presented in the following section.

Figure 59 Linkages between the Interreg CE 2021-2027 Programme and EU environmental policy objectives

SEA topics	Environmental (including health) policy objectives & concerns	Interreg Central Europe Programme 2021-2027 - version 1									
		Priority	1		2		3		4		
		SO	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1
Air	Air quality impacts on human health and well-being										
	Air quality impacts on ecosystems										
Climate	Mitigation (GHG emission reductions, renewable energy, energy efficiency)										
	Adaptation (adaptive capacity and adaptation measures)										
Water	Water ecosystems and wetlands										
	Hydro-morphological pressures										
	Pollution pressures on water and links to human health										
	Water abstraction and its pressures on surface- and groundwater										
Soil	Ensuring sustainable use of land and soil										
	Preventing loss of soil and soil pollution										
Biodiversity and Natura 2000	Protection and preservation of biodiversity and natural ecosystems										
	Promotion of green infrastructure and ecosystem-based management										
	Enabling the necessary transformative change										
	Protection and preservation of Natura 2000 species and habitats										
Population and human health	Public health and environmental health										
	Noise										

Material assets	Resource use and efficiency	Grey	Black	Grey	White	Black	White	Grey	Black	Grey
	Waste generation and management	White	White	White	White	Grey	White	White	Grey	White
	Buildings	White	White	White	White	Grey	White	White	Grey	White
Cultural heritage	Protection, preservation and management of cultural heritage	Grey	White	Grey	White	White	Grey	Grey	Grey	Grey
	Promotion of participatory management of cultural heritage	White	White	White	White	White	White	White	White	Grey
Landscape	Protection and preservation of landscapes	White	White	Grey	Grey	White	Black	Black	Black	White
Resilience	Resilience to economic, social, and environmental shocks	White	Grey	Grey	Black	Grey	Black	Grey	White	Grey
	Resilient agricultural and food production systems	White	White	White	Grey	White	White	White	White	White
	Resilient health systems	Grey	White	White	White	White	White	White	White	Grey
	Resilient infrastructure	White	White	Grey	Grey	White	White	White	White	White
	Resilience of urban systems	White	White	Grey	Grey	White	Grey	Grey	White	Black

Key:

The strength of potential relationships (positive or adverse) determined on the basis of their significance and the territorial magnitude:

- Strong relationship
- Significant relationship
- Weak relationship

5.2 POTENTIALLY SIGNIFICANT IMPACTS OF INTERREG CENTRAL EUROPE 2021-2027 PROPOSAL ON ENVIRONMENT AND HUMAN HEALTH

5.2.1 Air

The assessment considered the following environmental issues established through the review of the relevant environmental policy objectives in chapter 3:

- Air quality impacts on human health and well-being
- Air quality impacts on ecosystems

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	/	/	/	The SO 1.1 includes thematic fields related to green economy and bio-economy that are not expected to have any significant positive or adverse impacts on air quality. We only recommend to add an indicative example of action on innovations that facilitate the decentralisation and optimisation of production systems since they can reduce air emissions associated with freight transport (and increase resilience of the product supply).
SO 1.2: Developing skills for smart specialisation, industrial transition and	/	/	/	The SO 1.2 again includes thematic fields related to green economy and bio-economy that are not expected to have any significant positive or adverse impacts on air quality. The SEA team does not propose any mitigation or enhancement measures in this SO.

entrepreneurship in central Europe				
SO 2.1: Supporting the energy transition to a climate neutral central Europe	+2	/	T+	The SO 2.1 includes various interventions related to energy efficiency of buildings, energy demand management, and reductions of greenhouse gas emissions from industrial processes that are all expected to have significant co-benefits for air quality objectives. Since no proposal contained in this SO is expected to have adverse impacts on climate-related concerns, the SEA team does not propose any mitigation or enhancement measures in this SO. Air quality improvements may also have transboundary dimension.
SO 2.2: Increasing the resilience to climate change in central Europe	+1	/	/	The SO 2.2 includes interventions that could have moderate benefits for air quality improvements – e.g. expansion of green areas may reduce PM concentrations; reduction of the urban heat island effect may reduce the formation of ground ozone, etc. We do not foresee any significant adverse impacts and do not propose any mitigation or enhancement measures in this SO.
SO 2.3: Taking circular economy forward in central Europe	+1	/	/	The SO 2.3 does not include any interventions that would have significant positive or adverse impacts on air quality. We do not suggest any changes here.
SO 2.4: Safeguarding the environment in central Europe	+2	/	/	The SO 2.4 includes thematic fields and indicative example of action related to environmental pollution (air, water, soil, noise, light etc.) that may have significant positive impacts on air quality protection objectives. No proposal contained in this SO is expected to have adverse impacts on air quality concerns and we not propose any mitigation or enhancement measures in this SO.
SO 3.1: Improving transport connections of rural and peripheral regions in central Europe	+1	-1	T	The SO 3.1 includes thematic fields and indicative example of actions that aim to improve the mobility in and accessibility of rural and peripheral regions, especially in view of their linkages to main EU transport corridors and nodes. All such interventions represent both opportunities as well as risks for air quality protection. While the proposed actions aim to support sustainable solutions that, as a side effect help to reduce transport-related air pollution, the actual reductions of the air emissions cannot be take for granted – e.g. PM is partly derived from the movement of vehicles regardless of their fuel source. To this end, we recommend to encourage the project applicants to deploy ‘sustainability-by-design’ approach that examines whether and how their proposed actions reduce the need for transport; reduce or optimize the transport flows; and support switching to least emission-intensive fuels (considering also emissions generated by the electricity production). At the same time, it will be important to ensure that proposals for new infrastructure development include assessment of potential transboundary impacts if and when required under the EIA Directive and Espoo Convention.
SO 3.2: Greening urban mobility in central Europe	+2	/	/	The SO 3.2 includes thematic fields and indicative example of actions related to sustainable urban mobility that are expected to have significant positive impacts on air quality objectives. No proposal contained in this SO is expected to have adverse impacts on climate-related concerns. The SEA proposes several minor editorial changes to sharpen the wording of the proposed thematic fields without changing their content.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses multi-sectoral governance processes on different territorial levels that may generate moderate benefits for environmental protection systems. The arrangements proposed do not pose any significant risks on climate change concerns.

5.2.2 Climatic factors

The assessment focused on the following environmental issues correlating within relevant environmental policy objectives presented in chapter 3:

- Mitigation (GHG emission reductions, renewable energy, energy efficiency)
- Adaptation (adaptive capacity and adaptation measures)

Interreg CE 2021-2027 proposals	Potential benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	+1	/	/	The SO 1.1 includes thematic fields related to green economy and bio-economy, and several indicative example of actions that may have moderate positive impacts on climate change mitigation objectives through reduction of the need for the production of energy-demanding resource inputs. We do not expect any adverse impacts on climate-related concerns and do not suggest any further mitigation or enhancement measures.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	+1	/	/	Ditto.
SO 2.1: Supporting the energy transition to a climate neutral central Europe	+2	/	T+	The SO 2.1 has significant direct positive impacts on climate change mitigation aspirations. We only propose to consider adding potential actions on carbon capture, utilisation and storage and initiatives embedding climate change (with other relevant environmental factors) into core corporate decision-making. We also recommend to seek synergies between the supported projects and the InvestEU and the Strategic Investment Facility, where relevant.
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	T+	The SO 2.2 has significant direct positive impacts on climate change mitigation objectives and does not contain any proposal that may have potentially significant adverse impacts on climate-related concerns. The SEA team does not propose any mitigation or enhancement measures in this SO.
SO 2.3: Taking circular economy forward in central Europe	+1	/	/	The SO 2.3 includes thematic fields related to sustainable product design, clean production processes, closed loop systems and circular economy which representing important stepping stones towards the carbon neutral production. It also includes interventions related to waste prevention and management. All these actions may have moderate positive impacts on climate change mitigation objectives. No proposal contained in this SO is expected to have adverse impacts on climate-related concerns and we do not propose any changes therein.
SO 2.4: Safeguarding the environment in central Europe	+2	/	Y+	The SO 2.4 includes thematic fields related to sustainable land management and suggests several indicative examples of actions having significant positive impacts on climate change mitigation and adaptation objectives, such as: best practices to foster integrated management of natural resources such as air, water and soil; building capacities for an integrated management of water ecosystems (e.g. by harmonising the implementation of water management plans to improve water quality in transnational river basins, or by applying innovative water treatment technologies). No proposal contained in this SO is expected to have adverse impacts on climate-related concerns. The SEA team does not propose any mitigation or enhancement measures in this SO.
SO 3.1: Improving transport connections of rural and	+1	-1	/	The SO 3.1 includes thematic fields and indicative examples of actions that aim to improve the mobility in and accessibility of rural and peripheral regions, especially in view of their linkages to main EU transport corridors and nodes. All such interventions represent both opportunities as well as risks for climate

peripheral regions in central Europe				change mitigation agenda. The real impact of the proposed interventions on the GHG emission reductions will be determined by numerous factors, including the changes in the transport flows and the carbon footprint of the fuels used (including in electricity). The potential adverse impacts can be mitigated by systemic efforts to reduce the need for transport; reduce or optimize the transport flows; and switching to least emission-intensive transport systems.
SO 3.2: Greening urban mobility in central Europe	+2	/	/	The SO 3.2 includes thematic fields and indicative examples of actions related to sustainable urban mobility that are expected to have significant positive impacts on climate change mitigation agenda. No proposal contained in this SO is expected to have adverse impacts on climate-related concerns.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 promotes multi-sectoral governance processes on different territorial levels that may generate moderate benefits for climate change mitigation and adaptation agenda without posing any risks.

5.2.3 Water

The assessment considered the following environmental issues established through the review of the relevant environmental policy objectives in chapter 3:

- Protection of water ecosystems and wetlands;
- Hydro-morphological pressures;
- Pollution pressures on water and links to human health;
- Water abstraction and its pressures on surface- and ground-water.

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	+1	/	/	SO 1.1 addresses the issue of “water” in an indirect manner, with several proposed interventions aiming at introduction of green trends and standards, improved capacities and cross-sectoral collaboration, fostered digital and technological innovations, etc. Subsequently, the IP will have moderate positive impact through support to “greener economy” by reducing water-pollution and water-abstraction pressures. Due to the transnational nature of the programme transboundary effects could occur, but due to rather limited amount of funding, they can not be reasonably expected.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	/	/	/	SO 1.2 also addresses the issue of “water” in an indirect manner, especially with proposed interventions aiming at fostering skills of employees and entrepreneurs to implement “green economy” business concepts. However, this exposed positive impact linked to promotion and introduction of “greener economy” can only be considered as limited one. As such, transboundary effects can not be reasonably expected.
SO 2.1: Supporting the energy transition to a climate neutral central Europe	/	-1	/	SO 2.1 could lead to potentially increased exploitation of waters for production of “green energy” (e.g. surface waters for hydro-energy, ground waters for geothermal-energy, etc.). There is no doubt that “green energy” brings many benefits on other environmental topics. However, from the perspective of “water”, SO 2.1 supported projects could adversely contribute

				<p>to already existing high hydro-morphological pressures on surface waters, especially rivers. Such adverse impacts could be linked either to supported “pilot investments” targeting specific locations or to interventions like development of policy frameworks, new or improved incentive schemes, mobilization of public and private investments.</p> <p>However, due to above explained IP character, we emphasize that only potential minor localized direct impacts of only few selected project “pilot investments” could be reasonably expected during the lifetime of this IP. SO 2.1 linked outputs like policies, strategies and mobilized investments could result in long-term follow-up interventions and subsequently potential adverse impacts, especially through increased hydro-morphological and water use pressures. Due to the transnational nature of the programme minor and long-term transboundary effects could occur, but due to rather limited amount of funding, they can not be reasonably expected.</p> <p>As SO 2.1 could have potentially moderate negative impact on already existing hydro-morphological and water use pressures, the SEA team proposed additional mitigation measures, which would ensure alignment of SO 2.1 with set environmental policy objectives, especially “<i>Water stress in the EU is prevented or significantly reduced</i>” and “<i>Good hydro-morphological status</i>”.</p>
SO 2.2: Increasing the resilience to climate change in central Europe	+2	-1	T+	<p>The environmental issue of “water” is deeply embedded in SO 2.2, which also recognizes the complexity of ecosystems and promotes cross-sectoral and ecosystem-based solutions, as well as innovative and improved water management. It also directly contributes to improved climate change linked risk management (e.g. flooding, droughts, etc.) by promoting ecosystem-based solutions.</p> <p>Nonetheless, due to complexity of expected projects, it is important to point out that some supported projects, either implemented through “pilot investments” or planned through transnational policy/strategy frameworks, could have potentially adverse impacts, especially through increased hydro-morphological pressures – similar to those already explained for SO 2.1.</p> <p>Subsequently, the SEA team proposed additional mitigation measures, which would ensure alignment of SO 2.2 with set environmental policy objectives, especially “<i>Good hydro-morphological status</i>”.</p>
SO 2.3: Taking circular economy forward in central Europe	+2	/	/	<p>From the perspective of “water” issues, SO 2.3 represents an operational upgrade of recognized positive impacts from SO 1.1, by promoting, testing and introducing “circular economy” concept into public and private operational processes and waste/resource management. Subsequently, the IP will have potentially significant positive impact through support to “greener economy” by reducing water-pollution and water-abstraction pressures. Due to the transnational nature of the programme transboundary effects could occur, but due to rather limited amount of funding they are not likely.</p>
SO 2.4: Safeguarding the environment in central Europe	+2	/	T+	<p>As “water” is an integral element of our environment, almost all proposed interventions of SO 2.4 have direct or indirect positive impacts on all four exposed environmental issues. As a complex and ecosystem-solutions based specific objective, it will also have potentially significant positive impact on all environmental policy objectives. Due to the transnational nature of the programme transboundary effects are also expected.</p>
SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	/	/	/	<p>SO 3.1 proposes interventions linked to transport strategies and coordinated planning of strategic transport and logistic oriented investments. This is further enhanced by a clear ambition of the IP to act as a catalyst to lever further investment for new transport infrastructure with subsequent potential impacts on water bodies.</p> <p>However, due to the “non-investment” character of the IP no such direct impacts are expected during the lifetime of this IP on “waters”.</p>

				Regardless of the stated IP character, the SEA team proposed additional mitigation measures, which would ensure alignment of SO 3.1 with set environmental policy objectives, especially “Good hydro-morphological status”.
SO 3.2: Greening urban mobility in central Europe	/	/	/	Public transport interventions in SO 3.2 are not expected to have significant adverse impacts on water bodies. Potential local impacts (e.g. pollution by potential oil contaminants from public transport depots) can be well addressed through standard arrangements that do not require attention on strategic level.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses the issue of “water” in a rather indirect manner. However, designed as a broad capacity building and governance improvement objective, it clearly provides the opportunity to address transboundary water management on a river basin scale.

5.2.4 Soil

The assessment focused on the following environmental issues correlating within relevant environmental policy objectives presented in chapter 3:

- Ensuring sustainable use of land and soil;
- Preventing loss of soil and soil pollution;
- Land and soil protection policy mainstreaming.

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	+1	/	/	SO 1.1 addresses the issue of “soil” in an indirect manner, with several proposed interventions aiming at introduction of green trends and standards, improved capacities and cross-sectoral collaboration, fostered digital and technological innovations, etc. Subsequently, the IP will have moderate positive impact through support to “greener economy” and “bioeconomy” by improving current practices and operational processes. Due to the transnational nature of the programme transboundary effects could occur, but due to rather limited amount of funding and types of supported actions, they can not be reasonably expected.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	/	/	/	As SO 1.2 does not address the issue of “soil” with proposed interventions, it will have no impact on relevant policy objectives or any of three highlighted environmental concerns.
SO 2.1: Supporting the energy transition to a climate neutral central Europe	/	/	/	As SO 2.1 does not address the issue of “soil” with proposed interventions, it will have no impact on relevant policy objectives or any of three highlighted environmental concerns.
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	/	Several types of SO 2.2 proposed interventions addresses the issue of “soil”, all directly contributing to resilience of existing ecosystems, climate-proofing of landscapes and improved urban planning, subsequently improving resilience, management and reduced risk of soil loss and significantly positively impacting “Ensuring sustainable use of land and soil”

				and <i>“Preventing loss of soil and soil pollution”</i> , as well as all relevant environmental policy objectives. Despite the transnational nature of the programme transboundary effects are not likely due to typically localized impacts on soil.
SO 2.3: Taking circular economy forward in central Europe	+1	/	/	SO 2.3 addresses the issue of <i>“soil”</i> in an indirect manner, through several proposed interventions aiming at an overall behavioural change of both public and private stakeholders. Thus, positively but moderately impacting the environmental concern <i>“Preventing loss of soil and soil pollution”</i> and all relevant environmental policy objectives – primarily <i>“Reduce soil erosion, increase soil organic matter, and promote remedial work on contaminated sites”</i> .
SO 2.4: Safeguarding the environment in central Europe	+2	/	/	SO 2.4 is the key SO with which IP targets not only protection, but also sustainable use, prevention of soil loss and improved spatial planning. Subsequently, the IP will have significant positive impacts on <i>“Ensuring sustainable use of land and soil”</i> and <i>“Preventing loss of soil and soil pollution”</i> , as well as all relevant environmental policy objectives. Despite the transnational nature of the programme and expected significant positive impacts, transboundary effects are not likely due to typically localized impacts on soil. Which is why the SEA team proposed additional enhancement measure to maximize benefits of the IP for soil management, including the reuse of brownfields.
SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	/	/	/	SO 3.1 addresses the issue of <i>“soils”</i> through interventions linked to transport strategies and coordinated planning of strategic transport and logistic oriented investments. This is further enhanced by a clear ambition of the IP to act as a catalyst to lever further investment for new transport infrastructure with potential impacts on land take and fragmentation issues. However, due to the <i>“non-investment”</i> character of the IP, no direct impacts are expected during the lifetime of this IP on <i>“soil”</i> . Nonetheless, the SEA team proposed that IP should encourage all applicants to use <i>‘environmental sustainability by design’</i> approach, thus ensuring alignment of SO 3.1 with set environmental policy objectives, especially the commitment of <i>“No net land take by 2050”</i> .
SO 3.2: Greening urban mobility in central Europe	/	/	/	SO 3.2 indirectly addresses the issue of <i>“soil”</i> with potential pilot interventions of the <i>“investment”</i> nature. Although, interventions like green connections between urban and peri-urban areas have many other benefits, inappropriate solutions proposed by individual projects might adversely impact land take issue. However, taking into account IP character and the fact that only localized impacts could be reasonably expected, we consider such impacts as minor. Regardless of stated IP character, the SEA team proposed additional mitigation measures, which would ensure alignment of SO 3.2 with set environmental policy objectives, especially the commitment of <i>“No net land take by 2050”</i> .
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses the soil management” in a rather indirect manner. However, designed as a broad capacity building and governance improvement objective, it clearly provides the opportunity to address the current lack of the general framework for soil protection, currently lacking in many member states. Thus, positively impacting <i>“Land and soil protection policy mainstreaming”</i> . However, as there is almost no guarantee that potential applicants will actually apply with such a project, we consider the exposed positive impact as a limited one. Nonetheless, we see potential to reinforce the exposed positive impact of the IP and recommend further enhancement measures.

5.2.5 Biodiversity, Natura 2000 and Ecosystem services

The assessment considered the following environmental issues established through the review of the relevant environmental policy objectives in chapter 3:

- Protection, conservation and restoration of biodiversity and well-functioning ecosystems
- Promotion of green infrastructure and ecosystem-based management
- Enabling the necessary transformative change – strengthen governance framework
- Protection, conservation and preservation of Natura 2000 species and habitats

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	+1	-1	/	<p>The SO 1.1 in general will not directly contribute to or prevent achieving the biodiversity and Natura 2000 objectives. However, the moderate benefits to biodiversity could be expected through support to green economy and bioeconomy since their concepts are aiming to a more sustainable economy and in that manner are in line with the objectives of EU Biodiversity strategy 2030.</p> <p>However, since the bioeconomy implies the use of renewable biological resources from land and sea¹⁴ and Bioeconomy strategy also suggest usage of tools of molecular genetics there are certain potential risks for biodiversity. From that point of view, the SEA team recommend to encourage the project applicants to deploy ‘sustainability-by-design’ approach that considers whether and how their proposed actions take into the consideration effective use of natural resources. Furthermore, in case of innovation that includes genetic modifications they should be based on relevant researches and prove they are in line with objectives of EUBD Strategy 2030.</p>
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	/	/	/	<p>Since the actions supported under SO 1.2 are directed to improving skills and knowledge, there is no direct benefits or risks on biodiversity nor Natura 2000.</p>
SO 2.1: Supporting the energy transition to a climate neutral central Europe	/	-1	T	<p>Although the SO 2.1 generally promotes the “green energy”, some supported actions under it could cause a significant risk to biodiversity and Natura 2000. Primarily, those are actions related to renewable energy production with the potential risks i.e. on birds, bats, and migration of large carnivores (wind farms), butterflies and pollinating insects (solar farms) or water ecosystems (hydropower plants).</p> <p>This, however, greatly depends on the scale of the projects as well as on their locations. Since the IP does not give such details, the significance of the impact cannot be assessed on the strategic level and it will therefore have to be addressed on the project level.</p> <p>That is why the SEA team recommends ensuring that proposals for production of renewable energy consider potential impacts on biodiversity and Natura 2000 species and habitats and have clear mitigation measures integrated in the project design.</p>

¹⁴ <https://ec.europa.eu/research/bioeconomy/index.cfm?pg=home>

				Adverse TB impact could be expected if the intervention will be implemented in border regions or on the transboundary migrating routes of certain species.
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	T+	The SO 2.2 includes interventions that could have significant benefits for biodiversity and natural ecosystems – e.g. implementing pilot actions for restoration toward resilient ecosystems (rivers and wetlands) based on good practices on ecosystem-based climate change adaptation measures. Positive TB impact could be expected if the intervention will be implemented in border regions.
SO 2.3: Taking circular economy forward in central Europe	+1	/	/	The SO 2.3 includes intervention that could have moderate benefits for the biodiversity and Natura2000 species and habitats due to lower use of natural resources. The concept of circular economy has important value to the conservation status of ecosystems and increasing of the ecosystem services potential.
SO 2.4: Safeguarding the environment in central Europe	+2	/	T+	The SO 2.4 includes thematic fields and indicative examples of actions that are directly related to biodiversity conservation and recovery, protection of natural heritage, ecosystems, and Natura 2000 sites as well as restoration of degraded ecosystems etc. Hence strong direct positive impact is expected. Positive TB impact could be expected if the intervention will be implemented in border regions.
SO 3.1: Improving transport connections of rural and peripheral regions in central Europe	/	-1	T	The SO 3.1 includes indicative examples of actions (e.g. designing and testing integrated, demand-responsive and sustainable transport solutions to better connect rural and peripheral areas to major transport nodes) that could have moderate negative impact on biodiversity and Natura 2000 species and habitats due to fragmentation of habitats, degradation and loss of biodiversity and Natura2000 species and habitats. That is why the SEA team recommends ensuring that proposals for new infrastructure consider potential impacts on biodiversity and Natura 2000 species and habitats. Also, the SEA team recommends encouraging the project applicants to deploy ‘sustainability-by-design’ approach that considers whether and how their proposed actions reduce or optimize fragmentation of habitats. Adverse TB impact could be expected if the intervention will be implemented in border regions.
SO 3.2: Greening urban mobility in central Europe	/	/	/	Limited impact on urban biodiversity.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	The SO 4.1 does not address biodiversity and Natura 2000 topics. However, EUBD 2030 emphasizes that there is no comprehensive governance framework to steer the implementation of biodiversity commitments agreed at national, European, or international level. General improvements in governance systems create enabling conditions for improvements in biodiversity governance.

5.2.6 Population & human health

The assessment focused the following environmental issues correlating within relevant environmental policy objectives presented in chapter 3:

- Public health (general);
- Environmental health;
- Noise.

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	/	/	/	Innovations can create new employment opportunities that may have a positive impact on wellbeing especially in the post-pandemic period. However, as SO 1.1 does not target “health” with proposed interventions directly, it will have no or only limited positive impact on exposed environmental issues and correlated environmental objectives.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	+1	/	/	Similar to the previous specific objective, SO 1.2 also addresses “health” in an indirect manner, especially with proposed interventions aiming at improving skills to implement new technologies and digitalization in healthcare, but also interventions aiming at overall improvement of the economic and social situation. However, this exposed positive impact can only be considered as a limited one. As such, transboundary effects can not be reasonably expected.
SO 2.1: Supporting the energy transition to a climate neutral central Europe	+1	-1	/	There is no doubt that “green energy” brings benefits on environmental “health” issues, as well as other environmental topics, due to efforts to reduce air pollution from the energy sector. However, from the perspective of “health”, some SO 2.1 supported projects could also adversely contribute to already existing environmental pressures like noise, vibrations or electromagnetic radiation. Such adverse impacts could be linked either to supported “pilot investments” targeting specific locations (mainly in case of poor site selection) or to interventions like development of policy frameworks, new or improved incentive schemes, mobilization of public and private investments. However, due to above explained IP character, we emphasize that only potential moderate localized direct impacts of only few selected project “pilot investments” could be reasonably expected during the lifetime of this IP. SO 2.1 linked outputs like policies, strategies and mobilized investments could result in long-term follow-up interventions and subsequently potential adverse impacts on previously exposed segments of health.
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	T+	Climate change are an important driver of destabilization in our environment, not only due to climate change interlinked weather extremes and hazards, but also due to overall decreased resilience of environment, economy and society we live in. By aiming at improved resilience to climate change, IP will significantly positively impact and actively support climate change stabilization efforts. Furthermore, SO 2.2 directly aims to improve cross-sectoral climate resilience, risk management and response. From a system-wide perspective, any resilience-building interventions in lower level systems (e.g. flood management) may have potential positive transboundary impacts.
SO 2.3: Taking circular economy forward in central Europe	+1	/	/	From the perspective of “health” issues, SO 2.3 represents an operational up-grade of already recognized positive impacts from SO 1.1, by promoting, testing and introducing “circular economy” concept into

				public and private operational and production processes and waste/resource management. This will result in reduced pollution and improved living conditions, positively contributing to improved environmental health and contributing to improved public health. However, the IP is rather a “limited investment” programme by design, with specific intention of piloting innovative solutions, meaning that only localized direct impacts on health can be reasonably expected. Due to the transnational nature of the programme transboundary effects could occur, but due to rather limited amount of funding they are not likely.
SO 2.4: Safeguarding the environment in central Europe	+2	/	T+	Almost all proposed interventions of SO 2.4 have direct or indirect positive impacts on all three exposed environmental issues and will result in reduced pollution of various pollutants, improved living conditions, thus delivering improved environmental health and substantially contributing to improved public health. As a complex and ecosystem-solutions based specific objective, it will have potentially significant positive impact on all environmental policy objectives. Due to the transnational nature of the programme transboundary effects are also expected.
SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	+1	-1	/	There is no doubt that “improved mobility and accessibility” brings benefits due to improved living conditions and welfare of societies in general. However, the actual reductions of the air emissions cannot be taken for granted – e.g. PM and noise pollution partially derive from the movement of vehicles regardless of their fuel source. Also, from the perspective of “health”, some SO 3.1 supported projects linked to development of transport strategies and coordinated planning of strategic transport and logistic oriented investments, could also deliver potentially long-term adverse impacts. This is further enhanced by a clear ambition of the IP to act as a catalyst to lever further investment for large-scale transport infrastructure. Despite the fact that only limited above described impacts are expected during the lifetime of this IP on “health”, such outputs could result in long-term follow-up interventions like transport infrastructure projects and subsequently potential adverse impacts on all three exposed environmental issues.
SO 3.2: Greening urban mobility in central Europe	+2	/	/	By attempting to “green” urban mobility, SO 3.2 is taking on one of the most important health concerns of central Europe – degraded living conditions in urban and peri-urban areas due to air and noise pollution. Greener urban mobility would reduce air and noise pollution, reduce traffic congestions and improve overall environmental and public health and significantly improve living conditions of inhabitants, exposed to such impacts on daily basis. However, despite the transnational character of the IP, the exposed positive impacts are likely to have potential transboundary effects only in the far future when tested and proven good practices will be up-scaled and mainstreamed.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses the issue of “health” in a rather indirect manner. However, designed as a broad capacity building and governance improvement objective, it clearly provides the opportunity to address intersectoral and inclusive approach towards improving environmental health. Thus, contributing to all environmental policy objectives with a moderate positive impact.

5.2.7 Material assets

The assessment considered the following environmental issues established through the review of the relevant environmental policy objectives in chapter 3:

- Resource use and efficiency
- Waste generation and management
- Buildings

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	+2	/	/	<p>The SO 1.1 includes thematic fields related to green economy and bio-economy, and several indicative examples of actions that may have significant positive impacts on circular economy objectives, such as:</p> <ul style="list-style-type: none"> • digitalisation when transitioning to industry 4.0 (while respecting sustainability aspects); • exchanging good practices on new green trends and standards and implementing pilot actions to support SMEs in taking up green economy approaches; and • improving collaboration along value chains of (green) innovative products and services in line with national and regional smart specialisation strategies. <p>No proposal contained in SO 1.1 is expected to have adverse impacts. We only suggest to encourage the potential linkages between the SO and the future investment mobilisation for digital technologies under the InvestEU and the new Strategic Investment Facility (e.g. through preparation of cross-border projects or regional know-how exchanges to discuss good practices in the use of these instruments).</p>
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	+1	/	/	<p>The SO 1.2 also includes a thematic field related to green economy and bio-economy and one indicative example of action (fostering skills of employees and entrepreneurs to implement green economy business concepts) that could provide moderate contribution to the attainment of the circular economy objectives.</p> <p>No proposal contained in SO 1.2 is expected to have adverse impacts on climate-related concerns.</p>
SO 2.1: Supporting the energy transition to a climate neutral central Europe	+1	/	/	<p>The SO 2.1 can offer potential moderate benefits for material assets if the second and third generation of biofuels would be promoted. We noted moderate risks associated with the management of end-of-life solar panels and suggest a dedicated action on this front.</p>
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	T+	<p>The SO 2.2 includes an indicative example of action for increasing the climate resilience of critical infrastructures and cultural heritage sites as well as a range of urban adaptation measures which could deliver significant positive impacts on material assets. Resilience enhancement in critical infrastructure (such as power networks, transport systems) may have potential positive transboundary impacts.</p>
SO 2.3: Taking circular economy forward in central Europe	+2	/	/	<p>All interventions proposed in the SO 2.3 deliver significant positive impacts on policy objectives related to material resource efficiency and waste management. We only propose to add specific indicative examples of actions on recovery of nutrients from municipal wastewater; regenerative circular economy approaches based on manufacturing of products that can be disassembled and be either broken down by nature or returned to production process; and creation of regional marketplaces for recyclates (either covering</p>

				all waste streams or dedicated marketplaces for key recyclates, such as plastics).
SO 2.4: Safeguarding the environment in central Europe	/	/	/	The SO 2.4 does not have significant effects on material assets. We only suggest to add an indicative example of action on the integration of environmental, climate and renewable resource management into corporate decision-making or embedding it into existing business management tools (such as analytics and product development).
SO 3.1: Improving transport connections of rural and peripheral regions in central Europe	/	/	/	The SO 3.1 does not have significant effects of material assets.
SO 3.2: Greening urban mobility in central Europe	/	-1	/	The SO 3.2 includes actions for promotion of electromobility that will, as a side effect, generate increasing volumes of Li-ion batteries. Such batteries can be recycled, but so far only at very high costs which represents a potentially significant concern that requires attention. We therefore suggest to add an indicative example of action on the future management or use of end-of-life batteries in electromobility systems .
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses multi-sectoral governance processes on different territorial levels that may generate moderate benefits for management of material assets. For sake of completeness, SEA proposes to mention integrated urban-rural development planning among the thematic fields.

5.2.8 Cultural heritage

The assessment focused on the following environmental issues correlating within relevant environmental policy objectives presented in chapter 3:

- Protection and preservation of cultural heritage;
- Promotion of participatory management of cultural heritage.

Interreg CE 2021-2027 proposals	Benefits and risks			Explanations
	+	-	T B	
SO 1.1: Strengthening innovation capacities in central Europe	+2	/	/	While the SO 1.1 addresses “ <i>Protection and preservation of cultural heritage</i> ” in an indirect manner, its potentially significant positive impact on “ <i>Promotion of participatory management of cultural heritage</i> ” is much more tangible – mainly due to interventions like enabling cross-sectoral collaboration and strengthening linkages between the public and private sector (e.g. Cultural and Creative industries) and finance institutions. Through such interventions the IP could reinforce cultural heritage management and its condition.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	/	/	/	As SO 1.2 includes a reference to culture and tourism in the description of territorial needs but does not list any example of indicative example of action that would further address this need. The SO is therefore not expected to have significant impacts on relevant policy objectives related to cultural heritage. To this end, we suggest to add an indicative example of action on skills-building for the productive use of cultural heritage and arts in the service sector and leisure economy.

SO 2.1: Supporting the energy transition to a climate neutral central Europe	/	/	/	As SO 2.1 does not address the issue of “cultural heritage” with proposed interventions and under presumption that cultural heritage protection regimes will be respected in line with national legislation in case of any “pilot investments”, it will have no impact on relevant policy objectives or both highlighted environmental concerns. However, the SEA team recognized additional potential to achieve additional positive impacts of the IP and proposed enhancement measures.
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	/	SO 2.2 addresses the issue of “cultural heritage” mainly through the intervention increasing climate resilience of critical infrastructures and cultural heritage sites through improved risk preparedness and risk management plans – thus, delivering a potential significant positive impact on “Protection and preservation of cultural heritage”, but also on “Promotion of participatory management of cultural heritage”.
SO 2.3: Taking circular economy forward in central Europe	/	/	/	As SO 2.3 does not address the issue of “cultural heritage” with proposed interventions, it will have no impact on relevant policy objectives or both highlighted environmental concerns.
SO 2.4: Safeguarding the environment in central Europe	/	/	/	As SO 2.4 does not address the issue of “cultural heritage” with proposed interventions, it will have no impact on relevant policy objectives or both highlighted environmental concerns.
SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	/	/	/	SO 3.1 proposes interventions linked to transport strategies and coordinated planning of strategic transport and logistic oriented investments. This is further enhanced by the IP ambition to act as a catalyst for new transport infrastructure development. Despite the fact that no direct impacts are expected during the lifetime of this IP on “cultural heritage”, due to the “non-investment” character of the IP, the SEA team proposed that the IP should encourage all applicants to use ‘environmental sustainability by design’ approach, include the relevant cultural heritage concerns into the project design, thus avoiding all potentially adverse impacts.
SO 3.2: Greening urban mobility in central Europe	+1	/	/	Actions proposed by SO 3.2 could lead to reduced traffic pollution in urban areas and subsequently to reduced air pollution linked damages to urban cultural heritage sites, as well as decreased climate change related risks. No potential adverse impacts are expected on cultural heritage related concerns.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses the issue of “cultural heritage” in a rather indirect manner. However, designed as a broad capacity building and governance improvement objective, it clearly provides the opportunity to also address cultural heritage governance and management issues.

5.2.9 Landscape

The assessment focused on the relevant issues and objective for the “Protection, preservation and improved management of landscapes” presented in chapter 3.

Interreg CE 2021-2027 proposals	Benefits & risks			Explanations
	+	-	TB	
SO 1.1: Strengthening innovation capacities in central Europe	/	/	/	As SO 1.1 does not address the issue of “landscapes” with proposed interventions, it will have no impact on relevant policy objectives and “Protection, preservation and improved management of landscapes”.
SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe	/	/	/	As SO 1.2 does not address the issue of “landscapes” with proposed interventions, it will have no impact on relevant policy objectives and “Protection, preservation and improved management of landscapes”.
SO 2.1: Supporting the energy transition to a climate neutral central Europe	/	-1	/	<p>There is no doubt that “green energy” brings many benefits on other environmental topics. However, some SO 2.1 supported projects could lead to adverse impact on “landscapes”, especially in case of locating renewable energy resources (e.g. solar/wind power) inside areas of protected or characteristic natural and cultural landscapes, thus visually impacting them. Due to the IP character, only localized moderate impacts can be reasonably expected.</p> <p>SO 2.1 indirectly addresses the issue of “landscapes” also through interventions like development of policy frameworks, new development concepts, mobilization of public and private investments, etc. Despite the fact that no direct impacts are expected during the lifetime of this IP, such outputs of potentially supported projects could result in indirect long-term follow-up interventions and subsequently potential adverse impacts. In both cases the key environmental concern is linked to potentially adverse visual impacts of proposed interventions.</p> <p>The SEA team proposed additional mitigation measures, which would ensure alignment of SO 2.1 with the environmental issues “Protection, preservation and improved management of landscapes”.</p>
SO 2.2: Increasing the resilience to climate change in central Europe	+2	/	/	SO 2.2 addresses the issue of “landscapes” through several types of proposed interventions, all directly contributing to resilience of existing ecosystems, climate-proofing of landscapes and improved urban planning, subsequently significantly positively impacting the environmental concern “Protection, preservation and improved management of landscapes” and all relevant environmental policy objectives.
SO 2.3: Taking circular economy forward in central Europe	/	/	/	<p>Several proposed SO 2.3 interventions, aiming at an overall behavioural change of both public and private stakeholders, address the issue of “landscapes” in an indirect manner. Thus, positively impacting the environmental concern “Protection, preservation and improved management of landscapes” and all relevant environmental policy objectives.</p> <p>However, the SEA team recognized the potential to reinforce the exposed positive impact of the IP and recommended further enhancement measures.</p>
SO 2.4: Safeguarding the environment in central Europe	+2	/	/	SO 2.4 directly address the issue of “landscapes” with almost all proposed interventions, making it the key SO with which IP targets not only protection and preservation, but also improved management of landscapes. Furthermore, with this SO the IP recognized the complexity of the “landscapes issue” and aims to combine green and blue infrastructure interventions with protected areas in order to join relevant “pieces of the puzzle”. The IP also makes sure to capitalize on already established initiatives like European Green Belt Initiative. Subsequently, the IP will have significant

				positive impacts on “Protection, preservation and improved management of landscapes” and all relevant environmental policy objectives.
SO 3.1: Improving mobility and accessibility of rural and peripheral regions in central Europe	/	-1	T	Key “landscape” relevant SO 3.1 interventions are linked to transport system upgrades, transport strategies and coordinated planning of strategic transport and logistic oriented investments. This is further enhanced by the IP ambition to act as a catalyst to lever further investment for transport infrastructure. There is a moderate risk that new transport infrastructure may contribute to cumulative visual deterioration and fragmentation of European landscapes – especially if such projects would be located inside of the protected or characteristic natural and cultural landscapes However, due to the “non-investment” character of the IP, only potentially moderate impacts on visual characteristics of “landscape” can be reasonably expected during the lifetime of this IP. Also, transport system upgrades in the border areas may have potential transboundary impacts on the landscapes. To this end, the SEA team proposed additional mitigation measures, which would ensure alignment of SO 3.1 with the environmental issues “Protection, preservation and improved management of landscapes”.
SO 3.2: Greening urban mobility in central Europe	/	/	/	SO 3.2 indirectly addresses the issue of “landscape” with potential pilot interventions of the “investment” nature. Although, interventions like green connections between urban and peri-urban areas have many other benefits, inappropriate solutions proposed by individual projects might adversely impact landscapes fragmentation and visual impacts. However, taking into account IP character and the fact that only localized adverse impacts could be reasonably expected from a limited number of supported projects, we consider such impacts as minor. Regardless of stated IP character, the SEA team proposed additional mitigation measures.
SO 4.1: Strengthening governance for an integrated territorial development in central Europe	+1	/	/	SO 4.1 addresses the issue of “landscapes” in a rather indirect manner. However, designed as a broad capacity building and governance improvement objective, it clearly provides the opportunity to address the current lack of the general framework for landscape preservation in line with European Landscape Convention (COE, 2000). Thus, positively impacting “Protection, preservation and improved management of landscapes” and all relevant environmental policy objectives. However, the SEA team recognized the potential to reinforce the exposed positive impact of the IP and recommended further enhancement measures.

5.2.10 Synergistic & cumulative impacts of the entire Interreg Central Europe 2021-2027 proposal

As evident from the overview of the summary assessments below, the IP is clearly oriented towards sustainable development and search for green solutions by design. Since all projects and their potential pilot actions with an “investment character” need to be implemented in line with national level legislation and standards, no potentially significant adverse impact is foreseen even for the realistic worst/case scenario of the programme implementation.

SO 1.1: Strengthening innovation capacities in central Europe

SO 1.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	/	+1	+1	+1	+1	/	+2	+2	/
Risks	/	/	/	/	-1	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 1.2: Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe

SO 1.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	/	+1	/	/	/	+1	+1	/	/
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 2.1: Supporting the energy transition to a climate neutral central Europe

SO 2.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	/	/	/	+1	+1	/	/
Risks	/	/	-1	/	-1	-1	/	/	-1
TB	T+	T+	/	/	T	/	/	/	/

SO 2.2: Increasing the resilience to climate change in central Europe

SO 2.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+2	+2	+2	+2	+2	+2	+2	+T
Risks	/	/	-1	/	/	/	/	/	/
TB	/	T+	T+	/	T+	T+	/	/	/

SO 2.3: Taking circular economy forward in central Europe

SO 2.3	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	+2	+1	+1	+1	+2	/	/
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

SO 2.4: Safeguarding the environment in central Europe

SO 2.4	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	+2	+2	+2	+2	/	/	+2
Risks	/	/	/	/	/	/	/	/	/
TB	/	T+	T+	/	T+	T+	/	/	/

SO 3.1: Improving transport connections of rural and peripheral regions in central Europe

SO 3.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	/	/	/	+1	/	/	/
Risks	-1	-1	/	/	-1	-1	/	/	-1
TB	T	/	/	/	T	/	/	/	T

SO 3.2: Greening urban mobility in central Europe

SO 3.2	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+2	+2	/	/	/	+2	/	+1	/
Risks	/	/	/	/	/	/	-1	/	/
TB	/	/	/	/	/	/	/	/	/

SO 4.1: Strengthening governance for an integrated territorial development in central Europe

SO 4.1	Air	CC	Water	Soil	Bio	Health	Mater.	Cult	Land
Benefits	+1	+1	+1	+1	+1	+1	+1	+1	+1
Risks	/	/	/	/	/	/	/	/	/
TB	/	/	/	/	/	/	/	/	/

The programme's transboundary effects are largely positive. The programme creates only few minor risks of potentially adverse transboundary impacts in the case of transboundary policy/strategic frameworks and infrastructure interventions in border areas that would be independently followed up by investments outside of the Interreg CE programme framework. Such risks can be managed by the existing well-established provisions for the transboundary consultations within the respective EIAs or SEAs that would accompany any such intervention.

The following chapter present our proposed mitigation and enhancement measures in detail.

6 PROPOSED MITIGATION AND ENHANCEMENT MEASURES

This chapter describes measures proposed to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the programming document (as per the SEA Directive requirement Annex 1, item g).

While the mitigation measures are proposed as formal recommendations for the implementation of the IP, the enhancement measures are conceived mainly as suggestions which the CE programming working group and the MA/JS may - or may not – eventually accept.

6.1 GENERIC CROSS-CUTTING RECOMMENDATION FOR THE ENTIRE INTERREG CENTRAL EUROPE PROPOSAL

6.1.1 Mitigation measure no. 1

The IP should encourage all applicants to use ‘environmental sustainability by design’ approach. This approach implies that environmental or broader sustainability considerations are no longer treated as “afterthoughts” and instead become the core part of decision-making processes ranging from e.g. the business management tools (such as analytics and product development) public sector planning and programming (adapted from Palerm & Sloomweg, 2020).

To promote such thinking in the actual project applications, the CE programme is advised to:

- a) encourage the prospective applicants to identify and consider any potentially significant environmental and health issues of concern during their project design; consider available options for implementing projects that do not adversely affect the quality of the environment and ideally contribute to regeneration of the environment and ecosystem functions and services; and prepare arrangements for environmentally sound project implementation;

and

- b) explain all of the above considerations in the project application (e.g. in the dedicated section of the project application templates).

The project selection process should recognize and appreciate good practices in environmental sustainability-by-design.

6.2 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 1.1: STRENGTHENING INNOVATION CAPACITIES IN CENTRAL EUROPE

6.2.1 Mitigation measure no. 2

With regard to the potential support to bio-economy any supported innovation that involve genetic modifications (e.g. synthetic biology) should be supported only if they prove compliance with the related *acquis communautaire* for genetic engineering, including the relevant provisions of the EU Biodiversity Strategy 2030.

6.2.2 Enhancement measure no. 1

We recommend to consider adding a new indicative example of action on innovations that facilitate decentralisation and demand-responsive production systems (as they generate lower environmental footprint due to their reduced transport demands and lower dependencies on external products and material supplies).

6.2.3 Enhancement measure no. 2

The IP could guide the potential applicants to transfer and up-scale already proven green solutions, thus capitalizing on ready-to-go solutions and maximizing its impact delivery potential. It could also encourage any mutually beneficial linkages between the proposed actions and the future investment mobilisation for next generation technologies under the InvestEU and the new Strategic Investment Facility (through e.g. preparation of cross-border projects or regional know-how exchanges to discuss good practices in the use of these instruments).

6.2.4 Enhancement measure no. 3

Lastly, the IP could include “creative industries” and “cultural heritage institutions” in the main target groups which could enhance its beneficial impact on the service sector and the leisure economy.

6.3 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 1.2: DEVELOPING SKILLS FOR SMART SPECIALISATION, INDUSTRIAL TRANSITION AND ENTREPRENEURSHIP IN CENTRAL EUROPE

6.3.1 Enhancement measure no. 4

Consider adding a new indicative example of action on skills for the productive use of cultural heritage, assets and arts in the service sector and leisure economy.

6.4 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 2.1: SUPPORTING THE ENERGY TRANSITION TO A CLIMATE NEUTRAL CENTRAL EUROPE

6.4.1 Mitigation measure no. 3

The project selection process should ensure that proposals for the production of renewable energy consider their potential impacts on biodiversity and Natura 2000 species and habitats, hydro-morphology, water-use, landscape, noise, vibrations and electromagnetic impacts.

6.4.2 Enhancement measure no. 5

We recommend to consider adding new indicative examples of actions on:

- carbon capture, utilisation and storage;
- business networks raising corporate climate change mitigation and adaptation targets or embedding climate change mitigation and adaptation (along with other relevant environmental factors) into

existing business management tools (e.g. analytics) and core corporate decision-making (e.g. product development, etc.);

- second generation of biofuels (produced from non-food crops, such as cellulosic biofuels and waste biomass) and third generation of biofuels (algal biomass), as well as sustainable management of management of end-of-life solar panels;
- energy efficiency solutions in challenging environments such as cultural heritage buildings.

6.5 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 2.2: INCREASING THE RESILIENCE TO CLIMATE CHANGE IN CENTRAL EUROPE

6.5.1 Mitigation measure no. 4

The project selection process should ensure that proposals for climate change risk (e.g. floods) adaptation measures consider their potential hydro-morphological impacts.

6.5.2 Enhancement measure no. 6

The IP should encourage all applicants to promote, as much as possible, sustainable ecosystem-based solutions and approaches to climate change adaptation and treating infrastructure upgrades as the last resort possibilities.

6.6 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 2.3: TAKING CIRCULAR ECONOMY FORWARD IN CENTRAL EUROPE

6.6.1 Enhancement measure no. 7

We suggest to consider adding new indicative example of action related to:

- recovery of organic waste, including nutrients from municipal wastewater;
- regenerative circular economy approaches based on manufacturing of products that can be disassembled and be either broken down by nature or returned to production process; and
- creation of (single or synchronized) marketplaces for recyclates in the region.

6.7 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 2.4: SAFEGUARDING THE ENVIRONMENT IN CENTRAL EUROPE

6.7.1 Enhancement measure no. 8

We suggest to consider adding 'transboundary water management on a river basin scale' and 'protection, preservation and improved management of landscapes' amongst priority topics to be addressed within this SO.

We suggest to consider adding new indicative examples of actions related to:

- reuse of degraded brownfields and regeneration of degraded peri-urban areas for resilience building purposes;
- ‘transboundary water management on a river basin scale; and
- protection, preservation and improved management of landscapes.

6.8 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 3.1: IMPROVING MOBILITY AND ACCESSIBILITY OF RURAL AND PERIPHERAL REGIONS IN CENTRAL EUROPE

6.8.1 Mitigation measure no. 5

Should the IP fund the preparation of transport infrastructure plans and programmes that would fall under the scope of the SEA Directive or SEA Protocol, it needs to ensure that the relevant activities consider the required strategic environmental assessments.

6.8.2 Mitigation measure no. 6

The IP should encourage all applicants to use ‘environmental sustainability by design’ approach, that considers, particularly in the SO 3.1, whether and how the proposed transport actions:

- reduce the need for transport;
- reduce or optimize the transport flows;
- promote switching to least emission-intensive transport systems;
- reduce or optimize fragmentation of habitats and
- reduce the impacts of the transport systems on air and noise pollution; public health; biodiversity and Natura 2000 species and habitats, landscape fragmentation, hydro-morphological impacts, land take and cultural and archaeological heritage.

6.8.3 Mitigation measure no. 7

Should the IP fund the preparation of transport infrastructure projects in border regions that would fall under the scope of the Espoo Convention and the Article 7 of the EIA Directive, it needs to ensure that the activities consider the relevant requirements for transboundary consultations.

6.9 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 3.2: GREENING URBAN MOBILITY IN CENTRAL EUROPE

6.9.1 Mitigation measure no. 8

As mentioned in the case of SO 3.1, the IP should encourage all applicants to use ‘environmental sustainability by design’ approach, that is particularly relevant to also for the SO 3.2. This approach should consider whether and how the proposed transport actions:

- reduce the need for transport;

- reduce or optimize the transport flows;
- promote switching to least emission-intensive transport systems; and
- reduce the impacts of the transport systems on air and noise pollution; public health; and cultural heritage.

6.9.2 Enhancement measure no. 9

We recommend to consider the following wording changes in the proposed thematic fields:

- Sustainable multimodal connections between urban and peri-urban areas;
- Urban traffic congestions management; and
- Monitoring and management of greenhouse gases and other air pollutants from urban transport.

6.9.3 Enhancement measure no. 10

We also suggest to consider adding a new indicative example of action on the future management or use of end-of-life batteries in electromobility systems.

6.10 PROPOSED MITIGATION AND ENHANCEMENT MEASURES FOR SO 4.1: STRENGTHENING GOVERNANCE FOR AN INTEGRATED TERRITORIAL DEVELOPMENT IN CENTRAL EUROPE

6.10.1 Enhancement measure no. 11

We suggest to consider adding a new indicative example of action aiming to integrate new biodiversity governance frameworks (with e.g. more effective stakeholder dialogues) developed based on the 2030 EU Biodiversity Strategy into new territorial governance models promoted by the IP.

7 PROPOSED MONITORING ARRANGEMENTS

The IP does not yet include specific proposals for the future programme monitoring and evaluation. Detailed arrangements for monitoring will not be part of the IP but laid down in a separate document later on.

Considering the fact that the IP does not have any potentially significant adverse impacts on the environment, the SEA team does not have any specific recommendations for the monitoring arrangements under the SEA Directive Annex 1, item i.

8 LITERATURE

CEC.1992. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. The Council of the European Communities. 21.05.1992

Ciscar JC, Feyen L, Soria A, Lavalle C, Raes F, Perry M, Nemry F, Demirel H, Rozsai M, Dosio A, Donatelli M, Srivastava A, Fumagalli D, Niemeyer S, Shrestha S, Ciaian P, Himics M, Van Doorslaer B, Barrios S, Ibáñez N, Forzieri G, Rojas R, Bianchi A, Dowling P, Camia A, Libertà G, San Miguel J, de Rigo D, Caudullo G, Barredo JI, Paci D, Pycroft J, Saveyn B, Van Regemorter D, Revesz T, Vandyck T, Vrontisi Z, Baranzelli C, Vandecasteele I, Batista e Silva F, Ibarreta D (2014). Climate Impacts in Europe. Current and predicted trends in temperature variations and heat extremes. The JRC PESETA II Project. JRC Scientific and Policy Reports, EUR 26586EN.

COE. 1992. European Convention on the Protection of the Archaeological Heritage, ETS No.143. Council of Europe. Valleta. 16.1.1992.

COE.2000. European Landscape Convention, ETS No.176. Council of Europe. Florence. 20. 10. 2000.

COE. 1996. Pan-European Biological and Landscape Diversity Strategy. Council of Europe. Sofia. 23.10.1995.

COE. 2005. Council of Europe Framework Convention on the Value of Cultural Heritage for Society, CETS No.199. Council of Europe. Faro. 27. 10. 2005.

COE. 2017. European Cultural Heritage Strategy for the 21st century – facing Challenges by following Recommendations. Council of Europe. May 2017.

EASA, 2016. European aviation environmental report 2016. European Union Aviation Safety Agency, Cologne, Germany. 2016

EC.2002. Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise

EC. 2011. Our life insurance, our natural capital: An EU biodiversity strategy to 2020. COM/2011/0244 final

EC. 2012. The EU Approach to Resilience: Learning from Food Security Crises. Communication from the Commission to the European Parliament and the Council. COM(2012) 586 final. European Commission. Brussels, 3.10.2012

EC. 2013a. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - "A Clean Air Programme for Europe", COM(2013) 918 final

EC. 2017. A Strategic Approach to Resilience in the EU's external action. Joint Communication to the European Parliament and the Council. JOIN(2017) 21 final. European Commission and High Representative of the Union for Foreign Affairs and Security Policy. Brussels, 7.6.2017

EC. 2018. European Framework for Action on Cultural Heritage. European Commission. Brussels. 5. 12. 2017.

EC. 2019. The European Green Deal. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM (2019) 640 final.

EC. 2020. Proposal for a Regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law). COM(2020) 80 final 2020/0036 (COD).

EC.2020b. A new Circular Economy Action Plan: For a cleaner and more competitive Europe. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2020) 98 final. Brussels, 11.3.2020

EC, 2020: Natura 2000 Nature and Biodiversity Newsletter, No 47/2020 (<https://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/ENG%20Nat2k47%20WEB.pdf>)

EC, 2020c. Health effects of noise. European Commission. 2020:
https://ec.europa.eu/environment/noise/health_effects_en.htm

EEA, 2004: High Nature Value Farmland: Characteristics, Trends And Policy Challenges

EEA. 2008. Environment and health. European Environmental Agency, 2008.

EEA. 2014a. Air quality in Europe – 2014 report. European Environment Agency. Copenhagen. 2014.

EEA, 2014b. Technical Report No 2/2014, Spatial analysis of green infrastructure in Europe

EEA. 2015. Air quality in Europe – 2015 report. European Environment Agency. Copenhagen. 2015.

EEA, 2016a. Landscapes. European Environment Agency. Copenhagen. 2008.

EEA, 2016b. Air quality in Europe – 2016 report. European Environment Agency. Copenhagen. 2016.

EEA. 2017. Air quality in Europe – 2017 report. European Environment Agency. Copenhagen. 2017.

EEA, 2018, European waters: assessment of status and pressures 2018, EEA Report No 7/2018, European Environment Agency (<https://www.eea.europa.eu/publications/state-of-water>) accessed 20 May 2020.

EEA. 2018a. Air quality in Europe – 2018 report. European Environment Agency. Copenhagen. 2018.

EEA. 2018b. Mercury in Europe's environment. A priority for European and global action. European Environment Agency. Copenhagen. 2018.

EEA, 2019a. The European environment — state and outlook 2020. Knowledge for transition to a sustainable Europe. European Environment Agency, Luxembourg. URL: <https://www.eea.europa.eu/publications/soer-2020/soer-2020/viewfile#pdfjs.action=download>

EEA. 2019b. Air quality in Europe – 2019 report. European Environment Agency. Copenhagen. 2019.

EEA, 2019c: EEA signals 2019 – Land and soil in Europe, Why we need to use these vital and finite resources sustainably

EEA. 2019d. Exposure of Europe's population to environmental noise. European Environment Agency. Copenhagen. 2019

EEA.2019e. Annual Indicator Report Series. Environmental indicator report 2018. Environmental noise. European Environment Agency. Copenhagen. 2019: <https://www.eea.europa.eu/airs/2018/environment-and-health/environmental-noise>

EEA, 2019f. Landscape fragmentation pressure and trends in Europe. European Environment Agency. URL: <https://www.eea.europa.eu/data-and-maps/indicators/mobility-and-urbanisation-pressure-on-ecosystems-2/assessment#tab-used-in-publications>

EEA, 2019g. Landscape fragmentation pressure and trends in Europe. European Environment Agency. URL: <https://www.eea.europa.eu/downloads/3a81d6f1907143db84677b1297a42f56/1576248745/assessment.pdf>

- EEA, 2019h. State of Nature in the EU 2020 – draft (<https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/condition-of-habitat>)
- EEA, 2020a. Natura 2000 barometer (<https://www.eea.europa.eu/data-and-maps/dashboards/natura-2000-barometer>, accessed on 17 June 2020)
- EEA, 2020b. Health impacts of air pollution. European Environmental Agency. Copenhagen. 2020.
- EEA, 2020c. Environmental noise in Europe – 2020. European Environmental Agency. Copenhagen. 2020.
- EEA, 2020d. Data and maps – Land take and net land take, URL: <https://www.eea.europa.eu/data-and-maps/dashboards/land-take-statistics#tab-based-on-data>
- EEA, 2020e. Landscape fragmentation status and trends, 2009-2015: affected lands. European Environment Agency. URL: https://www.eea.europa.eu/data-and-maps/daviz/landscape-fragmentation-status-and-trend-5#tab-chart_1
- EP. 2019. EU Public Health Policies: State of play, current and future challenges. European Parliament, Policy Department for Economic, Scientific and Quality of Life Policies, Directorate-General for Internal-Policies. September 2019
- ETC/ATNI. 2019. Analysis of changes on noise exposure 2007 – 2012 – 2017. European Topic Centre on Air pollution, transport, noise and Industrial pollution. 2019.
- EU. 2008. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
- EU. 2008. Presidency Conclusions. 7652/1/08REV1. Council of the European Union. Brussels. 20 May 2008.
- EU.2009. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. European Parliament and the Council of the European Union. 30 November 2009
- EU. 2013. Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 ‘Living well, within the limits of our planet’.
- EU. 2014. Conclusions of the European Council. EUCO 169/14. Brussels. 24 October 2014
- EU.2014. Regulation (EU) No 282/2014 of the European Parliament and of the Council of 11 March 2014 on the establishment of a third Programme for the Union's action in the field of health (2014-2020) and repealing Decision No 1350/2007/EC
- EU. 2016. 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.
- EU. 2018. Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste
- EU Open Data Portal, 2019. Special Eurobarometer 466: Cultural Heritage. URL: https://data.europa.eu/euodp/en/data/dataset/S2150_88_1_466_ENG
- Eurostat, 2019. Collection: Statistical books. Culture statistics, 2019 edition. European Union, September 2019.
- FAO. 2017. Global Soil Organic Carbon Map, URL: <http://www.fao.org/3/a-i8195e.pdf>

- IAIA. 2018. International Best Practice Principles: Biodiversity and Ecosystem Services in Impact Assessment. International Association for Impact Assessment. Special Publication Series No. 3 January 2018
- IPBES, 2018: The Regional Assessment Report On Biodiversity And Ecosystem Services For Europe And Central Asia
- JRC.2014. European Commission. Joint Research Centre. Institute for Prospective Technological Studies. Human Health Impacts of Climate Change in Europe. Report for the PESETA II project. 2014.
- JRC, 2018. Agricultural land abandonment in the EU within 2015-2030, Joint Research Centre. URL: <https://ec.europa.eu/jrc/sites/jrcsh/files/jrc113718.pdf>
- JRC, 2019. Baseline distribution of species listed in the 1st update of Invasive Alien Species of Union concern, EUR 29675 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-00280-2, doi:10.2760/75328, JRC114406
- OECD/EU.2018. Health at a Glance: Europe 2018: State of Health in the EU Cycle. OECD Publishing. Paris. https://doi.org/10.1787/health_glance_eur-2018-en
- Palerm, Juan and Roel Slootweg. 2020. Personal communication
- Kovács et al, 2013. Landscape in the spatial planning system of European countries. Fábos Conference on Landscape and Greenway Planning: Pathways to Sustainability. Filepné Kovács, Krisztina & Ágnes, Sallay & Jombach, Sándor & Valánszki, István. University of Massachusetts, Amherst. 13. 4. 2013.
- Kundzewicz, Zbigniew W.; Pińskwar, Iwona; Brakenridge, G. Robert (2014). Changes in river flood hazard in Europe: a review. Hydrology Research 1 April 2018; 49 (2): 294–302. doi: <https://doi.org/10.2166/nh.2017.016>
- SEPA. 2019. Guidance on consideration of material assets in Strategic Environmental Assessment. SEPA Guidance Note LUPS-SEA-GU4. Scottish Environment Protection Agency. 05.04.2019
- UN. 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Resolution 70/1. United Nations General Assembly. 25 September 2015
- UNECE. 2012. Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment. United Nations. New York and Geneva, 2012
- UNECE. 2017. Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context. United Nations Economic Commission for Europe
- UNESCO, 1972. Convention concerning the protection of the World Cultural and Natural Heritage. United Nations Educational, Scientific and Cultural Organization. Paris. 16. 11. 1972.
- UNESCO, 2001. Convention on the Protection of the Underwater Cultural Heritage. United Nations Educational, Scientific and Cultural Organization. Paris. 2. 11. 2001.
- UNESCO, 2003. Convention for the Safeguarding of the Intangible Cultural Heritage. United Nations Educational, Scientific and Cultural Organization. Paris. 17. 10. 2003
- UNESCO, 2020. World heritage List Statistics by region. URL: <https://whc.unesco.org/en/list/stat>
- UNESCO, 2020a. World heritage list. URL: <https://whc.unesco.org/en/syndication>
- UNESCO, 2020b. World heritage list, .kml file. URL: <https://whc.unesco.org/en/syndication>
- UNESCO, 2020c. List of World Heritage in Danger by Year. URL: <https://whc.unesco.org/en/list/stat#s7>

WHO. 2013a. Health 2020, A European policy framework and strategy for the 21st century. World Health Organization, Regional office of Europe, 2013.

WHO. 2013b. Successes and Failures of Health Policy in Europe, Four decades of divergent trends and converging challenges. World Health Organization, Regional office of Europe, 2013

WHO and UNECE. 2015. Improving environment and health in Europe: How far have we gotten? WHO, Regional office of Europe and United Nations Economic Commission for Europe. 2015

WHO. 2020. Health topics. Environment and health. Chemical safety. Data and statistics. World Health Organization, Regional office of Europe, 2020: <http://www.euro.who.int/en/health-topics/environment-and-health/chemical-safety/data-and-statistics>

WHO. 2005. International health regulations (2005) -- 3rd ed. ISBN 978 92 4 158049 6

WHO. 2018. Joint external evaluation tool: International Health Regulations (2005). World Health Organization.

WHO and UNECE. 2017. Declaration of the sixth ministerial conference on environment and health. World Health Organization, Regional office of Europe and United Nations Economic Commission for Europe. Ostrava, Czech Republic. 2017