Interreg Atlantic Area

Co-funded by the European Union

Final Environmental Assessment Report

Screening of the Strategic Environmental Assessment

Interreg Atlantic Area 2021-2027 Programme

spi
Sociedade Portuguesa de Inovação

List of Abbreviations

AA - Atlantic Area

CBD - Convention on Biological Diversity

CCDR-N - Norte Regional Coordination and Development Commission

EEA - European Environment Agency

ERDF - European Regional Development Funds

FG - Fragmentation Geometry

FWI - Fire Weather Index

ISO 1 - Interreg Specific Objective

KICs - Skills and Innovation Communities

MPAs - Marine Protected Areas

MSFD - Marine Strategy Framework Directive

NIS - Number of Non-Indigenous Species

NMVOCs - Non-Methane Volatile Organic Compounds

PAHs - Polyaromatic Hydrocarbons

PBDE - Polybrominated Diphenyl Ethers

PM - Particulate Matter

PO - Policy Objectives

RSS - Regional Spatial Strategies

SDG - Sustainable Development Goals

SEA - Strategic Environmental Assessment

SME - Small and Medium Enterprises

SO - Specific Objectives

SPI - Sociedade Portuguesa de Inovação

TEN-E - Trans-European Energy Network

TEN-T - Trans-European Transport Network

TRL - Technology Readiness Levels

VET - Vocational Education and Training

WEI+ - Water Exploitation Index

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Chapter 1

Introduction

1. Introduction

1.1 Contextualization and aims of the screening of the Strategic Environmental Assessment (SEA)

A screening of the Strategic Environmental Assessment (SEA) for the future Interreg Atlantic Area (AA) 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.

The main aim of the SEA Directive is "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development".

The SEA 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 environmental report, the performance of public participation and consultations and, finally, the results of the public participation and consultations in a plan or programme.

The purpose of the current SEA is to assure that the environmental consequences of the Interreg Atlantic Area Programme are identified and assessed in advance during its elaboration phase and before its implementation, through a methodology which involves the participation of the public and several environmental entities.

That way, the first phase consists of a screening to assess whether the implementation of a SEA is relevant and necessary, i.e., if the Interreg AA Programme is susceptible to have significant effects on the environment. The SEA process is based on the following documents:

- Directive 2001/42/EC, which defines the criteria for determining the likely significant effects, the characteristics of the plans and programmes and the characteristics of the impacts and the areas affected;
- Annex 1 of the Directive 2001/42/EC, which includes the information needed for the Environmental Report.

The current SEA is carried out under the direction of the management authority of the Programme (Norte Regional Coordination and Development Commission (CCDR-N)) and based on the European regulatory framework (Directive 2001/42/EC) and its transposition at the national level in the Member States participating in the Operational Programme of the AA: France, Ireland, Portugal and Spain. Each country complies with the following regulations:

- France: L'Ordinance no. 2004-480, of June 3rd 2004;

- Ireland: S.I No. 435/2004, modified by S.I. No. 200 of 2011, and S.I. No. 436/2004, modified by S.I. No. 201 of 2011;
- Portugal: Decree 232/2007, of June 15th 2007 (amended by the Decree 58/2011, of May 4th 2011).
- Spain: Law 21/2013, of December 9th 2004.

The Directive states that a SEA is required for all plans and programmes [1]:

a) Which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II of the Directive 85/335/ECC;

b) Which, in view of the likely effect on sites, have been determined to require an assessment pursuant to article 6 or 7 of Directive 92/43/EEC;

c) Which determine the use of small areas at local level and minor modifications to plans and programmes;

d) Which set the framework for future “non-EIA projects” and “non-SEA sector”.

The main goal of this particular screening is to further strengthen environmental considerations into the preparation and adoption of the Interreg AA Programme for the period of 2021-2027. The SEA process has also other specific objectives, such as:

- Consider impacts and contributions of the draft programme on the relevant environmental policy objectives adopted at the European Union level;
- Assess the likely significant impacts of interventions proposed in the programme and their cumulative effects on key environmental issues in the programme area;
- Propose corrective measures to prevent, reduce and mitigate the adverse environmental effects caused by the Programme implementation;
- Involve environmental authorities and public in the process for consultations.

Therefore, this environmental report has been prepared to determine the need for a SEA for the Interreg AA Programme for 2021-2027. As stated before, the screening has been made in accordance with European Directive. Under such Directive, the corresponding process was adopted to submit for the consideration of environmental authorities the need to carry out a Strategic Environmental Assessment of the Interreg AA Programme for 2021-2027.

1.2 SEA methodology

Taking into consideration the requirements of the SEA Directive, specific types of plans must be subjected to an environmental assessment. To establish if a plan or programme needs to be subject to the full SEA process, a "screening" assessment is required against a series of criteria.

The overview of the main steps for performing an environmental assessment are detailed in Figure 1 [2].

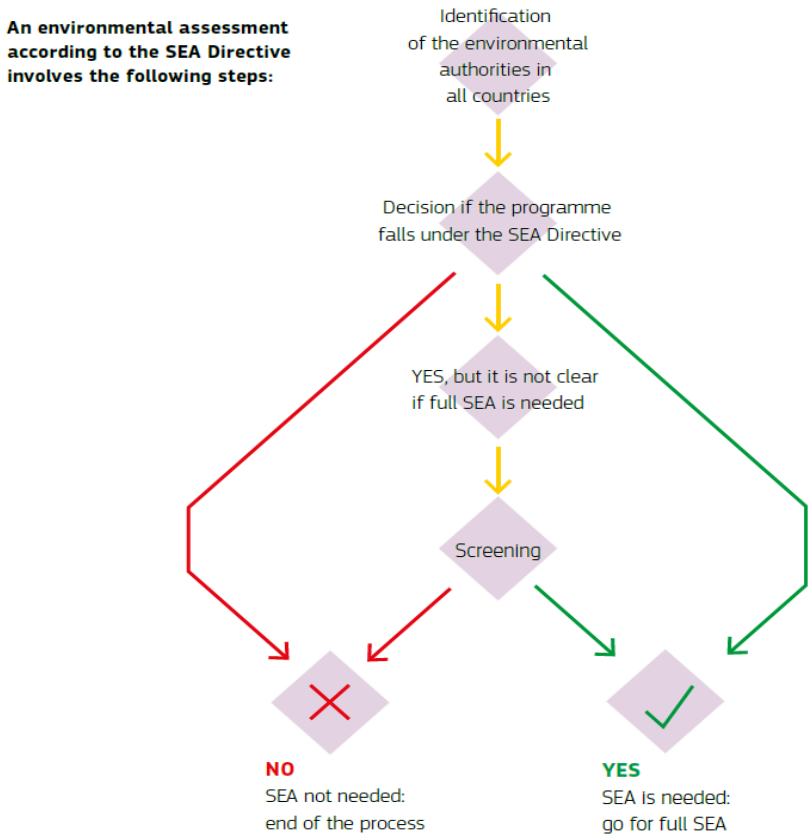


Figure 1: Overview of the process steps for carrying out an environmental assessment.

Source: [2]

Before initiating the screening process, the Member State where the Managing Authority is located starts by consulting the Public Administrations that will perform the processes technical analysis and, if necessary, determine the possibility of initiating an assessment process on the appropriateness of conducting a Strategic Environmental Evaluation.

Therefore, the first phase consists of a screening to assess whether the implementation of a SEA is relevant and necessary, i.e., if the Interreg AA Programme is susceptible to have significant effects on the environment. Sociedade Portuguesa de Inovação (SPI) was the consultant

company chosen to support the entities involved in the elaboration of the new Interreg Atlantic Area Programme in the SEA screening process.

The methodology for the present SEA screening process for the Interreg Atlantic Area Programme is based on the following structure:

Phase 1: Assessment of the environmental impact

This main aim of this phase is to elaborate an environmental assessment report to distribute to the national authorities of each country.

In this phase, the impact of the Programme in the environment will be assessed, using the identified priorities and objectives for the new Programme's proposal as a basis. The full Programme will be analysed in detail and later the most relevant aspects that could influence and interfere in the environmental impact will be identified. This analysis will be based in Annexes I and II of the Directive 2001/42/EC, which describe the criteria for determining the likely significant effects of these programmes.

Phase 2: National and regional authorities' consultation and public consultation

The environmental assessment report will be made available to the national and regional authorities nominated, requesting for feedback and comments. After consultation to the national and regional authorities, a collaborative environmental report will be developed and made available to the environmental authorities and the public for consultation. This task includes preparing the organization of public consultations (in collaboration with the Managing Authority/ Joint Secretariat) with the environmental authorities and the general public of the Member States involved.

Phase 3: Elaboration of general recommendations

After the public consultation by the National and Regional Environmental Authorities of the countries affected by the environmental impact of the Programme (Phase 2), the Final Environmental Assessment Report will be developed. At the end of this phase, considering the contributions from the competent authorities and the criteria describe in Annex II of the SEA Directive, general recommendations will be made on whether a full environmental impact assessment should be carried out.

At the end of the phases and considering the consultation processes, there are two possibilities:

- The Programme has no significant effects on the environment; therefore, the process should be concluded; or

- The Programme has significant effects on the environment; hence, a full SEA should be developed.

The present report is the result of the phase 3 and provides recommendations on whether a full SEA of the Interreg AA Programme for 2021-2027 should be carried out. This report includes the results of the consultation with the environmental authorities (conducted between 25th October and 22nd November 2021) and the general public of the Member States (conducted between 26th January and 28th February 2022).

1.3 Content of the Report

Besides the current chapter, the present Final Environmental Assessment Report contains the following chapters:

- **Interreg Atlantic Area 2021-2027 Programme Proposal**: this chapter presents the programme area, the territorial analysis, followed by the presentation of the programme strategy (including the priorities and specific objectives selected), reasons for the selections, relationship with other plans or programmes and finally the description of the environmental objectives which are relevant to the Programme;
- **Relevant aspects of the current state of the environment and future trends**: this chapter describes the relevant aspects of the current state of the environment and future trends with particular focus on: air, water, soil, biodiversity, climatic factors, population and human health, material assets, landscape and cultural heritage.
- **Possible effects on the environment**: this chapter includes the assessment of the environmental impacts (positive, negative or no significant) of the programme regarding the previous environmental issues;
- **Proposed mitigation and enhancement measures**: this chapter describes the measures to prevent, reduce or mitigate significant adverse effects on the environment of implementing the programme;
- **Monitoring measures foreseen by the Interreg AA 2021-2027**: this chapter presents the monitoring measures foreseen by the Interreg AA 2021-2027;
- **Final remarks**: this chapter presents general recommendations on whether a full environmental impact assessment should be carried out, the European regulation (namely the horizontal principles and the do no significant harm principle) and the feedback from environmental authorities and general public to the environmental assessment report.

Chapter 2

Interreg Atlantic Area 2021-2027 Programme Proposal

2. Interreg Atlantic Area 2021-2027 Programme Proposal

2.1 Programme Area

The Interreg Atlantic Area is a European funding programme that promotes transnational cooperation in the Framework of the EU Cohesion Policy. The previous Interreg Atlantic Area (2014-2020) supported transnational cooperation projects in 36 Atlantic regions (NUTS 2) of 5 countries: France, Ireland, Portugal, Spain and the United Kingdom, contributing to the achievement of economic, social and territorial cohesion. The Programme overall objective was to implement solutions to answer to regional challenges in the fields of innovation, resource efficiency, environment and cultural assets, supporting regional development and sustainable growth. With a total budget of 185 million € (140 million € from the European Regional Development Funds - ERDF), the Programme focused on four main priorities axis and specific objectives related [3].

Currently, the future Interreg AA Programme for the period of 2021-2017 is being prepared by a Task Force. The Task Force is composed by representatives of Programme' Member States (France, Ireland, Portugal and Spain), the Managing Authority (CCDR-N), the Joint Secretariat and the European Commission. The main aim of this Task Force is to prepare the Interreg Atlantic Area Programme for 2021-2027, all relevant documents related to the programming process and the future programme structures.

The Atlantic Area covers the western part of the Atlantic Ocean and includes all regions of Ireland and Portugal, as well as several French and Spanish regions close to or on the Atlantic Ocean coast. The Atlantic Area is made up of NUTS 2 from four Member States: France, Ireland, Portugal and Spain, including the island territories of the Azores, Madeira and the Canary Islands. The participation of the three insular regions will contribute to a more cohesive Atlantic Region, increase its natural and cultural heritage and enhance its comparative advantage related to its maritime perspective.

The Programme is composed by the following NUTS 2 regions (Figure 2):

- **France:** Normandie (Haute Normandie and Basse Normandie), Pays-de-la-Loire, Bretagne, Nouvelle-Aquitaine (Aquitaine, Limousin, Poitou-Charentes)
- **Ireland:** Northern and Western, Southern, Eastern and Midland
- **Portugal:** Norte, Algarve, Centro, Lisboa, Alentejo, Região Autónoma dos Açores, Região Autónoma da Madeira
- **Spain:** País Vasco, Navarra, La Rioja, Cantabria, Principado de Asturias, Galicia, Andalucía, Islas Canarias.

Figure 2: Map of the Atlantic Area regions.

2.2 Territorial analysis and main challenges of the Atlantic Area

The Atlantic Area (AA), due to its geographical and maritime characteristics, is in constant evolution and subject to challenges that are common to all the Member States and regions. Besides the challenges of balanced economic development and climate change, a new challenge has arisen: the COVID-19. This ultimate challenge is a major constrain and can be a serious risk for the social and economic evolution of the AA. In fact, the crisis generated by the Covid-19 pandemic and the needs for resilience is very present in the Programme's strategy.

The Atlantic Area is a territory where there are some imbalances between the regions. At macro level, the income per capita has important differences. The Irish and French regions exceed the EU27 average (18,800 euros per capita, 2017). In contrast, the southern regions are at much lower levels. There is also high disparity in unemployment rates between the north and the south of the area. In Ireland and Portugal regions, the unemployment rate is lower than the EU27 average values (8.1% in 2019). French regions are above the EU27 average, with the exception of Normandie and Nouvelle Aquitaine. In the case of the Spanish regions, the unemployment rate is much higher than the EU average. The unemployment rate is especially high, in all countries,

in those under 25. In general, it can be concluded that the unemployment rates, for all age groups and by gender, are in line with the general unemployment rates for the AA. However, Covid-19 crisis shows an overall worsening of economic indicators, including unemployment.

As stated before, the Atlantic Area is facing several challenges, some of them are standing out due to the COVID-19 crisis. Based on the Territorial Analysis carried out, several characteristics and challenges were identified for the AA as described below.

Land territory mainly maritime: The AA is a very large territory, mainly consisting of the Atlantic Ocean with several similarities in economic sectors, culture and biodiversity.

Land-sea interactions: The programme's maritime approach involves interactions with inland territories, which impact on the coastal areas and the ocean itself. Waste management to prevent waste from reaching the sea, circular economy actions, promotion of renewable energies, economic activities complementary or contributory to the blue economy, innovation centres and sustainable tourism are examples of the necessary land-sea interaction in the programme.

Competitiveness and innovation capacities: There are strong disparities between the regions in terms of competitiveness and innovation capacities. The differences are both between countries (especially North-South) and within each Member State, and between regions close to two Member States.

Blue growth: The Atlantic is the common element of the cooperation area, as well as the activities linked to blue growth and the blue economy sectors. The territory has strong economic sectors such as fishing, fisheries, aquaculture, agroindustry, renewable energies, ports and water projects, naval sector, tourism linked to landscape, natural and cultural heritage sites. The Atlantic Area ports are key stakeholders and act as economic drivers. They also have a large capacity for interaction between coast and land and are strong consumers of energy and waste generators.

Covid's impact: The territory has been largely impacted by the effects of the Covid-19 crisis. The reconversion of certain sectors and product, process and social innovation are basic pillars for the survival of the economic sectors of the Atlantic Area and the protection of its resources on the longer term.

Tourism: Tourism is an essential activity throughout the area and faces scenarios of uncertainty for which innovation and creativity in the provision of services, digitalisation, adaptation to legal requirements and visitor perception are elements to which the Programme can contribute. Post-Covid tourism prioritises elements such as safety and non-overcrowding.

Smart blue skills: The situation in the companies of the maritime sectors but also the COVID-19 crisis forces a reconversion of the traditional forms of development of the activities. For instance,

in industry and the service sector, giving priority to smart and sustainable new skills, especially in digitalisation, adaptation to change, efficient and non-polluting industry 4.0, among others. Workers and companies need support in those economic activities specific to the maritime space. It is important to outline and develop innovative skill-oriented training programs, promoting sustainable collaboration between maritime and port activities and academia and research centres.

Climate change & risks: The territory faces common and supranational challenges arising from the effects of climate change and natural risks, particularly coastal and areas closer to coast, as well as and waterways-related risks.

Biodiversity: The territory is very rich in natural and cultural protected areas. The marine biodiversity is a wealth for the cooperation area that must be preserved. At the same time, this natural heritage is a vector of attraction and well-being for the territory that must be used to support economic activities such as tourism.

Resource efficiency and production of blue energies: The Atlantic Area, as an eminently maritime and coastal area, has important resources for the generation of renewable energies, in particular, those classified as blue energy: tides, waves and wind. Ports, industries, urban areas are large consumers of energy that need to be used in an efficient way and can be provided by renewable means, with proximity between the point of production and consumption.

Circular economy: The circular economy is a critical factor that combines actions of preservation and economic valorisation, promoting a more harmonious development of the points with the greatest concentration of resources such as ports and urban areas. Fighting pollution of the ocean through collection and recycling (plastics) but also preventing inland waste discharge into the ocean is a priority to tackle a good quality environment.

2.3 Cohesion Policy for the period of 2021-2027 - Planning objectives

The European Commission presented the Cohesion Policy for the period of 2021-2027. The EU cohesion policy has set a shorter, modern menu of 5 policy objectives (PO) supporting growth for the period 2021-2027. The new framework proposes the following five main PO to guide the European Union investments:

- PO1: a more **competitive** and **smarter** Europe;
- PO2: a **greener**, low-carbon transitioning towards a net zero carbon economy;
- PO3: a more **connected** Europe by enhancing mobility;
- PO4: a more **social** and inclusive Europe;

- PO5. Europe **closer to citizens** by fostering the sustainable and integrated development of all types of territories.

These objectives represent the direction that should be taken by the various Programmes co-financed by the EU Cohesion Policy, which include the European Regional Development Funds (ERDF). The ERDF aims to strengthen economic, social and territorial cohesion in the European Union by correcting imbalances between its regions. In 2021-2027 it will enable investments in a smarter, greener, more connected and more social Europe that is closer to its citizens [4].

Based on their prosperity, all regions and Member States will concentrate the support on a more competitive and smarter Europe (PO 1), as well as greener, low-carbon transitioning towards a net-zero carbon economy and resilient Europe (PO2). All regions and Member States will concentrate at least 30% of their allocation to PO2 and:

- More developed regions or Member States will dedicate at least 85% of their allocation to PO1 and PO2;
- Transition regions or Member States at least 40% to PO1;
- Less developed regions or Member States at least 25% to PO1.

All regions and Member States will also concentrate at least 8% of their allocation to urban development that will be delivered through local development partnerships with different tools.

Operations under the ERDF are also expected to contribute 30 % of the overall financial support to climate objectives [4].

Interreg is the Union's instrument to support cooperation across regions and countries in order to further develop joint services and strengthen solidarity. Interreg provides funding for projects between Member States, their outermost regions, the EU acceding countries and the neighbourhood countries. In 2021-2027, Interreg will continue to support cross-border mobility, and efforts to develop environmental protection, emergency services, skilled jobs and access to public services [4]. In addition, Interreg Programmes include two new objectives will steer territorial cooperation:

- ISO1: Better cooperation governance
- ISO2: A safer, more secure Europe.

Interreg has an impact on citizens' lives at different levels. It encompasses cross-border cooperation along all EU land and maritime borders; transnational cooperation, including macro-regional strategies and sea basins; and interregional cooperation, which builds networks and lets leading regions share their successes and experience with other territories.

In accordance with the Regulation (EU) 2021/1060 (Article 5), ERDF shall support a set of specific objectives. Additionally, under Interreg programmes, the ERDF may also support the Interreg-specific objective of 'a better cooperation governance' and 'a safer and more secure Europe' (Regulation (EU) 2021/1059 (Article 14)), as shown in Annex 1.

2.4 Programme Strategy for the Interreg Atlantic Area 2021-2027

The Atlantic Area Draft Programme is the result of the work carried out by the Task Force for the preparation of the Interreg AA Programme for the period 2021-2027. The strategic formulation of the Interreg AA 2021-2027 is based on the selection of the Policy Objectives (PO) and Specific Objectives (SO) set out in Article 5 of Regulation (EU) No. 2021/1060 on the ERDF.

The Interreg Programmes should set out a joint strategy for the programme's contribution to the policy objectives described in Annex I. The Program, through its transnational cooperation activities, intends to contribute to this strategy and objectives, adopting cooperation priorities and achievable specific objectives, capable of generating measurable results of change in the territory of the Atlantic Area.

The Interreg AA 2021-2027 Programme is primarily based on the three PO:

- **PO1**: A smarter Europe by promoting innovative and smart economic transformation;
- **PO2**: A greener, low-carbon Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaption and risk prevention and management;
- **PO4**: A more social Europe implementing the European Pillar of Social Rights.

The AA Programme would also contribute to a better governance of the cooperation area through the selection of the Interreg Specific Objective (ISO 1) - Better governance of cooperation. Therefore, the Interreg AA Programme will be based on 4 Priorities.

This Programme focuses on measures which according to the current draft Interreg AA 2021-2027 Programme are foreseen to be implemented in the following 4 priorities and 8 specific objectives (SO), as presented in Figure 3.

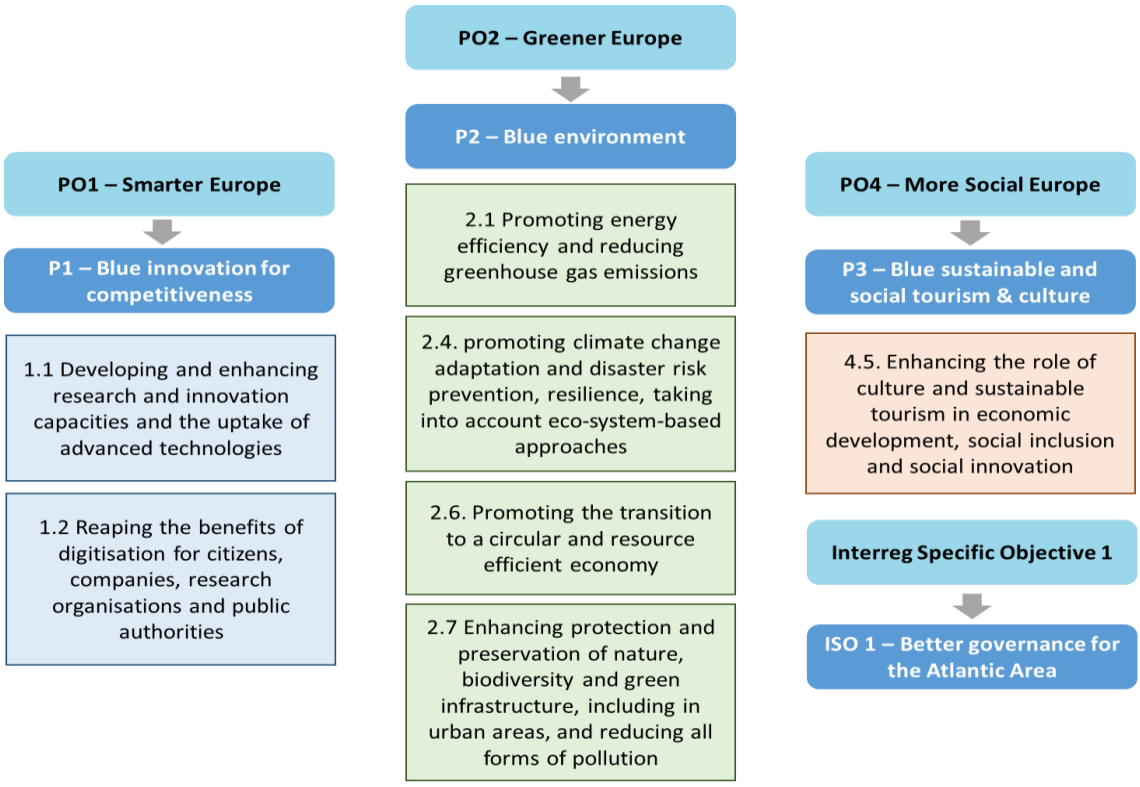


Figure 3: Strategy for the Interreg AA Programme for the period 2021-2027.

2.4.1 Priorities

The selection of the Policy Objectives, Priorities and corresponding Specific Objectives is based on the main weaknesses and challenges identified in the territorial analysis. Considering the four priorities previously defined, Table 1 shows the priorities, specific objectives and the justification for the selection of the PO that structure the Interreg AA 2021-2027 Programme.

Table 1: Description of selected priorities of the Interreg Atlantic area 2021-2027.

Selected PO	Priority	SO	Justification for selection
PO1	Blue innovation and competitiveness (Priority 1)	1.1.	Innovation is a key element for strengthening the competitiveness of the productive sectors of the AA, from the point of view of transnational cooperation. The connection of knowledge + innovation centres is a priority in the sectors that make up the Blue Economy, due to the Atlantic maritime nature of the cooperation area. Investing in "stimulating innovation" as such should not be the most relevant topic for cooperation on innovation, should focus on the AA on subjects connected directly with the Ocean or with maritime/main activities.
		1.2.	Digitalisation is a general challenge for economic sectors and public administration. The European Green Deal and the Next Generation initiative highlight and prioritise such actions for economic competitiveness, care, citizens' well-being and adaptation to changes in consumer behaviour and forms of production. Skilling and reskilling of people at work or in training towards digitalisation and new technologies must be encouraged as well as the use of ICTs by Small and Medium Enterprises (SMEs) and local authorities (data, tools…) and their access provision to end users. The coordination of the regional smart specialization strategies about this issue is also a need.

Selected PO	Priority	SO	Justification for selection
PO2	Blue environment (Priority 2)	2.1.	AA needs to accelerate its commitment to energy efficiency and production systems based on renewable energies, mainly green/blue energy systems (waves, tidal currents but also wind and solar). This contributes to the reduction of air pollution, the improvement of the quality of life of citizens and the fulfilment of the objectives of the Sustainable Development Goals (SDG) and the European Green Deal. Investments in renewable energy are expensive and the cooperation programme does not have the resources to carry them out. However, the programme can encourage the analysis of the possibilities for new blue energy projects, favour the coordination of regional and national actors and improve the conditions of exploitation. In proportion to its means, the programme can contribute to the long-term achievement of a carbon-neutral zone in the Atlantic Area.
		2.4.	Coastal areas and inland areas close to the coast are highly exposed to the effects of climate change on natural environments, heritage and current forms of economic activity. It is necessary to continue analysing the impacts and proposing solutions for the future to build climate resilience, guarantee the sustainability of economic activities and preserve the existing fauna and flora to immediate, medium and long-term changes. Natural risks are a permanent element in the Atlantic area and have been increased by the effects of climate change. Considering the Atlantic area has the advantage of having common risks for a good part of the cooperation area, it is of great interest to address them jointly, to capitalize on those results.

Selected PO	Priority	SO	Justification for selection
		2.6.	The circular economy is a set of activities, actions and consumers behaviour that lead to the reduction (including elimination) of net waste resulting from human and industrial activities. The Atlantic area is a territory that must conciliate economic development with the preservation of its rich natural and cultural heritage. The circular economy contributes to this objective as well as to other more global Europeans environmental purposes. It is particularly important in resource-intensive industrial sectors (construction, industry, plastics, marine waste) and is supported by the digitisation and efficiency of production chains (support to bioeconomy, economy of functionality, etc.).
		2.7.	The cooperation area is rich in biodiversity and cultural and natural heritage resources that constitute richness. Air quality, noise and light pollution need to be tackled. Moreover, a balanced development between the protection of natural areas and economic activities that stimulate local economies must be attained.
PO4	**Blue sustainable and social tourism & culture (Priority 3)**	4.5.	The AA has an abundance of cultural and natural heritage. This priority will help harness these assets to stimulate economic development, both in urban and rural areas. Likewise, the development of well-trained tourism professionals with the capacity to adapt tourism services to the crucial and dominant trend of sustainable tourism, taking also in consideration the post-COVID period, is required. Tourism can help the development of agile innovative social/societal solutions and inclusive responses. The Atlantic area has a rich intangible cultural heritage that is common to the regions of the territory, and that encompasses creative and cultural industries.
ISO 1	**Better governance for cooperation in the Atlantic area (Priority 4)**		Governance has great importance to coordinate actions and maximise the results of projects in the cooperation area. AA requires better coordination with national, regional and local policies and European initiatives like the Maritime Atlantic Strategy to develop coordinated approaches. Governance has a horizontal approach for all SOs and may be implemented through the ISO1.

Source: AA 2021-2027 – Cooperation Programme (Draft).

2.4.2 Specific objectives and type of actions

The four priorities presented before are associated with 8 specific objectives. Each specific objective has a set of indicative type of actions in order to attain their main objectives and the results expected. The following tables describes the rationale and examples of supported actions for Priority 1 (Table 2), Priority 2 (Table 3), Priority 3 (Table 4) and Priority 4 (Table 5).

Table 2: Specific objectives' rationale and examples of actions supported under Priority 1.

PRIORITY 1: BLUE INNOVATION FOR THE COMPETITIVENESS OF THE ECONOMIC SECTORS	
SO	**Rationale and type of actions**
1.1.	Innovation is a key element for strengthening the competitiveness of the productive sectors of the AA, from the point of view of transnational cooperation. The connection "knowledge + innovation centres" is a priority in the sectors that make up the Blue Economy, due to the Atlantic maritime nature of the cooperation area. The specific objective supports the activities of the blue economy sectors as well as in other relevant sectors such as the green/ organic economy, industry 4.0, the silver economy and social innovation, cultural and creative industries. The SO 1.1 main aims are improving SME competitiveness, strengthening the capacities of innovation stakeholders and the competitiveness of the entrepreneurial ecosystems and finally, feeding public policies. Actions should contribute to the strengthening (or creation) of networks of innovation, with business support organisations, quadruple helix partnerships and value chains. Thus, the link with regional strategies of smart specialisation as well as with the blue economy will be positively valued. More concretely, the programme will fund the following type of actions: - Assisting stimulation of innovation and entrepreneurship with the Programme area; - Supporting innovation in blue economy sectors, including social innovation in the Atlantic area;

PRIORITY 1: BLUE INNOVATION FOR THE COMPETITIVENESS OF THE ECONOMIC SECTORS	
	- Improving capacities and cooperation, including digitalisation to help technology and innovation transfers to SMEs and other stakeholders (ports, local communities, public authorities…) in the blue economy sectors to increase their competitiveness and resilience (upskilling, social inclusion, etc.); - Developing and applying new materials for the blue economy activities; Key enabling technologies [TRL-6+ (Technology Readiness Levels)]; - Enhancing sectorial smart specialisation strategies: enhance the knowledge, skills and innovation communities (KICs), in particular in terms of blue economy; - Fostering interregional multi-level maritime clusters (quadruple helix); - Improving collaboration along value chains of products and services through support to innovation, to open up new business opportunities and markets and help societal resilience; - Supporting marine observation to provide robust data, from which innovative products and services could be developed in established and emerging maritime sectors; - Supporting innovation in the blue bioeconomy: healthcare and pharmaceutical applications; and aquaculture; industrial processes and manufacturing; energy production, biological waste prevention and recycling through technology and the use and valorisation of marine and maritime (co)products, etc; - Supporting the fishing and aquaculture sector through innovation to develop new products and applications in food, feed, fertilisers, cosmetics, nutraceuticals, pharmaceuticals, bio-materials, etc; - Support social entrepreneurship and cultural & creative industries in a post-covid context.
1.2.	Traditional sectors often encompass a large number of micro-enterprises with quite limited financial and human resources for the digital transformation. Digitisation is a tool to foster competitiveness of businesses and resilience of territories. Thus, not only technological aspects come into play, also business models and strategies, as well as data and access to ICT need to be considered for an adequate support. It is important to help the digital transition of the whole ecosystem (academics, businesses, local communities and public authorities). The activities of the blue economy, common throughout the territory, have been impacted by the COVID-19 crisis. Therefore, the digitisation of sectors has accelerated and it is even more relevant considering this crisis. A reskilling of workers towards digitalisation and new technologies must be encouraged. Tourism, shipbuilding, the fishing industry, among other sectors are very impacted

PRIORITY 1: BLUE INNOVATION FOR THE COMPETITIVENESS OF THE ECONOMIC SECTORS

and need urgent adaptation. The SO 1.2 main aim is achieving a bigger impact in the AA through combination of digitisation and skilling actions. This SO focus on promoting the digitisation of the blue economy services and exploring how tourism could benefit from digitisation. The qualification of people for digitization and new technologies should be encouraged, as well as the use of ICT by SMEs and local authorities (data, tools…), and their availability and access to end users. The coordination with regional strategies of smart specialisation is also necessary.

More concretely, the programme will fund the following type of actions:

- Raising awareness, training and making digital tools/ processes/ services available: information events, workshops, technology demonstration, free information sessions, one-to-one consulting, third places with access to digital tools and training, collect and use of data to develop new digital products and services;
- Training programmes/ modules to respond to the needs of the companies and workers in the key maritime sectors promoting digital platforms and data, by developing appropriate employment model trainings;
- Promoting maritime training programmes and methodologies valid for the whole Atlantic area and transferable among blue economic sectors;
- Coordinating and taking advantage of existing information platforms for job opportunities and harvest their potential for blue jobs;
- Adaptation of Industry 4.0 through collaborative projects with digital upskilling, tools (e.g. online platforms and market places) and processes (e.g. logistics and storage) and digitalisation of the blue economy sectors and public services to adapt to climate change and face the COVID-19's consequences;
- Strengthening collaboration between education and industry by assessing the needs for digitalisation in the value chain and promoting the adaptation of the technical and vocational education and training (VET) plans;
- Reinforcing entrepreneurship and self-employment models in the digital sectors by using digitalisation tools in all the sectors;
- Capitalisation actions from previous periods in the Atlantic area or in other Territorial Cooperation programmes.

Source: AA 2021-2027 – Cooperation Programme (Draft)

Table 3. Specific Objectives' rationale and examples of actions supported under Priority 2.

PRIORITY 2: BLUE ENVIRONMENT	
S.O.	**Rationale and type of actions**
2.1	AA needs to accelerate its commitment to energy efficiency and production systems based on renewable energies and blue energy systems. This contributes to the reduction of air pollution, the improvement of the quality of life of citizens and the fulfilment of the objectives of the SDG and the European Green Deal. The programme can encourage the analysis of the possibilities for new green/ blue energy projects, favour the coordination of regional and national actors and support SMEs to develop and test their pilots in real conditions. The programme can contribute to the long-term achievement of a carbon-neutral AA. More concretely, the programme will fund the following type of actions: - Supporting common strategies to reduce GHG emissions in the industrial sectors and housing and transports in the AA; - Supporting the development of business networks at AA level for the transition towards a climate-neutral economy and society in terms of efficient and sustainable energies; - Improving energy management by developing comparable models between regions and sectors of the AA, development of energy storage pilots and energy management systems, collection of data on energy management and their interoperability through digital technologies to help the development of green energies, energy efficiency and the reduction of GHG; - Developing local, regional and/or sectoral action plans to reduce GHG emissions thanks to renewable energies and the application of efficient techniques and technologies, especially related to the sea potential; - Supporting the development of sustainable ocean energy technologies and their application in the AA; - Capitalisation of the results of energy projects in the AA and in other areas of cooperation, in particular those with a maritime component; - Supporting pilot actions and measures increasing energy efficiency in the sectors of the blue economy (e.g., community led energy grids), and the integration of sustainable energy sources, including green hydrogen, methanisation, etc.;

PRIORITY 2: BLUE ENVIRONMENT	
	- Developing technological, legal and training solutions for the enhancement of marine renewable energies and energy efficiency in industrial estates, businesses, public facilities, social housings, etc.; - Pilot actions to test production of decentralised renewable energy and the empowerment of renewable self-consumers and local communities; - Encouraging ports (and also marinas) to share good practices, exchanging ideas and tackle problems jointly to reduce energy consumption and tap more into renewable energies; - Analysing the best options to reduce environmental impact to produce and even store energy, including best sites for marine renewable energy farms and adjacent ports across the Atlantic taking into account potential impacts on the marine environment.
2.4	Natural risks, in coastal areas and close to the coast, are a permanent shared issue in the Atlantic area with increased effects due to the climate change. In addition, risks linked to human activities are also an issue to tackle. Accordingly, there is therefore the necessity to anticipate potential human and natural risks ensuring effective adaptation measures as well as working on restoration of polluted environment. The SO 2.4 aims to: prevent from disasters and preserve the environmental status, restore polluted environment due to human activities and support stakeholders achieving effective planning and financing climate change adaption. More concretely, the programme will fund the following type of actions: - Identification of common natural and/ or technological hazards in the AA, data collection, analysis of their impacts, resilience and mitigation measures in coastal areas and close to the coast, development of mapping and joint action plans, especially for sectors of the blue economy and the marine environment; - Promoting sectoral or territorial plans for adaptation or mitigation to the effects of climate change, especially sectors of the blue economy; - Developing integrated strategies and solutions to support social resilience and counteracting socio-economic impacts on climate change, on groups and sectors; - Coastal protection measures/ nature-based solutions/ ecosystem services against natural and/ or technological and/ or man-made hazards compatible with landscape protection and the development of economic activities;

PRIORITY 2: BLUE ENVIRONMENT	
	- Increasing climate resilience of critical infrastructures through improved risks alerts and risks management plans; - Integrating adaptation to climate change in water management strategies: water quality, flooding, water scarcity, drinking water, ground water, promotion of a water saving culture, etc.; - Supporting marine observation to increase our knowledge and ability to forecast the behaviour of the ocean and its ecosystem and make the best of ecosystem services and stimulate behavioural change among the stakeholders (businesses, ports, public authorities, academics and local communities); - Strengthening capacity building and awareness raising to address environmental issues in order to change behaviour in the use of natural resources, including in tourism; - Supporting coordinated actions to prevent and response to deliberate and accidental pollution.
2.6.	The circular economy is a set of activities, actions and behaviours that lead to the reduction (including elimination) of net waste resulting from human and industrial activities. At the same time, the circular economy could contribute to the creation of new opportunities for business, production of goods and services and innovative solutions resulting in less negative impacts on the environment and more sustainable production systems. The actions of this SO will have to be concentrated on blue economy. For a circular economy it is essential to recycle materials from waste in order 'to close the loop'. The recovery of energy from waste also plays an important role. A circular economy model, which employs not only waste management, namely recycling and preparation for reuse, but also waste prevention, through the reuse of materials and responsible manufacture could support the development of new industries and jobs, reducing emissions and increasing efficient use of natural resources, including energy, water and materials. More concretely, the programme will fund the following type of actions: - Identification of the need for improvements and changes in sectorial value chains (blue economy sectors) and/ or local communities and/ or industrial estates to reduce barriers for circular economy applications and test pilots to boost behavioural change; - Increasing awareness of stakeholders about the need to transition towards a circular economy in the blue economy sectors and/ or local communities and/ or industrial estates in the AA;

PRIORITY 2: BLUE ENVIRONMENT	
	- Awareness actions to reduce the use of plastics and other materials and their discharge, as waste, into the ocean, and developing sustainable alternatives to the use of plastics and other materials by supporting the development of biodegradable organic substitutes or composites; - Exchanging knowledge and good practices on solutions to support circular economy, use and repair, recycling and upcycling in industrial sectors in blue economy, and testing them in pilot actions in the AA; - Developing and testing approaches enhancing market demand for recycled materials and products (e.g., sustainable public procurement, ecodesign, etc.); - Supporting eco-innovative business models (possible sectors: agriculture, food, fisheries, health, tourism, etc.) directly or indirectly linked to the ocean; - Supporting sustainable practices for waste reduction and prevention (overpacking, focus on plastic) directly or indirectly linked to the ocean; - Promoting the network of green ports to jointly address common problems, share experiences and advance in their sustainability.
2.7	The area of cooperation has remarkable natural heritage resources that constitute richness and that contribute to the tourist attractiveness of the AA. The main objectives of the SO are improving the management of natural resources and enhancing the sustainability of natural habitats, as well as promoting a balanced development between the protection of preserved areas and economic activities. More concretely, the programme will fund the following type of actions: - Restoration of degraded ecosystems, creation of multifunctional ecological continuities (blue and green corridors to foster biodiversity, ecosystem services); - Developing measures for the protection of natural heritage, including World Heritage Sites which allows, where appropriate, for the recovery, enhancement, management, sustainable development of economic activities; - Plans and coordinated measures to improve and promote biodiversity and reduce threats to AA flora and fauna, including invasive alien species; - Linking green and blue infrastructures to create and strengthen ecological corridors and protected sites at local, regional and transnational level to reduce landscape fragmentation and improve the connectivity of habitats;

PRIORITY 2: BLUE ENVIRONMENT
- Supporting the analysis and processing of reliable data and making use of available tools to identify major sources, pathways and hotspots of marine litter, as well as accidental or deliberate pollution; - Testing in pilot actions innovative technical solutions for restoring degraded marine and maritime ecosystems and those close to the coast; - Testing pilot actions of "litter-free" coastal communities; - Design and implementation of joint strategies for sustainable tourism that valorises the AA natural heritage: protected areas, wetlands, landscapes, through participatory approaches and avoiding usage conflicts; - Supporting long-term sustainability of both nature and other man-made activities into nature-friendly practices that would benefit the biodiversity and ecosystem services; - Supporting joint actions to promote a public awareness of the problem, e.g., beach days, beach cleaning days, etc.; - Reinforcing transnational links to protect and restore more effectively the areas covered by Natura 2000 network and marine protected areas.

Source: AA 2021-2027 – Cooperation Programme (Draft)

Table 4: Specific Objectives' rationale and examples of actions supported under Priority 3.

PRIORITY 3: BLUE SUSTAINABLE AND SOCIAL TOURISM & CULTURE	
S.O.	**Rationale and type of actions**
4.5	Tourism is one of the sectors for which adaptation or reconversion is urgent considering the necessary evolution towards the crucial and dominant trend of sustainable tourism, taking also in consideration the post COVID-19 context. The AA is plenty of cultural heritage that needs to be enhanced to make them a

PRIORITY 3: BLUE SUSTAINABLE AND SOCIAL TOURISM & CULTURE

real asset for economic development, both in urban and rural areas. Likewise, the development of well-trained tourism professionals with the capacity to adapt tourism services to new post-COVID period is required. Tourism can help the development of innovative social solutions and inclusive responses in coastal and close to the coast areas, rural and urban areas, where resilience is needed. The SO 4.5 is focused on the promotion of a transition towards a more sustainable tourism sector taking into consideration climate challenges, as well as supporting strategies and plans giving innovative and inclusive opportunities for tourism professionals.

More concretely, the programme will fund the following type of actions:

- Plans for the design and promotion of sustainable tourism in the AA, including approaches for common protocols for the provision of tourism services after COVID-19;
- Developing innovative sustainable solutions and new sustainable business models in culture/ creative and cultural industries and tourism, supporting cultural clusters through cooperation, networking, exchanges;
- Tackling the diversification of tourism activities, including culture, the extension of seasonal peaks and adaptation to consumer changes after COVID-19 towards less-crowded destinations, natural, coastal and close to the coast tourism;
- Driving diverse forms of sustainable coastal and close to the coast tourism, and combined products cultural events, cultural routes (e.g., old galleons, remarkable sites), bicycle rides, fisheries, boat trips to see seals or offshore wind-farms and other activities;
- Supporting on-line training systems that favour the transmission of knowledge and the acquisition of professional skills in AA priorities, support the introduction of digital tools in tourism;
- Enhancing the adaptation of traditional tourism mobility to a sustainable mobility in line with natural and sustainable destinations;
- Facilitating exchange systems between training centres, in vocational education and training (VET) in tourism and culture

Source: AA 2021-2027 – Cooperation Programme (Draft)

Table 5: Specific Objectives' rationale and examples of actions supported under Priority 4.

PRIORITY 4: A BETTER GOVERNANCE FOR COOPERATION IN THE ATLANTIC AREA	
S.O.	**Rationale and type of actions**
ISO 1	Governance has great importance to coordinate actions and maximise the results of projects in the cooperation area. AA requires better coordination with national, regional and local policies and European initiatives like the Maritime Atlantic Strategy. The main objective is to generate a greater impact of the programme's investments in the Atlantic Area: giving more visibility, better valorisation of the valuable project's results feeding in existing or potential governance networks or initiatives (e.g. capitalisation through thematic portfolio /horizontal projects) as well as improving the coordination and complementarity with other actors in the cooperation area, including the Atlantic Maritime Strategy, other ETC programmes, and national and regional programmes. More concretely, the programme will fund the following type of actions: - Capitalising on results on specific and limited strategic thematic for the Atlantic area with key stakeholders, networks and initiatives taking into account the other cooperation programmes sharing themes/ areas with the AA programme; - Better coordination with the Maritime Atlantic Strategy and other relevant stakeholders of the Atlantic area; - Encouraging studies and data collection about strategic subjects for the AA, taking in consideration some findings and orientations of the thematic pillar developed within the Maritime Atlantic Strategy.

Source: AA 2021-2027 – Cooperation Programme (Draft)

2.5 Reasons for the selection of the priorities and specific objectives

The Interreg AA 2021-2027 was developed with the intention of achieving a significant development at transnational cooperation level in order to generate a smarter, greener and closer Europe and with a better governance in the cooperation area.

For that purpose, a set of specific objectives it was selected in which the ERDF support has a larger chance of impact. For the development of the Programme, the main challenges and weaknesses of the AA were identified. Afterwards, the Priorities and Specific Objectives were selected, in order to respond or deal with the challenges of the cooperation area. Ideally, the implementation of the Programme will have several expected results (as explained below).

2.5.1 Priority 1: Blue innovation and competitiveness

Priority 1 is focused on strengthening the competitiveness of the productive sectors through innovation in all the blue sector, in order to promote innovative and economic transformation. In that sense, two main specific objectives were established related with the improvement of innovation capacities and the development of digital skills.

According to the territorial analysis, several challenges were identified in these areas. This priority aims to respond to several challenges observed in the AA, regarding the innovation capacities, the use of digital technologies and the digital transformation to improve the economic competitiveness of the blue sector. Table 6 shows the main challenges identified, the opportunities and expected results for the two specific objectives (1.1 and 1.2).

Table 6: Challenges and opportunities of the AA and expected results for the Priority 1.

SO	Main challenges and weaknesses	Opportunities	Expected results
1.1.	- High disparities in competitiveness and innovation capacity levels. Significant imbalance between the north and south of the cooperation area; - Improvement of the cooperation between businesses and education, at local/regional or transnational level; - Strengthening the sustainability of the territory through balanced and inclusive growth; - Connecting the needs of SMEs with the AA's innovation and knowledge centres to promote the growth and adaptation of SMEs.	- Establishment of platforms for cooperation between businesses and education, at local/ regional or transnational level; - Promotion of synergies between relevant stakeholders and centres of innovation.	- Improved competitiveness of the economic sectors of the blue economy and help the AA communities being more resilient through social innovation; - Reinforced quadruple helix cooperation carried out by the academics, businesses, local authorities and third sector organisations of the eligible area; - Increased capacity of and supported knowledge sharing between public authorities and private stakeholders to implement a sustainable and greener economy in the AA; - Improved transnational cooperation of stakeholders for the implementation of Regional Spatial Strategies (RSS);
1.2	- Lack of some essential skills in aquaculture; - Lack of workforce and skills as well as the seasonality of jobs;	- Establishment of platforms for cooperation between businesses and education, at local/regional or transnational level; - Promotion of synergies between relevant stakeholders and centres of innovation;	- Improved skills for the economic, public and academic players or local communities to handle digital tools; - Increased use of digital media in the sectors of the e-services, in the blue economy, with particular attention to micro and medium-sized

- Need for skilling and reskilling in the blue economy sectors and the promotion of blue careers; - Incorporation of digital elements into the training system in the AA countries; - Reconversion of the traditional forms of development of the blue economy activities, both in industry and the service sector, giving priority to smart new skills.	- Development of innovative skill-oriented training programs, promoting sustainable collaboration between maritime and port activities and academia and research centres.	enterprises and their positioning in the market through digital tool; - Improved competitiveness of businesses and improved adaptation to changes in consumer behaviour, towards a sustainable production and consumption models (business resilience); - Increased public e-services available to everyone in the AA with the provision of refined data and digital upskilling and ITC access with third places.

Source: Elaboration based on AA 2021-2027 – Cooperation Programme (Draft)

2.5.2 Priority 2: Blue Environment

Priority 2 is focused on environmental issues. In that sense, this priority promotes the energy efficiency, reduction of greenhouse gas, climate change adaption, transition to a circular economy and preservation and protection of the ecosystems of the AA. Those intervention areas are addressed in four specific objectives (SO 2.1, SO 2.4, SO 2.6 and SO 2.7) of Priority 2. Table 7 shows the main challenges identified, the opportunities and expected results of Priority 2.

Table 7: Challenges and opportunities of the AA and expected results for the Priority 2.

SO	Main challenges and weaknesses	Opportunities	Expected results
2.1.	- Reduced installed capacity of renewable energy sources in the AA, compared to other European countries - Large consumption of energy by Ports, industries and urban areas; - High emissions of greenhouse gases due to economic sectors; - Energy efficiency needs to be supported to enhance the competitiveness and attractivity of the AA	- Development of efficient sources of energy using blue energy: tides, waves and wind; - Proximity between the point of production and consumption of energy; - Production of renewable energy using hydrogen technology (highlighted in the European Green Deal).	- Stimulate solutions for energy efficiency and for the use of renewable energy production technologies, in particular marine and maritime energy; - Stronger networks of businesses, academics, public authorities and local communities for an improved use of renewable energies; - Increase capacities of the regions and sectors to implement improved energy efficiency measures and policies.
2.4	- Costal and waterways related risks; - High exposition of coastal zones to the effects of climate change (such as: increase in the sea level). - Rising in coastal flood risk due to rising sea levels; more intense coastal storms and global warming. - Changes in sea levels affect several services such as tourism and hotels, but also capital-	- Strengthening the AA in adapting to the effects of climate change in coastal areas to enable the development of economic activities and the enhancement of the AA; - Improvement of the AA's capacities to manage natural risks; - Capitalisation of projects on flood prevention in the period 2021-2027.	- Increased capacity to manage risks and prevention or mitigation measures; - Increased abilities for public authorities to identify and analyse natural and human activities related to risks, including better involvement of citizens; - More engaged citizens in the development of more sustainable living areas;

	intensive segments such as the shipbuilding industry.		- Increased capacity of public authorities in planning for climate change adaptation and resilience; - Strengthened governance framework (through sustainable investments and decision-making processes) in terms of climate change issues.
2.6	- Increase the capacity to recycle and reuse materials; - High water use/ consumption and high waste generation due tourism; - Generation of high amounts of waste and pollution by Ports; - The AA's resources need to be used in a more sustainable way, reducing the need to generate unnecessary materials and associated waste, and decrease the CO_2 emissions;	- Transition to become greener ports while remaining competitive; - Promotion of green ports in the area of cooperation - Collection and recycling (especially plastics) to fight against ocean pollution; - Strengthening the transition of AA businesses and industries and local communities to working methods based on the circular economy.	- Increased capacities of AA private and public stakeholders to implement circular economy action plans and innovative solutions in particular, in the sectors of the blue economy; - More engaged citizens in a more sustainable consumption approach; - Strengthened governance framework (through sustainable investments and decision-making processes) in terms of circular economy.
2.7	- Generation of pressure on local environment and ecosystems by tourism sector; - Trade-off between aesthetic benefits and installation of marine renewable energies; - Challenge between the need to exploit marine and maritime resources and the preservation of protected environments and biodiversity;	- Improvement of the catching techniques and the use of technologies for selecting fish catches; - Use natural heritage, in a sustainable manner, to support economic activities such as tourism; - Use cultural heritage as a vector of attraction and well-being for the territory;	- Better preserved, managed and interconnected natural and protected maritime coastal and close to the coast areas; - Reinforced ecosystem-based approaches conciliating preservation and economic activities;

	- Coordination issue between sustainable energy development with the network of protected areas and the development of fishing and maritime transport activities.	- Balanced development between the protection of natural areas and economic activities; - Preservation of the biodiversity for the growth of economic sectors, such as tourism.	- Improved ecological connections and enlarged protected areas in land and sea, ensured by innovative solutions.

Source: Elaboration based on AA 2021-2027 – Cooperation Programme (Draft)

2.5.3 Priority 3: Blue sustainable and social tourism & culture

Priority 3 aims at the sustainable development of tourism and culture taking into account the richness in natural and cultural heritage of the cooperation area. Several challenges are expected in the tourism sector, especially due to the COVID-19 context. In that sense, the SO 4.5 is focused on the promotion of actions and strategies for a transition to a sustainable tourism, in order to reduce the impacts for the environment. Table 8 describes the main challenges identified, the opportunities and expected results.

Table 8: Challenges and opportunities of the AA and expected results for the Priority 3.

SO	Main challenges and weaknesses	Opportunities	Expected results
4.5.	- Behavioural changes in tourism due to COVID-19. Tourism industry under unprecedented pressure; - Highly dependence of tourism from good environmental conditions and water quality; - High pressure on local environment and ecosystems due to tourism;	- Arising of sustainable tourism due to great awareness of climate change and adverse impacts of traditional tourism; - Intensification of digitalisation in tourism for providing new services and experiences.	- Further strengthened AA, through tourism and culture (and connected activities) in the fields of social economy and social innovation; - More resilience in case of pressure on the culture and tourism sectors, so that the economic development of the areas will

	- High risk of natural disaster due to climate change.	accompany the most fragile areas and sectors before and during the COVID-19 pandemic.

Source: Elaboration based on AA 2021-2027 – Cooperation Programme (Draft)

2.5.4 Priority 4: Better Governance for cooperation

This objective is transversal to all the programme and the aim is to generate greater impact of the programme's investment in the AA. Table 9 demonstrates the main challenges and opportunities of the AA, which are the basis for the selection of the priority 4 (Better governance).

Table 9: Challenges and opportunities of the AA and expected results for the Priority 4.

SO	Main challenges and weaknesses	Opportunities	Expected results
ISO 1	- Need for a better coordination with national, regional and local policies and European initiatives - Increase the cooperation with Maritime Atlantic Strategies	- Creation of new synergies; - Promotion and boost of Atlantic Maritime Strategy related networks.	- Better and clearer identification and recognition of the programme's project's results; - Further strengthened of the AA in their governance; - Better coordination among the stakeholders and creation of new synergies. - Maximisation of the individual investments by complementary and/ or common interventions, as well as capitalisation activities.

Source: Elaboration based on AA 2021-2027 – Cooperation Programme (Draft)

2.6 Relationship with other European Strategies, Plans and Programmes

The AA is an eminently maritime territory. This feature, together with the coast-hinterland interrelationships, corresponds to a major approach to the Programme's conception. Moreover, the AA is located within the Atlantic sea-basin strategy, so the discussion of synergies between the Programme and the sea-basin strategy is highly recommended in order to complement efforts and achieve more powerful results with hopefully a more significant impact at public policies level.

Therefore, the Atlantic Maritime Strategy published the Atlantic Action Plan 2.0, which has been taken into consideration in order to help fixing the common synergies for the benefit of the inhabitants of this territory.

The oceans, and the Atlantic in particular, play a very relevant role for human well-being through three main areas that make up an ecosystem of services that are in line with the EU's blue economy strategy. These services are classified into:

- Provision of services, such as food or water.
- Regulating environmental services: through the regulation of marine, coastal and inland ecosystems, such as climate regulation, carbon dioxide absorption, etc.
- Cultural services: these are non-economic benefits that are obtained directly from marine ecosystems, such as landscape, health and well-being, recreational, etc.

These three approaches to the blue economy are very present in the AA strategy for the 2021-2027 period and are developed through the selected priorities and specific objectives.

The following table (Table 10) demonstrates the relationship between the specific objectives selected for the Interreg AA 2021-2027 and other EU programmes with major focus on the Atlantic areas and blue economy.

Table 10: Relationship between SO of Interreg AA 2021-2027 and other EU programmes and strategies.

SO	EU Programme	Contribution
1.1	Atlantic Maritime Strategy - Atlantic Action Plan 2.0 Blue Economy Strategy	- Support the actions included in the **Pilar I** - ports as gateways and hubs for the blue economy; - Target economic sectors of blue economy, where the ports are included;
1.2	Atlantic Maritime Strategy - Atlantic Action Plan 2.0	- Support actions of **Pillar II** (Blue skills of the future and ocean literacy), in particular **objective 3** (Quality education, training and life-long learning).
2.1	Sustainable Development Goals (SDG) European Green Deal Atlantic Maritime Strategy - Atlantic Action Plan 2.0	- Support the reduction of air pollution and the improvement of the quality of life of citizens; - Contribute to actions of **Pillar III** (Marine renewable energy), in particular **objective 5** (The promotion of carbon neutrality through marine renewable energy).
2.4	Atlantic Maritime Strategy - Atlantic Action Plan 2.0	- Support the actions of **Pillar IV** (Healthy ocean and resilient coasts), in particular **objective 6** (stronger costal resilience).
2.6	Atlantic Maritime Strategy - Atlantic Action Plan 2.0	- Support the actions of **Pillar IV**, in particular **objective 7** (Fight against marine pollution).
2.7	Atlantic Maritime Strategy - Atlantic Action Plan 2.0	- Contribute to actions included in the **Pilar IV** in particular **objective 7**.

The Programme will seek ways to involve relevant actors of the Maritime Atlantic Strategy, in order to find synergies and to maximise the impact for the benefit of the territory and its citizens. The holding of regular meetings between those responsible for the Programme and the Atlantic Strategy will be analysed, in order to keep each other informed of progress and seek new forms of cooperation, and representatives of the Atlantic Strategy will be invited to the Programme's main events. In this way, the links between the Programme and the Strategy will be better visualised and communicated externally.

Likewise, the Programme will seek collaboration with other European territorial cooperation programmes present in the eligible area, both cross-border and neighbouring transnational

programmes. The aim of this collaboration is to learn about the governance models in each area, the strategic projects and their application to the AA and to promote the processes of capitalisation of results through joint learning and knowledge with other programmes (as expected in the Priority 4).

2.7 Environmental policy objectives

The climate change and environmental degradation are a threat for the whole world. To overcome these challenges, the European Green Pact aims to transform the EU into a modern, resource-efficient and competitive economy, ensuring that the EU will:

- Achieve net-zero greenhouse gas emissions by 2050;
- Decouple growth from resource exploitation;
- Foster an inclusive green transition and leave none behind [5].

The European Green Deal aims to make Europe the first carbon neutral continent through the development of green energy sources and green technologies, resulting in a cleaner environment, more affordable energy, smarter transport, new jobs and an overall better quality of life [6]. Hence, the EU policy assures the protection of the environment and intends the reduction or mitigation of the risk to the climate human health and biodiversity.

All EU actions and policies will have to contribute to achieving the goals of the European Green Deal. The European Green Deal is an integral part of this Commission's strategy to implement the 2030 Agenda and achieve the SGS as well [7].

Therefore, the EU has established several policy objectives that will last until 2050 in various areas as part of the European Green Deal. The communication from the European Commission about the European Green Deal [7] demonstrates the main areas of intervention and their objectives and targets, namely through the implementation or resolution of new strategies for the Europe. Moreover, the European Green Deal envisages 50 initiatives to convert climate change into the new model of economy growth.

The Interreg AA 2021-2027 Programme also defined a set of Specific Objectives with environmental character in line with EU strategies for protecting the environment, namely the European Green Deal. The following table (Table 11) demonstrates the main areas of intervention, objectives and targets established and their relationship with the Interreg AA Programme [7].

Table 11: European Green Deal policy areas and their relation with Interreg AA Programme for 2021-2027.

Policy Areas	Objectives and targets	Related Strategies	Interreg AA 2021-2027
Climate Ambition Increasing EU's Climate ambitions for 2030 and 2050	- Achieve climate neutrality by 2050; - Increase the EU's GHG emission reductions target for 2030 to at least 50% and towards 55% compared with 1990 levels; - Ensure effective carbon pricing throughout the economy; - Propose a carbon border adjustment mechanism, for selected sectors, to reduce the risk of carbon leakage.	European Climate Law European Climate Pact 2030 Climate Target Plan EU Strategy on Climate Adaptation	**Strong connection with SO 2.1** Weak connection with SO 2.6 ISO 1
Energy Supplying clean, affordable and secure energy	- Decarbonise the EU's energy system for achieve the climate goal; - Build interconnected energy systems and better integrated grids to support renewable energy sources; - Promote innovative technologies and modern infrastructure; - Boost energy efficiency and eco-design of products; - Decarbonise the gas sector and promote smart integration across sectors; - Empower consumers and help EU countries to tackle energy poverty; - Promote EU energy standards and technologies at global level; - Develop the full potential of Europe's offshore wind energy;	EU strategy on energy system integration EU strategy on offshore renewable energy	**Strong connection with SO 2.1** Weak connection with SO 2.6 ISO 1
Sustainable Industry Mobilising industry for a clean and circular economy	- Achieve a climate neutral and circular economy; - Support and accelerate the EU's industry transition to a sustainable model of inclusive growth; - Stimulate the development of markets for climate neutral and circular products; - Decarbonisation and modernisation of energy-intensive industries;	EU Industry Strategy Circular Economy Action Plan	**Strong connection with SO 1.1, SO 1.2., SO 2.1 and SO 2.4** Weak connection with SO 2.7 and SO 4.5 ISO 1

Policy Areas	Objectives and targets	Related Strategies	Interreg AA 2021-2027

	- Stimulate circular economy in industrial sectors through several actions, such as:
	  ○ Tackle intentionally added micro plastics and unintentional releases of plastics;
	  ○ Ensure that all packaging in the EU market is reusable or recyclable by 2030;
	  ○ Encourage businesses to offer reusable, durable and repairable products;
	  ○ Measures for tackling over-packaging and waste generation;
	  ○ Propose an EU model for separate waste collection.
	- Measures to ensure that digital technologies can accelerate and maximise the impact of policies deal with climate change and protect the environment;
	- Improve the energy efficiency and circular economy performance of digital sector.		

Building and renovating Building and renovating in an energy and resource efficiency way	- Engage in a 'renovation wave' of public and private buildings; - At least double the annual renovation rate of buildings; - Enforce the legislation related to the energy performance of buildings; - Ensure that the relative prices of different energy sources provide the right signals for energy efficiency; - Make buildings more resilient to climate change; - Design of buildings must be in line with circular economy principles;		**Strong connection with SO 2.1** Weak connection with SO 2.6 ISO 1

Policy Areas	Objectives and targets	Related Strategies	Interreg AA 2021-2027
Sustainable mobility Accelerating the shift to sustainable and smart mobility	- Achieve sustainable transport and provide more affordable, accessible, healthier and cleaner alternatives; - Achieve a 90% reduction in transport emissions by 2050; - Develop smart systems for traffic management and develop 'Mobility as a Service' solutions; - Increase the capacity of railways and inland waterways; - Reflect the price of transport on the impact it has on the environment and on health; - Ramp-up the production and deployment of sustainable alternative transport fuels by supporting alternative fuel cars and public recharging points; - Promote less-polluting transports, especially in cities; - Take action in relation to maritime transport, including to regulate access of the most polluting ships to EU ports and to oblige docked ships to use shore-side electricity; - Tackle the emissions of pollutants by aeroplanes and airport operations.		**Strong connection with SO 2.1 and SO 4.5** Weak connection with SO 1.2 ISO 1
Sustainable food system From 'Farm to Form': a fair, healthy and environmentally friendly food system	- EU should become a global standard for food sustainability; - Strengthen the efforts to tackle climate change, protect the environment and preserve biodiversity; - Stimulate sustainable food consumption and promote affordable healthy food; - Lead to the use of sustainable practices, such as precision agriculture, organic farming, agro-ecology, agro-forestry and stricter animal welfare standards; - Develop the potential of sustainable seafood as a source of low-carbon food; - Reduce significantly the use and risk of chemical pesticides, fertilisers and antibiotics;	Farm to Fork Strategy	**Strong connection with SO 2.4, SO 2.6 and SO 2.7** Weak connection with SO 1.1 ISO 1

Policy Areas	Objectives and targets	Related Strategies	Interreg AA 2021-2027
	- Develop innovative ways to protect harvests from pests and diseases and to consider the potential role of new innovative techniques to improve the sustainability of the food system; - Contribute to achieving a circular economy; - Reduce the environmental impact of the food processing and retail sectors by taking action on transport, storage, packaging and food waste; - Combat food fraud.		
Biodiversity Preserving and restoring ecosystems and biodiversity	- Halt EU biodiversity loss and contribute to preserving and restoring Europe's Natural Capital; - Increase the coverage of protected biodiversity-rich land and sea areas building in the Natura 2000 network; - Reinforce cross-border cooperation to protect and restore more effectively the areas covered by the Natura 2000 network; - Improve and restore damaged ecosystems to good ecological status, including carbon-rich ecosystems; - Include proposals to green European cities and increase biodiversity in urban spaces; - Attain effective afforestation, and forest preservation and restoration in Europe; - Improve the use of aquatic and marine resources and the use of new sources of protein to relieve pressure on agricultural land; - Take a zero-tolerance approach to illegal, unreported and unregulated fishing.	EU Biodiversity Strategy for 2030 New EU Forest Strategy Blue Economy Strategy Blue Growth Strategy	**Strong connection with SO 2.4 and SO 2.7** Weak connection with SO 1.1. ISO 1

Policy Areas	Objectives and targets	Related Strategies	Interreg AA 2021-2027
Zero-Pollution A zero-pollution ambition for a toxic-free environment	- Better monitor, report, prevent and remedy pollution from air, water, soil, and consumer products; - Adopt a zero-pollution action plan for air, water and soil in 2021; - Restore the natural functions of ground and surface water; - Preserve and restore biodiversity in lakes, rivers, wetlands and estuaries, and prevent and limit damage from floods; - Address pollution from urban runoff and from new or particularly harmful sources of pollution such as micro plastics and chemicals, including pharmaceuticals; - Help to protect citizens and the environment against hazardous chemicals and encourage innovation for the development of safe and sustainable alternatives;	Zero pollution action plan for water, air and soil Chemicals strategy for sustainability	Strong connection with SO 2.4 and SO 2.7 Weak connection with SO 1.1 and SO 2.1 ISO 1

There is a coherence and consistency of the objectives of the Programme with the areas of intervention of the European Green Deal. The specific objectives of Priority 1 and 2 are particularly relevant due to their strong connection with European Policies and objectives.

In order to foster the competitivity and innovation, the SO 1.1. and 1.2 can have a positive contribution through the innovation for strengthening the competitivity of productive sectors, as well as through the implementation of digital technologies and digital transition. These main areas are also approached in the European Green Deal.

In the case of SO 2.1, 2.4, 2.6 and 2.7, it aims to reduce carbon emission by promoting energy transition, circular economy, climate adaption and risk prevention. In that sense, several strategies and actions are encouraged to boost renewable energies (specially related to waves and tidal currents), which contribute to the reduction of air pollution and the improvement of quality of life. This is in accordance with the European Green Deal and Sustainable Development Goals (SDG). Besides that, there is a focus on climate adaption, circular economy, zero-pollution and conservation of ecosystems and nature, once again in line with European policies.

Finally, the Priority 3 (in particular SO 4.5) focused in culture and tourism to contribute for the economic and social development. Thus, the main focus is the richness of natural heritage, the development of sustainable solutions and new sustainable business models. In that sense, new digital tools and the adaptation of tourism mobility to sustainable mobility will be promoted. These actions have influence in the European strategies, especially related with sustainable mobility.

As a conclusion, a large number of specific objectives of the Interreg AA Programme are related with the pillars of environment, energy, climate and zero pollution (namely through: energy efficiency, reduction of greenhouse gas emission and climate adaption) and biodiversity (i.e., protection and preservation of nature and biodiversity).

Chapter 3

Relevant aspects of the current state of the environment

3. Relevant aspects of the current state of the environment

3.1 Geographic context and climatology

The Atlantic Area covers four countries of the western part of Europe and their coastal lines along the Atlantic Ocean. With an area over 450,000km², its population is close to 50 million people (2020) and represents 11.2% of the EU27 estimated total population [8]. The most populated regions include Norte (in Portugal), Andalucía (in Spain) and Aquitaine, Pays-de-la-Loire and Bretagne (in France), while the least populated include the Algarve and the Azores and Madeira archipelagos (in Portugal), and La Rioja (in Spain) (Figure 4).

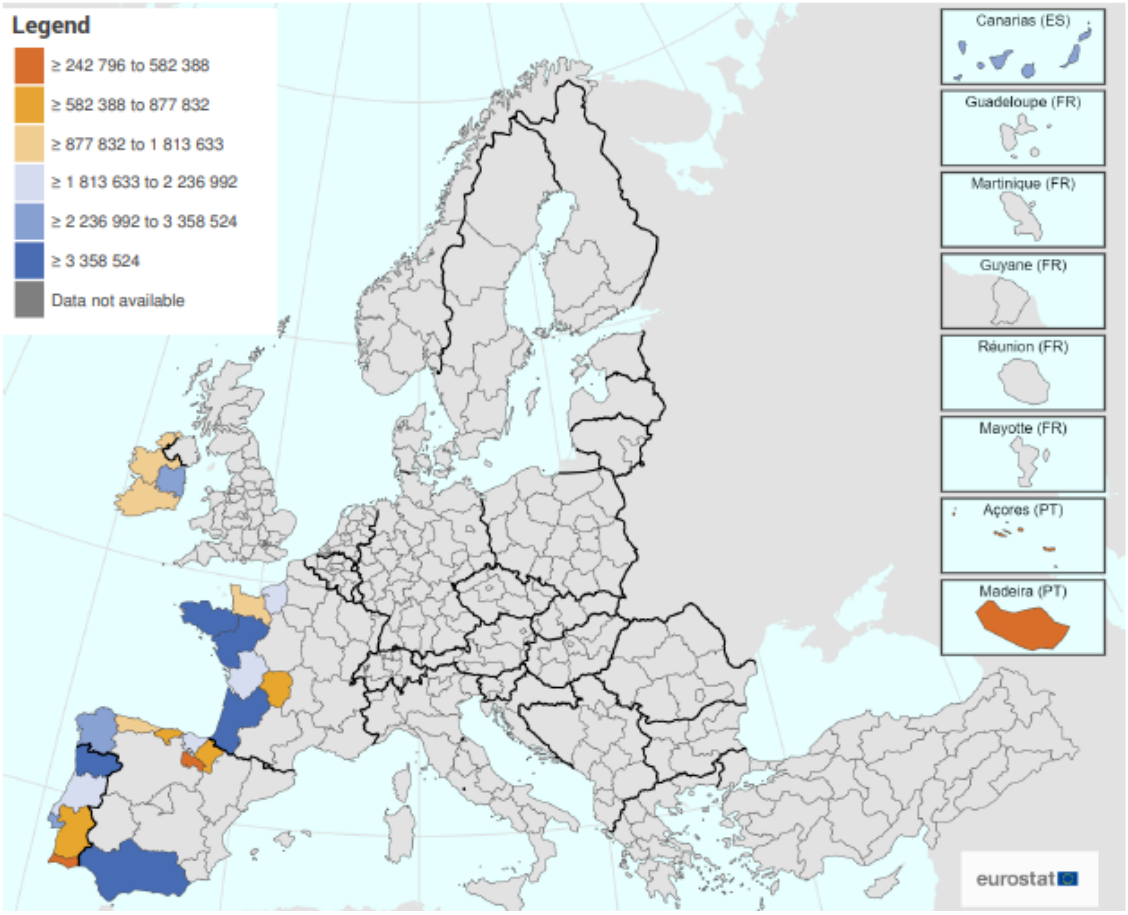


Figure 4: Atlantic Area Population by NUTS2.

Source: [8]

The Atlantic region is characterised by the presence of two main different types of climate: the Mediterranean and the Atlantic.

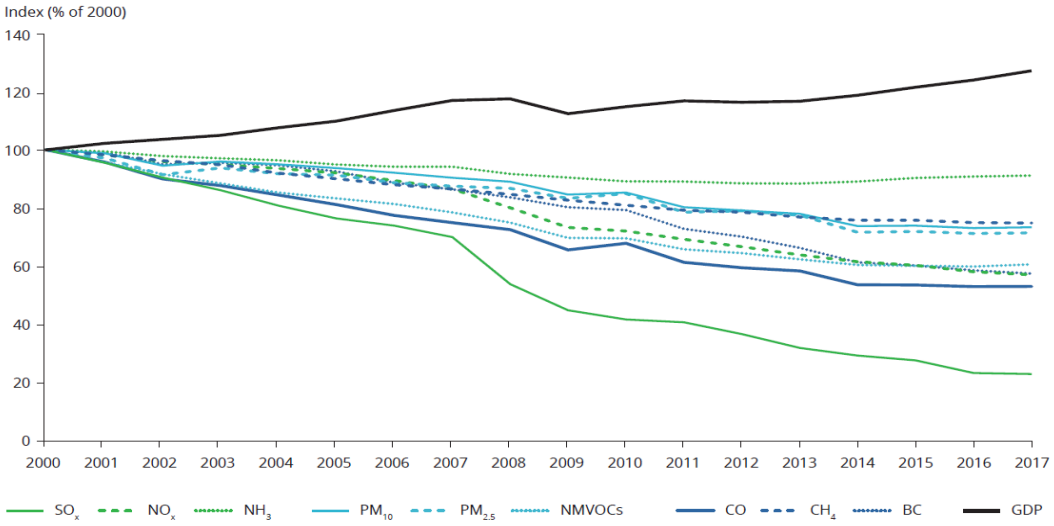
The Mediterranean climate covers most of the Portuguese and Spanish territory of the Atlantic Area and extends to other regions in the Mediterranean basin. With humid cool winters and hot and dry summers, climate is unpredictable, with diurnal temperature fluctuations, substantial winds, short lived deluges and occasional prolonged droughts [9]. In the Mediterranean climate, periods of temperature above 30º C are common. With an average annual rainfall that varies between 600 and 1,200 mm/year, it is an area prone to water shortage, especially in the more eastern parts. The wind may also provoke springtime or winter anomalies particular due to the dominant dry and cold winds from the north. It is one of the climatic regions that will suffer the most with climate changes, since higher temperatures will increase evapotranspiration and, thus, increase the general aridity [9].

The Atlantic climate covers the entire Irish territory and the French regions included in the Atlantic Area, as well the west-northern part of the Iberian Peninsula. Its temperature is oceanic with moderate and mild temperatures and generally a high precipitation and high humidity which may result on prolonged rainfalls. Thus, it is a region with water surplus, although there are discrepancies from east to west [9]. Even though it may experience days without wind, several severe storms may hit the region, which has been the case on the last decades due to the climate change. With short differences between summer and winter temperatures, the most eastern part of the region usually stays at a yearly average of 16ºC.

3.2 Air

Air pollution can be due to natural sources such as volcanic eruptions, sea salt or dust from wind erosion, as well as the result of human activities in economic sectors such as transport, agriculture, energy production and use, industry or waste management. Air pollution affects human health, vegetation and ecosystems, with particulate matter (PM), nitrogen dioxide (NO_2) and ground-level ozone (O_3) being the pollutants of greatest concern [10].

Air quality in Europe has improved significantly in recent years, with emissions of all primary pollutants and precursors contributing to ambient air concentrations of the major air pollutants declining between the years 2000 and 2017 (Figure 5).



Notes: Values for 2000-2017 are expressed as percentages of 2000 levels. Gross domestic product is expressed in chain-linked volumes (2010), as percentages of the 2000 level.
Methane (CH_4) emissions are total emissions (integrated pollution prevention and control sectors 1-7) excluding sector 5, land use, land use change and forestry. The present emission inventories include only anthropogenic non-methane volatile organic compound (NMVOC) emissions.
BC, black carbon.

Figure 5: Trends in the main air pollutant emissions and in gross domestic product in the EU-27.

Source: [10]

The emission reductions were uneven - while sulphur dioxide emissions have decreased by 62% since 2000, ammonia (NH_3) emissions have decreased by only 4% in the European Environment Agency (EEA) member countries. However, NH_3 emissions have been increasing since 2013 by about 3% mainly driven by the agriculture sector.

The substantial reduction in SO_2 emissions were noticed mostly in the production, distribution and energy use sectors. Furthermore, mainly as a result of the installation of three-way catalytic converters in gasoline-powered cars, driven by European legislative emission standards, reductions in nitrogen oxides (NOx) emissions, for example, have in turn been achieved. However, NH_3 emissions remain high and have even increased in recent years. Those events favour the formation of secondary particles in the air, which contributes to episodes of high particle concentrations and exceedances of air quality standards.

In 2017, total emissions for the EU as a whole of four major air pollutants - NOx, non-methane volatile organic compounds (NMVOCs), SO_2 and ammonia (NH_3) - were below the respective ceilings of the 2010 NEC Directive, which remain applicable until 2019. No member state in Atlantic Area exceeded their limit values for NOx or SO_2. However, Ireland and Spain continued to exceed their national emission ceilings for NH_3.

Therefore, further efforts are needed for all pollutants to meet the EU emission reduction commitments in 2030, which means a reduction of almost 40% for NOx compared to 2017 emissions, about 15% for NH_3, and more than 30% for SO_2, as well as for $PM_{2.5}$. Continued

progress is expected as implementation of current policies to mitigate air pollutant emissions continues. However, ammonia emissions are projected to decrease only slightly.

Regarding concentrations of air pollutants, a downward trend has been observed in the EU at most of the monitoring stations for PM_{10}, $PM_{2,5}$ and NO_2. Even if the trends indicate a reduction in concentrations at most of the stations, there remain persistent exceedances of the regulated standards for these air pollutants. Figure 6 shows NO_2 concentrations above the annual limit value in 2017 all over Europe including in Portugal, Spain and France. High pollutant concentrations are particularly serious in urban areas, where most of the European population lives. Poor air quality in cities can be mainly attributed to the high levels of emissions from road traffic (as the case of NO_2 shows).

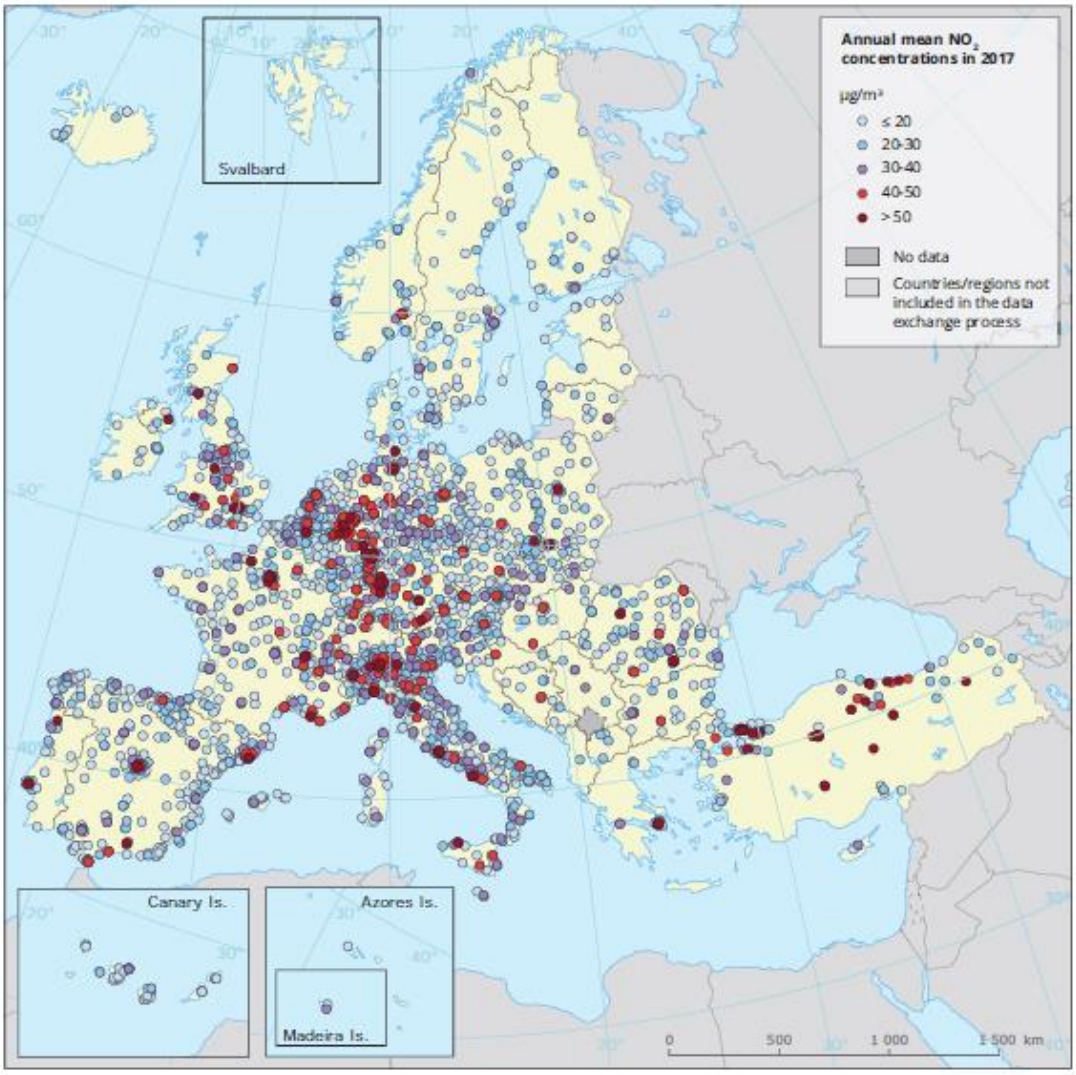


Figure 6: Annual mean NO_2 concentrations in 2017.

Source: [10]

3.3 Water

Water exploitation and domestic consumption

Water scarcity is mainly driven by two factors: water demand, which is largely affected by population trends and socioeconomic developments; and climatic conditions, which control the availability of renewable freshwater resources and the seasonality of water supply.

The water exploitation index (WEI+) is a measure of water stress. It measures the level of water scarcity by comparing water use with the renewable freshwater resource available. A WEI+ of above 20% indicates that water resources are under stress, and a WEI+ of more than 40% indicates severe stress and unsustainable resource use. In summer 2015, 19% of Europe's area experienced water stress. Focusing on the Atlantic Area, Portugal is the only country with a WEI+ above 20% (in the south), while the Northern regions have the best values (Figure 7). Due to the intensive irrigation, the Guadiana (Portugal and Spain) experiences severe water stress.

In fact, agriculture accounts for 59% of total water use in Europe, most of which is used in the southern basins (notably in Spain and Portugal) where precipitation and soil moisture are not sufficient to satisfy crop water needs and production of some crop types would not be possible without irrigation. Furthermore, Portugal and Spain are the Atlantic Area countries with the highest water consumption *per capita*.

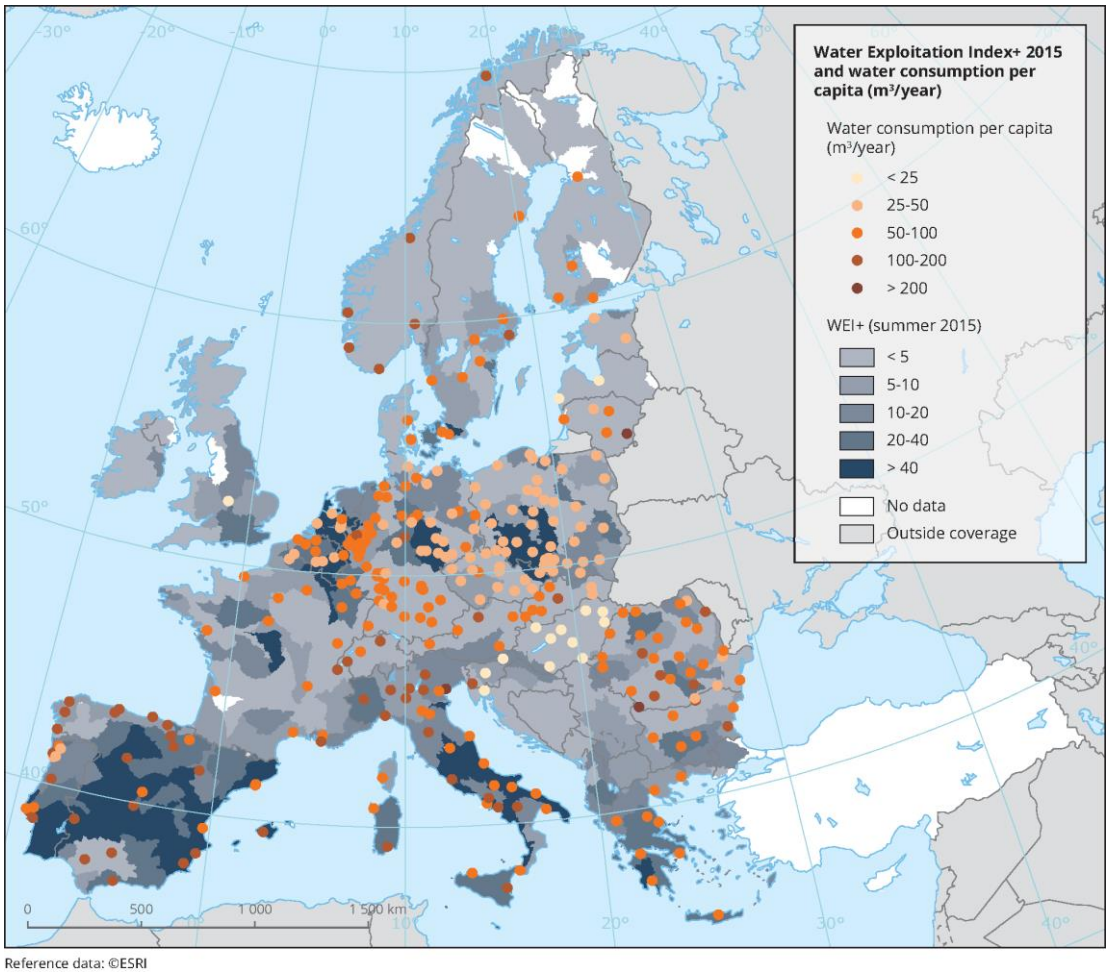


Figure 7: Water Exploitation Index+ 2015 and water consumption per capita (m³/year)

Source: [11]

Quality of water

The quality of surface water ecosystems is assessed as ecological status under the Water Framework Directive. The evaluation of ecological status is based on assessments of individual biological quality elements and supporting physicochemical and hydro-morphological quality elements [10].

Overall, around 40% of the surface water bodies are in good ecological status. Lakes and coastal waters tend to achieve better ecological status than rivers and transitional waters [12].

Figure 8 presents the percentage of surface water bodies classified in different hydrographic regions with less than good ecological status or potential, for rivers and lakes and for coastal and transitional waters. For rivers and lakes, in general, the Atlantic Area has a percentage above 30%. Southern Portugal, France and some regions of Ireland have the highest percentages, between 50 and 90%. In turn, in coastal and transitional waters, the south of Portugal and

southern France have a percentage below 10%. The central and northern regions of Portugal, southern Spain, northern France and Ireland have percentages above 50%.

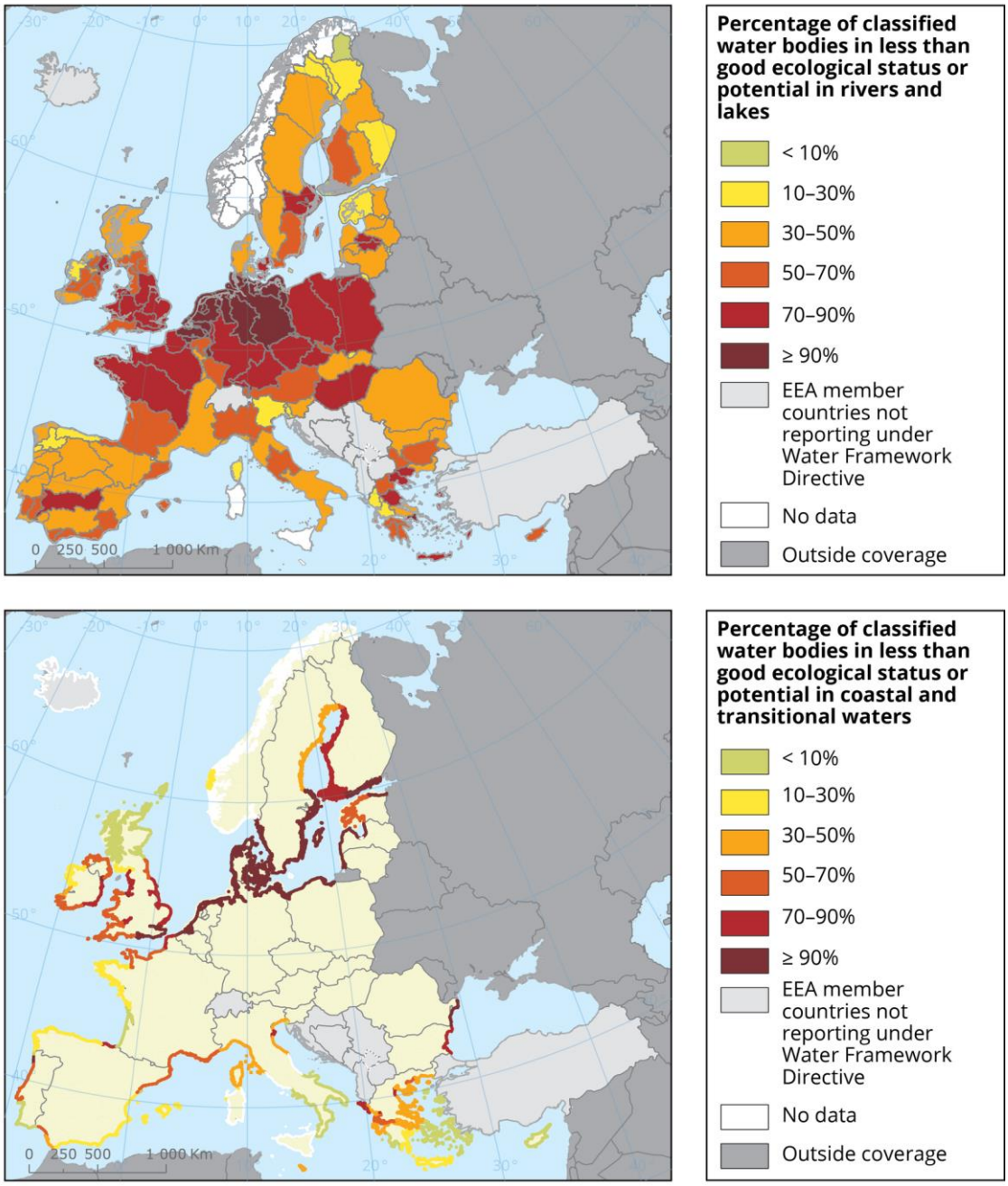


Figure 8: Percentage of classified surface water bodies in different river basin districts holding less than good ecological status or potential, for rivers and lakes (top) and for coastal and transitional waters (bottom)

Source: [13]

The main reasons for not achieving good ecological status are linked to hydro-morphological pressures (40%), diffuse source pollution (38%), particularly from agriculture and atmospheric deposition (38%), especially 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 [12].

Considering the Atlantic Area, France is the country where a high proportion of water bodies do not reach a good ecological status (Figure 9). In addition, northern France has the highest percentage of water bodies that are not in good chemical status.

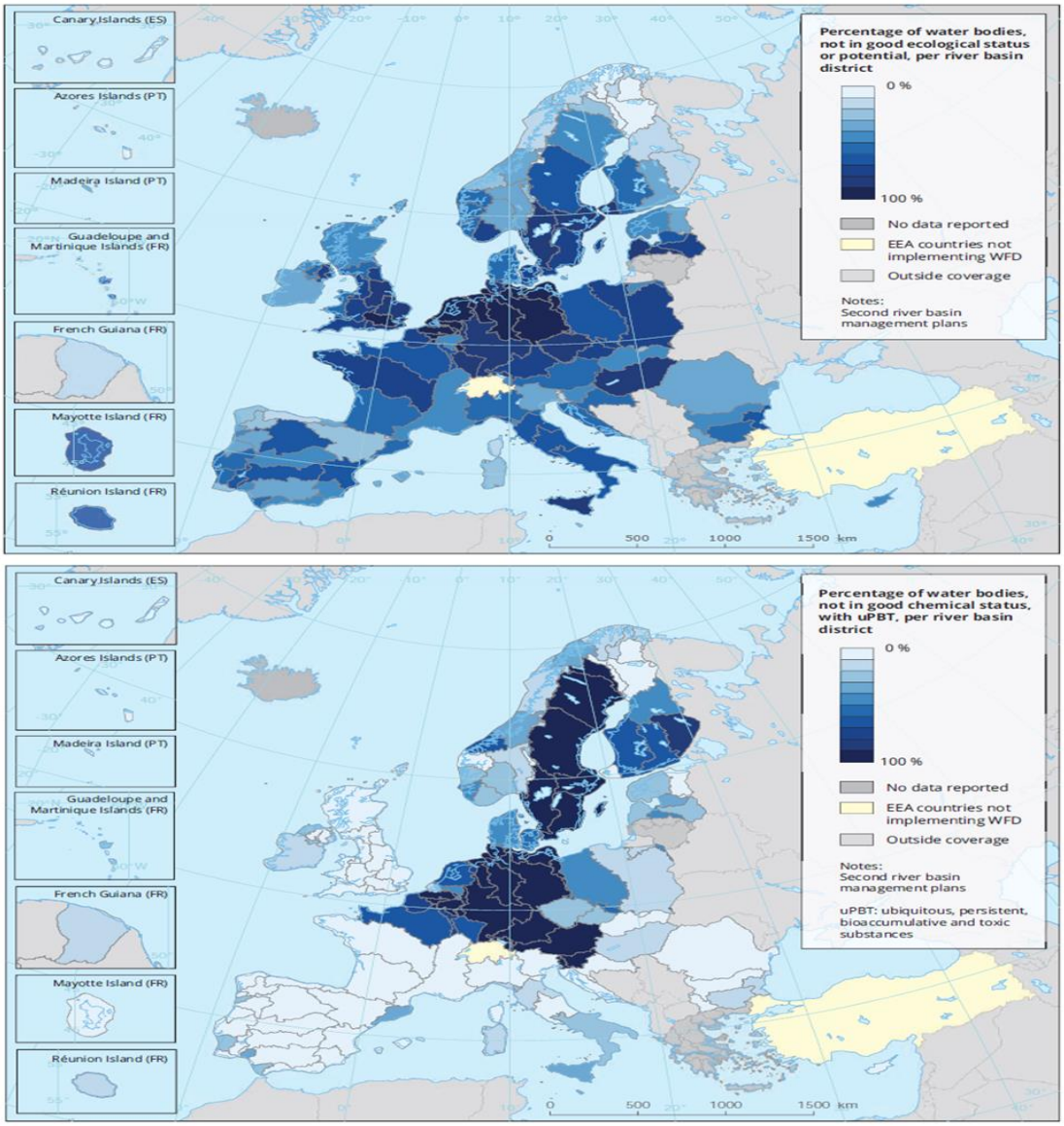


Figure 9: Country comparison - percentage of water bodies not achieving good ecological (top) or chemical status (bottom).

Source: [10]

The assessment showed a relatively small number of substances that are responsible for most of the failures to achieve good chemical status: in particular, mercury, polybrominated diphenyl ethers (PBDE) and polyaromatic hydrocarbons (PAHs) are responsible for causing failure in a large number of water bodies. Overall, a total of 38% of surface water bodies in the EU are in good chemical status [10].

Regarding the groundwater, a total of 74% of EU groundwater bodies are in good chemical status. The Atlantic Area countries are found to have good chemical status, with the exception of southern Spain and northern France and Ireland. Through nitrate and pesticide pollution, agriculture is the main pressure causing failure to achieve good chemical status in groundwater. In total, 160 pollutants caused the failure to achieve good chemical status. Of these, nitrates are the main pollutant, affecting more than 18% of the area of groundwater bodies [12].

As implementation of the Water Framework Directive proceeds, continued progress in improving the chemical status of surface waters is expected. Improvements in urban wastewater treatment and industrial pollution will produce improvements in pollution control, but diffuse pollution is expected to remain problematic. Furthermore, pressures from newly emerging pollutants and chemical mixtures are likely to intensify. Continued focus on maintaining and improving the quantitative status of groundwater is also expected. However, water stress remains a concern in some regions and the future availability of water will be affected by climate change [10].

Environmental status of the marine region

To assess the environmental status of the Atlantic Area's marine region, it is important to consider each of the qualitative descriptors listed in Annex I of the Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy, also known as the Marine Strategy Framework Directive (MSFD). The MSFD was put in place to protect the marine ecosystem and biodiversity upon which our health and marine-related economic and social activities depend. To determine the good environmental status for this marine region, the MSFD presents 11 qualitative descriptors that should aid in this task. The Atlantic Area countries should take these descriptors into consideration when aiming to achieve a good environmental status of the marine region [14].

The first indicator set out by the MSFD is the biological diversity of the marine region, which specifies that the quality and occurrence of habitats and the distribution and abundance of species must be in line with prevailing physiographic, geographic and climatic conditions. Figure 10 identifies the problem areas regarding the biodiversity condition across Europe. Looking at the Atlantic Area, most coastal and semi-enclosed areas are identified as problem areas, with

moderate to bad biodiversity condition and still facing significant challenges regarding the recovery of the entire ecosystem. However, the situation is not equally dire across the whole Atlantic since some, mainly offshore, areas in the North-East Atlantic Ocean are still in good condition. While the situation remains serious, there are signs that marine species and habitats are recovering due to significant, often decades-long, efforts by individuals and governments to reduce impacts [15].

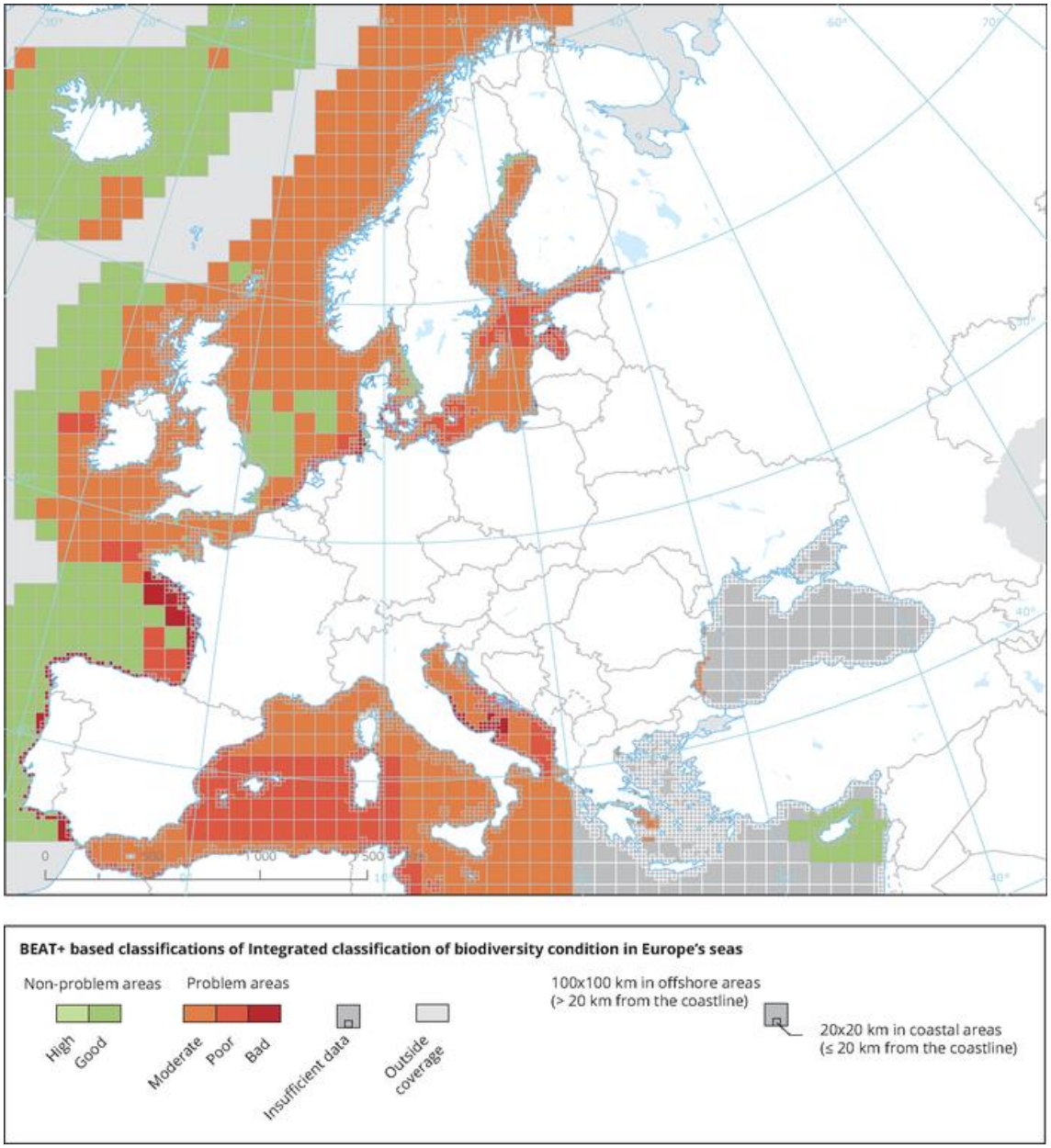


Figure 10: Integrated classification of biodiversity condition in Europe's seas.

Source: [15]

The second indicator featured in the MSFD is the number of non-indigenous species (NIS) introduced by human activities. NIS are classified as the species introduced outside of their natural past or present range, which might survive and subsequently reproduce, which in turn might threaten biodiversity. While many NIS do not harm the regional ecology and economics, in certain cases they can become “invasive” species and have enormous and long-lasting impacts on the region. So, according to the MSFD, to achieve a good environmental status of the marine region, it is important that NIS do not adversely alter the ecosystems. Over the past century, the number of introductions of NIS was increasing globally and at the European level due to the increase of maritime transport for food and goods over the world. However, in the last few years, the North-East Atlantic Sea has seen, for the first time in the 2012-2017 period, a significant decrease in the number of new NIS introduced, when compared to the upwards trend that was observed until 2011 (Figure 11).

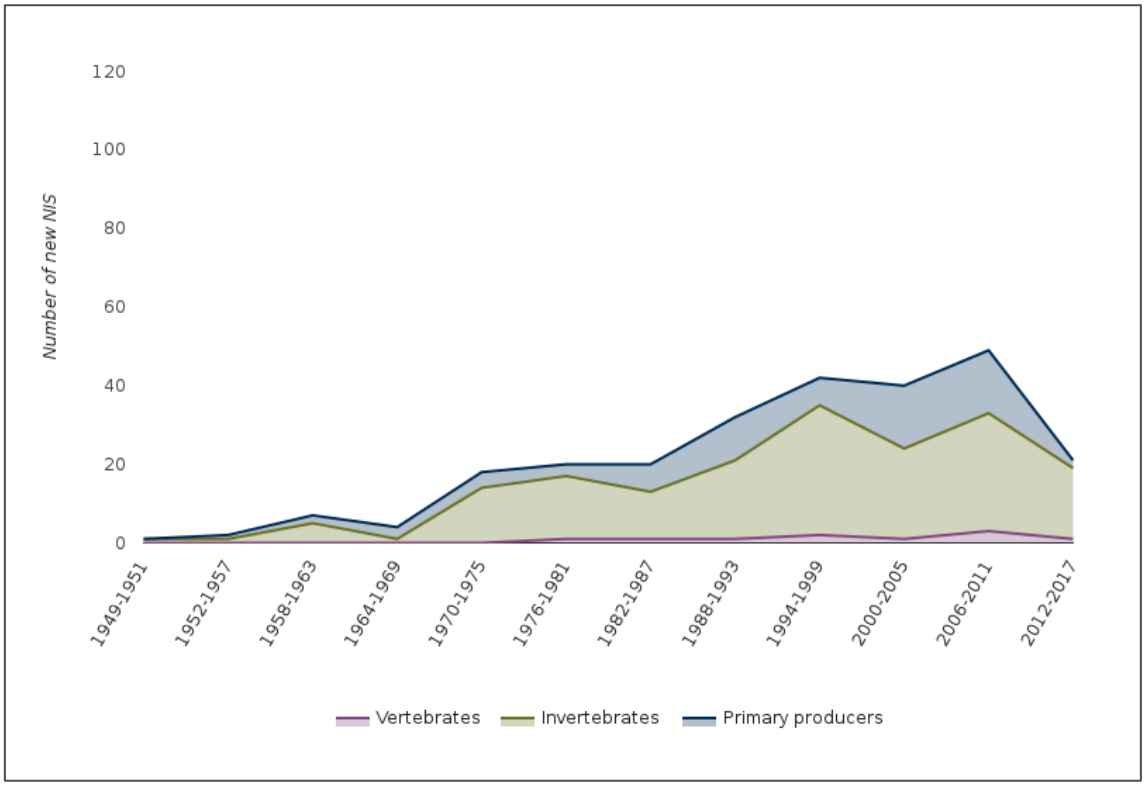


Figure 11: Temporal variability in numbers of new marine non-indigenous species per functional group, recorded in the North East Atlantic Sea.

Source: [16]

Overall, the number of cumulative NIS in the North-East Atlantic Sea was accounted to be 256 as of 2017. In comparison, the Mediterranean Sea has seen over 800 cases of new NIS introduced in the ecosystem (nearly 70% of Europe’s maritime NIS), which indicates that the situation in the Atlantic, despite worrying, is still not the worst. In fact, the introduction of NIS

seems to be slowing down and if this trend continues in the future, the negative impact of these potentially harmful species in the environment could be diminished.

Next, it is relevant to analyse the state of commercial fish and shellfish stocks across the Atlantic Area. As featured in the MSFD, populations of all commercially exploited fish and shellfish should be within safe biological limits, with a population age and size distribution that is indicative of a healthy stock. A good environmental status is achieved if a stock is exploited sustainably and consistently with high long-term yields, has full reproductive capacity in order to maintain stock biomass, and the proportion of older and larger fish/shellfish is maintained or increased. Figure 12 shows the state of the assessed European commercial fish and shellfish stocks.

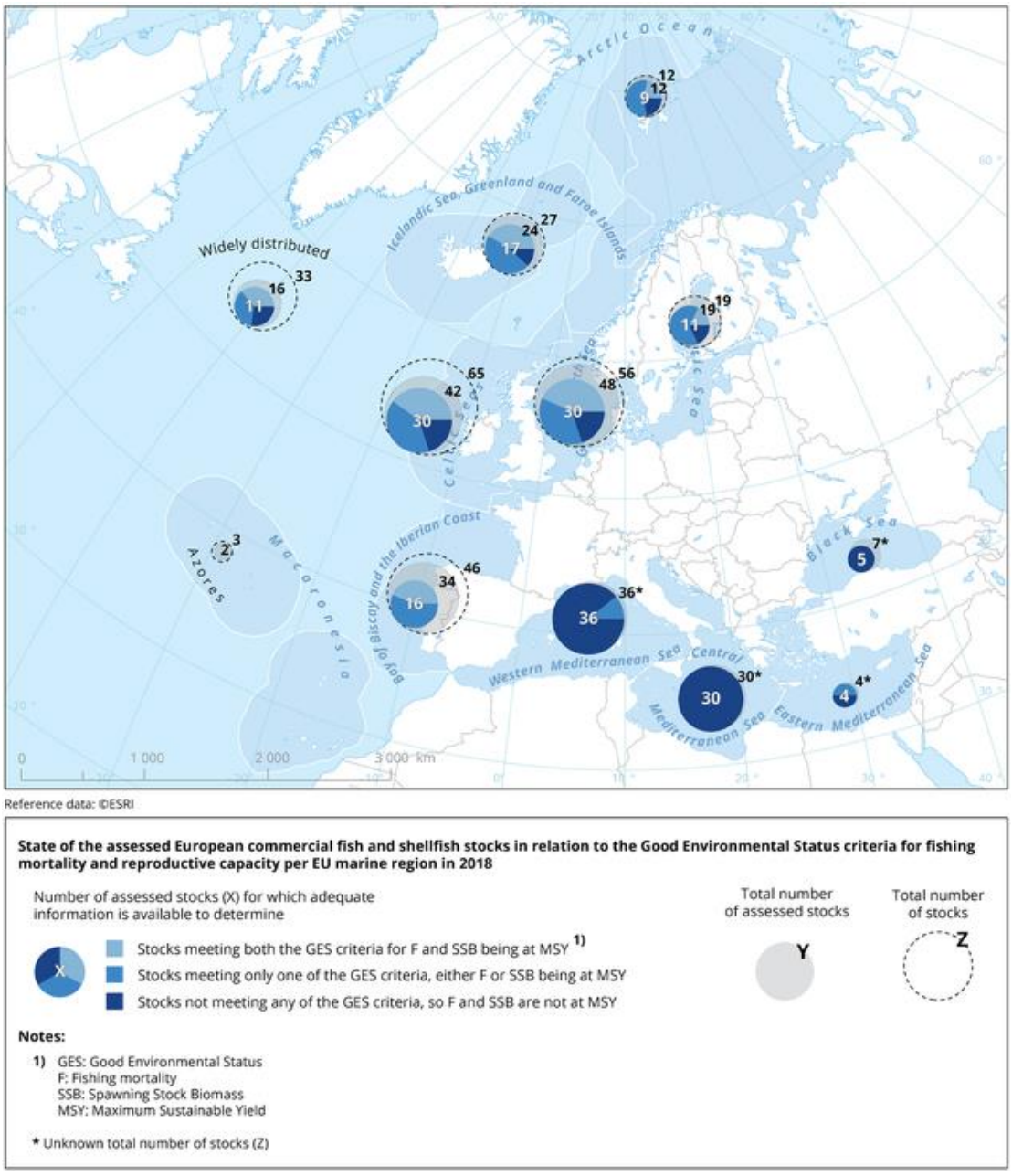


Figure 12: State of the assessed European commercial fish and shellfish stocks in 2018.

Source: [17]

Considering only the two sets of data pertaining to the Atlantic Area in the figure above, more than half of stocks do not meet the two criteria for good environmental status (fishing mortality and/ or reproductive capacity), which does not meet the safe biological limits. Although further improvements are still necessary regarding this indicator, the temporal analysis shows clear and important signs of improvement in the North-East Atlantic Ocean, with most assessed commercial fish and shellfish stocks in the North-East Atlantic Ocean meeting at least one of the two criteria mentioned. Since the early 2000s, better management of fish and shellfish fisheries has

contributed to a clear decrease in fishing pressure in this region, which has in turn resulted in signs of recovery in the reproductive capacity of several fish and shellfish stocks. If these efforts continue to show progress, fishing mortality should remain near the maximum sustainable yield and reproductive capacity should continue to improve towards the objective for healthy fish and shellfish stocks. Despite these promising results, there are still knowledge gaps. Many stocks in the Atlantic Area have still not been assessed or have had enough adequate information available to perform a full evaluation (only 30 out of 65 stocks were correctly assessed in the Celtic Seas and 16 out of 46 in the Bay of Biscay and the Iberian Coast).

The next MSFD indicator is related to food webs. All elements of marine food webs must occur at normal abundance and diversity and in levels capable of ensuring long-term abundance of the species and retention of their full reproductive capacity. Healthy and abundant food chains are key to ensure the survival of species. The interactions between species in food webs are constantly changing so it's difficult to establish a good environmental status in a particular region. The best way to measure the functioning of an ecosystem in terms of its food webs is by measuring the ratios of production at different trophic levels and the productivity of key species of groups and trophic relationships. Since this descriptor represents one of the most complex and unknown aspects of marine ecosystems, there are few assessments of the status of food webs publicly available. In fact, the good environmental status of 50% of food webs in the Atlantic Area has yet to be assessed, with the other 50% simply being listed as "Unknown". This lack of information is concerning and should be quickly addressed, in order to better comprehend the biological status of the marine food webs in this region [18].

Eutrophication is another key indicator of the good environmental status of a marine region. It is a process driven by the enrichment of water by nutrients, mainly compounds of nitrogen and/or phosphorus, and organic matter. It has been a problem in Europe's marine waters for decades since it leads to increased growth of algae, changes in the balance of organisms and water quality degradation. These consequences are undesirable since they can cause changes in the structure and functioning of marine ecosystems, which could adversely affect ecosystem health and services. EU water legislation addresses this problem, especially in relation to reductions of inputs and desired quality of aquatic environment. As such, the MSFD indicates that human-induced eutrophication should be minimised, especially adverse effects thereof, such as losses of biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters. To assess this, European seas can be classified accordingly to their eutrophication status as "non-problem areas" or "problem areas" (Figure 13).

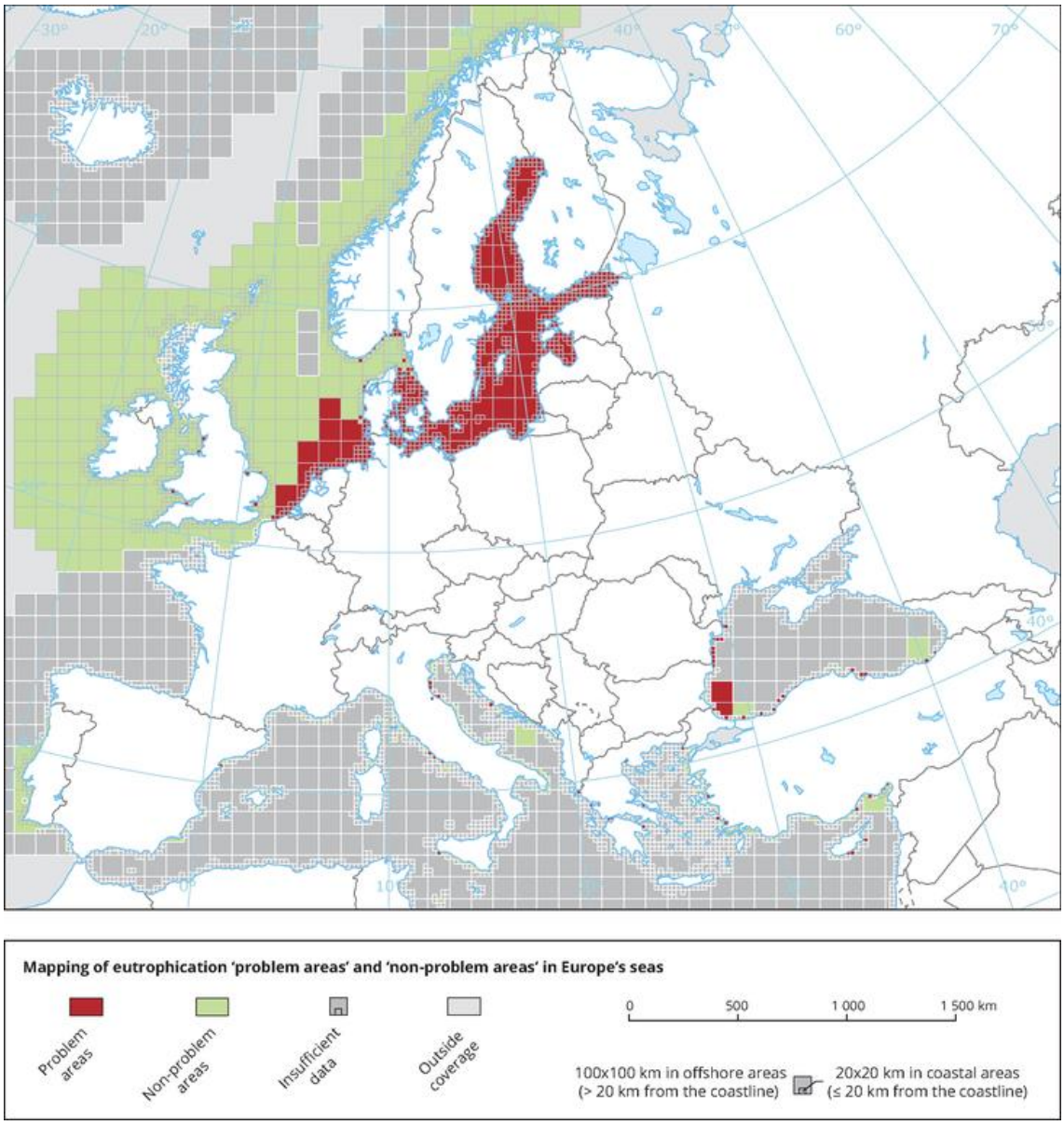


Figure 13: Eutrophication 'problem'- and 'non-problem' areas in European seas.

Source: [19]

In the Atlantic Area countries, despite the insufficient data for a large part of the Spain and France regions, the marine regions of the south of Portugal and Ireland are classified as non-problem areas, which could be seen as a positive sign of the good environmental status regarding eutrophication.

Sea-floor integrity is the next MSFD indicator to be considered. The sea-floor integrity needs to ensure that the structure and functions of the ecosystems are safeguarded and benthic ecosystems (species and communities living on the sea-floor), in particular, are not adversely affected. To measure the good environmental status of the sea-floor, it is key to analyse the

physical damage, including the physical loss of the seabed and physical disturbance to the seabed.

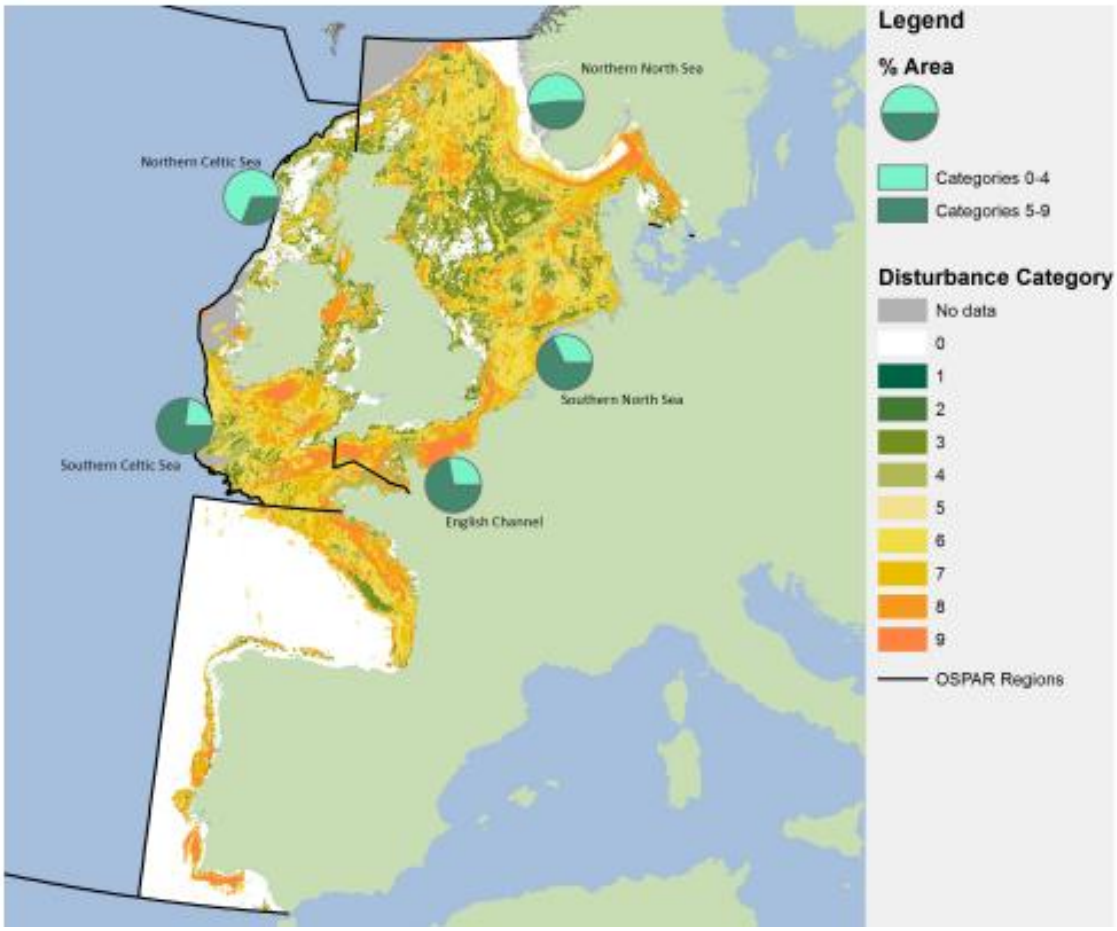


Figure 14: Assessment of the extent of surface and sub-surface seafloor disturbance. Disturbance categories 0–9, with 0= no disturbance and 9= highest disturbance.

Source: [20]

Across the Atlantic Area, the disturbance of the sea-floor habitats seems to be extremely high, as seen in Figure 14, which shows many orange and yellow areas (9 indicates the highest disturbance levels). Up to 86% of the grid cells that were assessed between 2010 and 2015 show evidence of some physical disturbance of the seafloor, of which 58% of the areas show higher levels of disturbance. This great pressure is caused by the joint effects of demersal fishing, coastal development and other human activities.

According to the MSFD, the permanent alteration of hydrographical conditions, i.e. the physical parameters of sea water (temperature, salinity, depth, currents, waves, turbulence and turbidity), should not affect marine ecosystems. These parameters play a crucial role in the dynamics of marine ecosystems and can be changed by human activities. One of the easier parameters to measure is the sea surface temperature. Figure 14 tracks the changes in temperature over the

last 140 years. As expected, all European seas have warmed considerably since 1870, due to the impacts of climate change, with a steep increase since the late 1970s, and the marine regions surrounding the Atlantic Area countries are no exception. During the period for which comprehensive data is available (1981-2018), sea surface temperature increased by 0.3°C per decade in the North Atlantic. Over the past century, the increase in sea surface temperature has been accompanied by an increase in the frequency and intensity of marine heatwaves. This has had considerable ecological impacts, including the promotion of harmful algal blooms, with increased risks to human health, ecosystems and aquaculture.

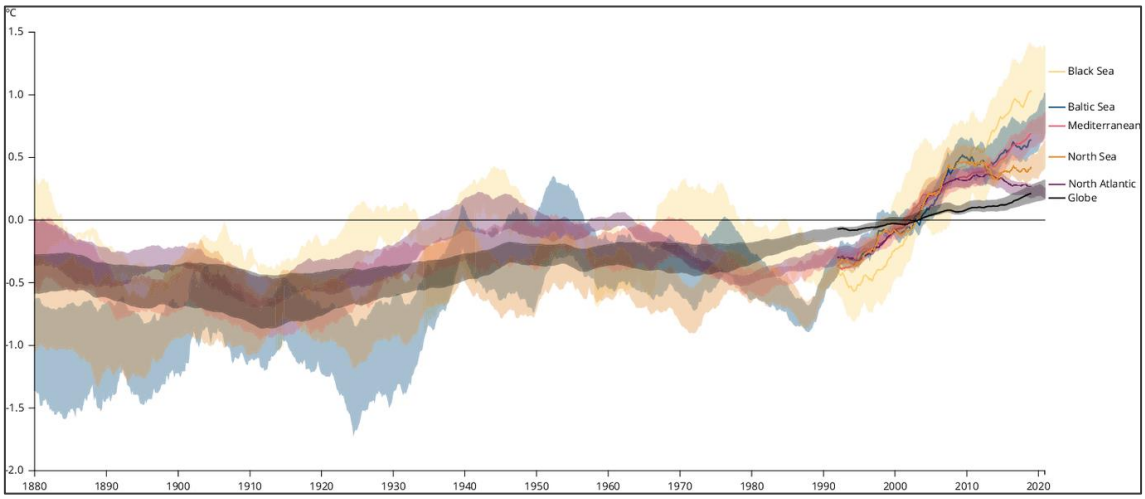


Figure 15: Decadal average sea surface temperature anomaly in different European seas (1870 to 2020).

Source: [21]

The eighth indicator featured in the MSFD is the concentration of contaminants, i.e. chemical elements, compounds or substances that are toxic, persistent and liable to bio-accumulate or that raise a level of concern. These should be at a level that doesn't give rise to pollution effects. Figure 16 shows the concentration of eight different contaminants in the European seas – cadmium, mercury, lead, HCB, HCHG, DDEpp, PCB7 and BAP. The relevant data pertaining to the Atlantic Area is found in the small dots along the coasts of the Atlantic Area countries.

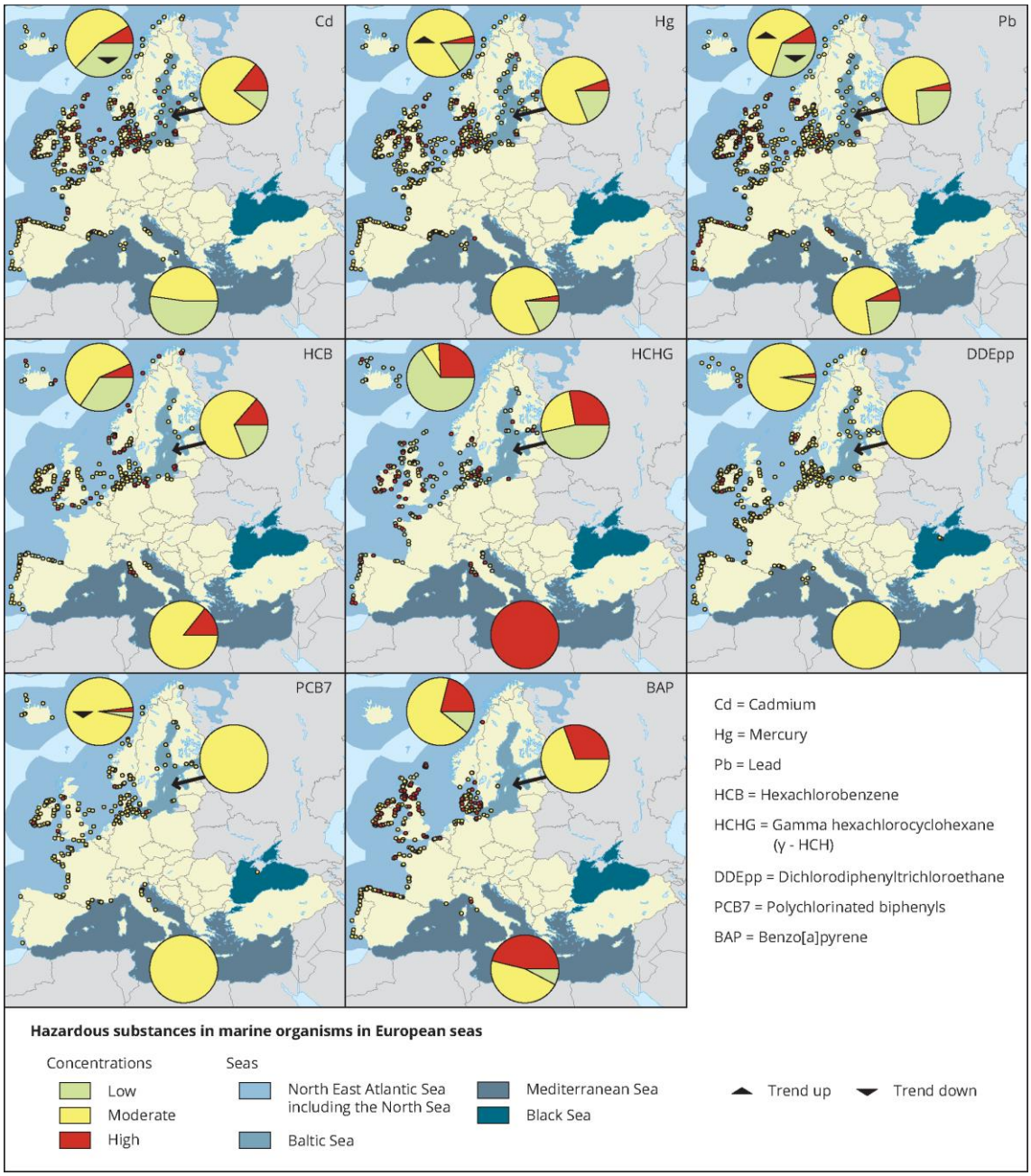


Figure 16: Hazardous substances in marine organisms in European seas.

Source: [22]

Cadmium, lead and mercury are found at low concentrations in the Earth's crust and occur naturally in seawater. The other substances, such as HCB and PCB7, are synthetic substances that are not found naturally in the environment. In the Atlantic Area, the concentration of the 8 substances in study was mainly moderate, with a few cases of significantly higher percentages of hazardous substances, like lead in the coasts of Portugal and Ireland, BAP in the north of Spain and Ireland and HCHG in the overall Atlantic Area. In fact, these three contaminants seem to be the main reasons for concern in the Atlantic Area. No major areas were reported to have low

concentration of contaminants. Despite this fact, the marine regions of the Atlantic seem to generally be in better condition regarding the concentration of hazardous substances when comparing to the other studied seas like the Mediterranean and Baltic Seas.

The general mobilisation of these hazardous substances in the marine environment is caused by human activities. The effects that some of these substances have on the environment and their potential risk to human health have led to considerable efforts (i.e. political, management, scientific) to address them, such as targeted policies and conventions aimed at minimising the direct and indirect effects of these contaminants by the reducing emissions and discharges to the marine environment.

The presence of contaminants is not only worrying in the sea water, but also when in sea food. Fish and other sea foods, such as crustaceans, molluscs or seaweed constitute an important food source for human consumption. The level of contaminants in edible tissues of seafood should not exceed levels established by community legislation or other relevant standards. Toxic contaminants end up in water bodies due to industrial discharges, agricultural practices, and storm and water runoff, that can also wash chemicals from the land or air into streams, rivers, and lakes. Later, these contaminants are absorbed by fish from water, sediments and food that they eat. In 2018, MSFD assessments for this descriptor focused on a few contaminants regulated under food legislation. The concentration of those contaminants in food that came from European waters was, overall, below the maximum levels established under food legislation. All reported trends under this descriptor were stable or decreasing.

Next, the MSFD specifies marine litter as another relevant indicator to the good environmental status of the marine regions, as the properties and quantities of marine litter should not harm the coastal and marine environment. Every day, millions of tons of litter end up in the ocean causing environmental, economic, health and aesthetic problems. This indicator aims to provide a framework for the quantitative assessment of marine litter and its negative impact in order to adopt measures that can protect the environment.

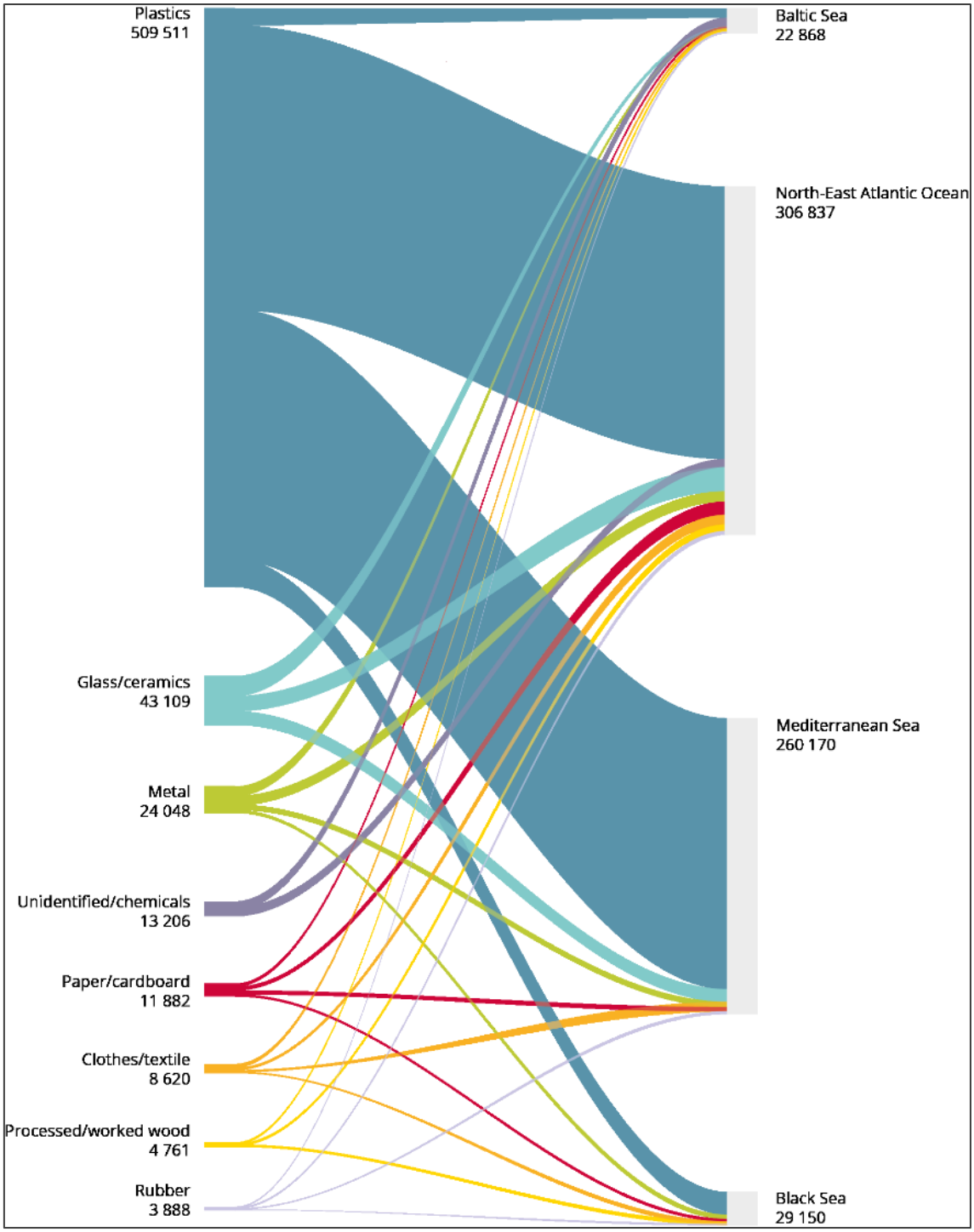


Figure 17: Distribution of marine litter by material type and European sea.

Source: [23]

Of all the regions featured in Figure 17, the North-East Atlantic Ocean is the marine region most affected by the presence of litter, with disposable plastic being the biggest contributor (around three-fourths of all litter found in this region). Around half of all plastics found in European seas can be attributed to the Atlantic. Plastic is without a doubt a worrying issue and is by far the

biggest cause of marine litter, since it is used in all production chain steps and can be made into an infinite variety of products, which in turn can end up in the environment when discarded. It is extremely important to find solutions to this problem, since it does not comply with the condition for a good environmental status.

Finally, the MSFD highlights energy (including water noise) as the last relevant indicator of a good environmental status. The additional energy caused by human activities, which includes underwater sound, magnetic and electromagnetic radiation, heat and artificial light, should be at levels that do not adversely affect the marine environment. Currently, only underwater noise caused by anthropogenic sounds inputs is directly addressed by the MSFD criteria. Sources of continuous noise are shipping, the operation of human-made structures or installations and other offshore and coastal industrial activities.

The mapping of marine routes across the Atlantic Area, shown in Figure 18, gives insights to the areas where continuous underwater noise could potentially occur. It is apparent that the North East Atlantic Sea is a center of human activity, with many routes linking the countries of the Atlantic Area. The coasts of Portugal and Northeast France seem to be hubs for maritime transport, with a great concentration of routes. As maritime traffic slowly grows (a trend seen in recent years not exclusively in Europe but aligned with the rest of the world), the widespread energy caused by boats inevitably affects the ocean and its ecosystem.

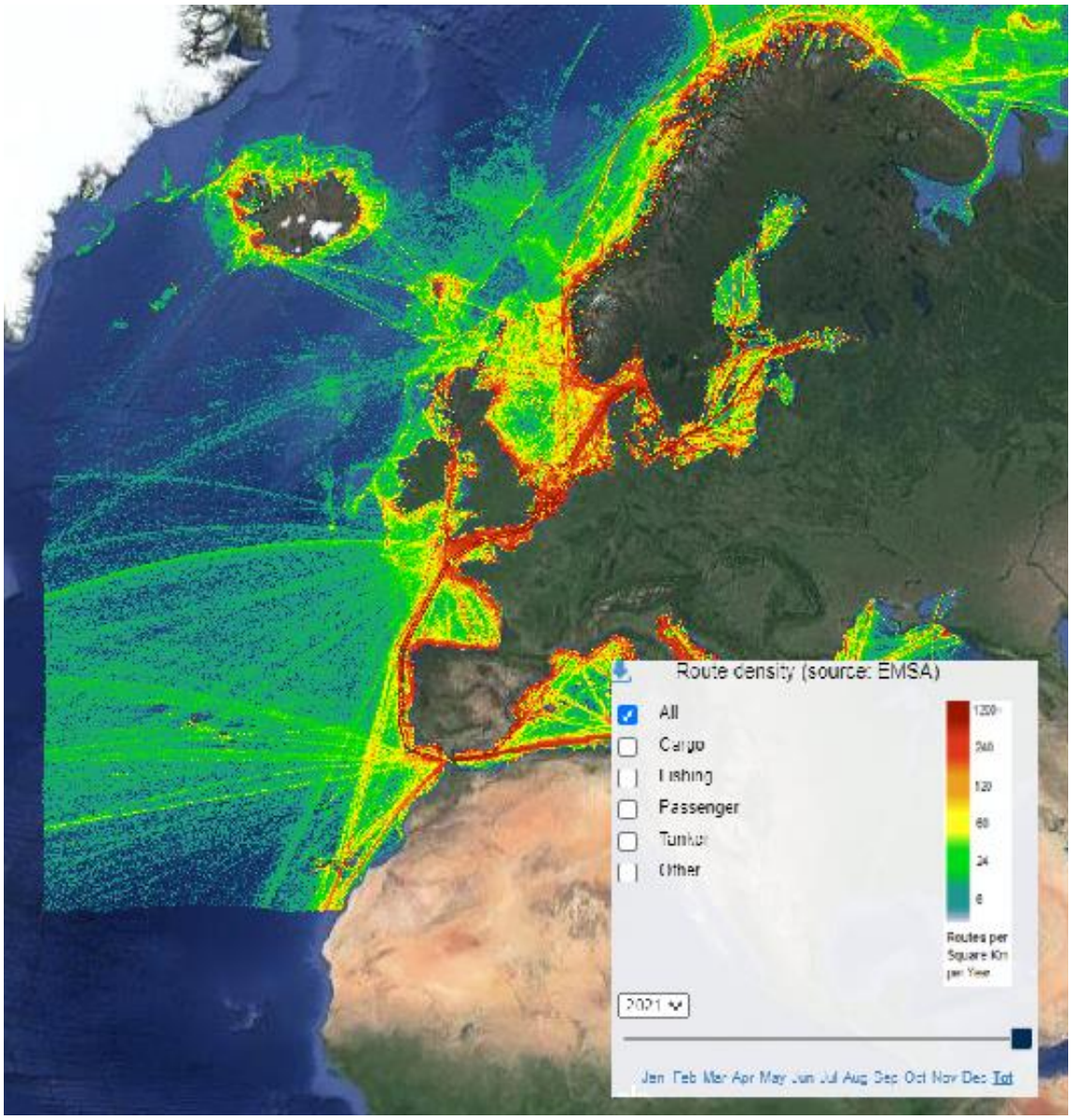


Figure 18: Route density across Atlantic waters.

Source: [24]

Overall, considering the 11 indicators established by the MSFD and the status of the marine environment in the Atlantic Area, it is clear that, despite recent efforts to lessen the impacts of human activity, marine ecosystems are still under great pressure. Through joint efforts, European countries have managed to reduce selected pressures, and positive effects are starting to become visible, like the recovery of some commercially exploited fish and shellfish stocks due to the increasing number of these stocks being fished at maximum sustainable yield. At the same time, the target of achieving a good environmental status of European marine waters by 2020 was considered to be unlikely to be achieved in relation to key pressures such as contaminants, eutrophication, NIS and marine litter [10].

3.4 Soil

Land use

Land use modifies the quality and quantity of ecosystem services, constraining the potential of land and soil to provide them. The main drivers of land degradation during the 2000-2018 period were unsustainable agricultural and forestry practices, urban expansion and climate. Those factors have already resulted in the loss of ecosystem services in many parts of the world [10].

The proportion of Europe's main land cover types are relatively stable (e.g., 25.1% arable land and permanent crops, 16.6% grassland, 34.4% forests). However, long-term changes show that the area of artificial surfaces has changed the most, increasing by 7.1% during the 2000-2018 period [10].

Despite a reduction in the last decade, land take in the EU28 still reached 440 km²/year between 2012-2018 (Figure 19). The main drivers behind this trend were expansion of urban areas and transport networks [10]. Between 2000-2018, occupied land was concentrated around larger urban agglomerations, with 80% of land occupied at the expense of arable land and permanent crops (50%) and pasture and agricultural land mosaics (almost 30%) [10].

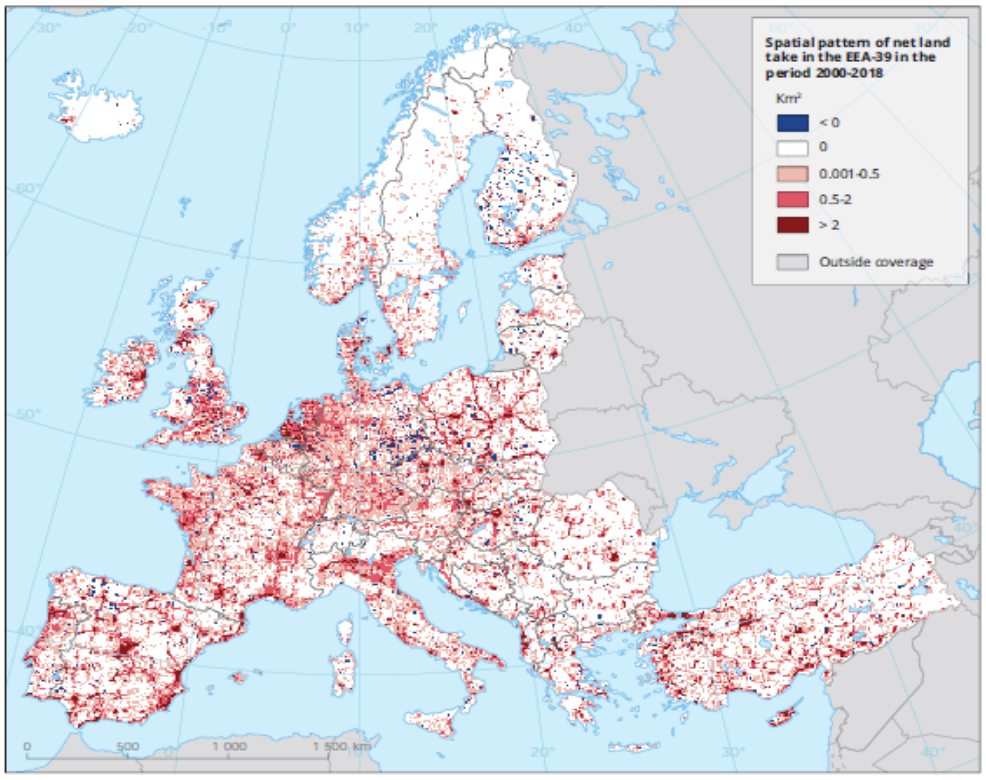


Figure 19: Spatial pattern of net land take in the EEA-39 in the 2000-2018 period

Source: [25]

Unsustainable agricultural and forestry practices are mostly linked to high societal demand for agriculture and forestry outputs, land abandonment and fragmentation. In Atlantic Area countries, the largest losses of arable land and permanent crops in the 2000-2018 period were observed in the interior of Spain (due to increase in construction and industrial sites) and southern Portugal (due to withdrawal of farming and subsequent woodland creation) [10].

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, floods and forest fires present increasing threats for soil erosion, also driven by climate change [10].

Regarding the future trends, Europe's land resources are exposed to intensive use at an accelerated rate. Artificial surfaces are expected to increase by 0.71% by 2050, due to further growth of urban agglomerations. This urban expansion is expected to bring a greater need for infrastructure (transport, water, waste and electricity), which decreases the long-term availability of productive land resources. Land take and the resulting landscape fragmentation is expected to increase by 2030. The intensive use of productive farmland is likely to increase, impacting the quality and ecosystem services of agricultural areas [10].

Condition of Soil

Soils all over Europe are threatened by increasing competition for land, unsustainable practices and inputs of pollutants, causing their degradation in various forms (physical, chemical and biological) [10].

The dominating activities for contamination at local level are municipal and industrial waste sites (37%) together with industrial emissions and leakages (33%) [10]. On the other hand, diffuse contamination is predominantly linked to contamination with heavy metals (like cadmium and copper presented in Figure 20, pesticides and herbicides, as well as – all predominantly linked to agriculture.

Cadmium - mainly originating from mineral phosphorus fertilisers - accumulates in 45% of agricultural soils, mainly in southern Europe (Figure 20). In 21% of agricultural soils, the cadmium concentration in the topsoil exceeds the limit for groundwater, 1.0 mg/m^3 (used for drinking water). On the other hand, copper has been widely used as a fungicide spray, especially in vineyards and orchards. High levels of copper have been found in soils in the olive and wine growing regions of the Mediterranean (Figure 20).

According to Figure 20, cadmium pollution can be considered a regional environmental issue for Atlantic Area countries (related especially to the south of Portugal and Spain). Copper pollution can be characterized as a widespread environmental issue in Atlantic area countries (with a special focus in France), which occurs on all agriculturally significant areas.

Regarding the nitrogen pollution, it 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 [10].

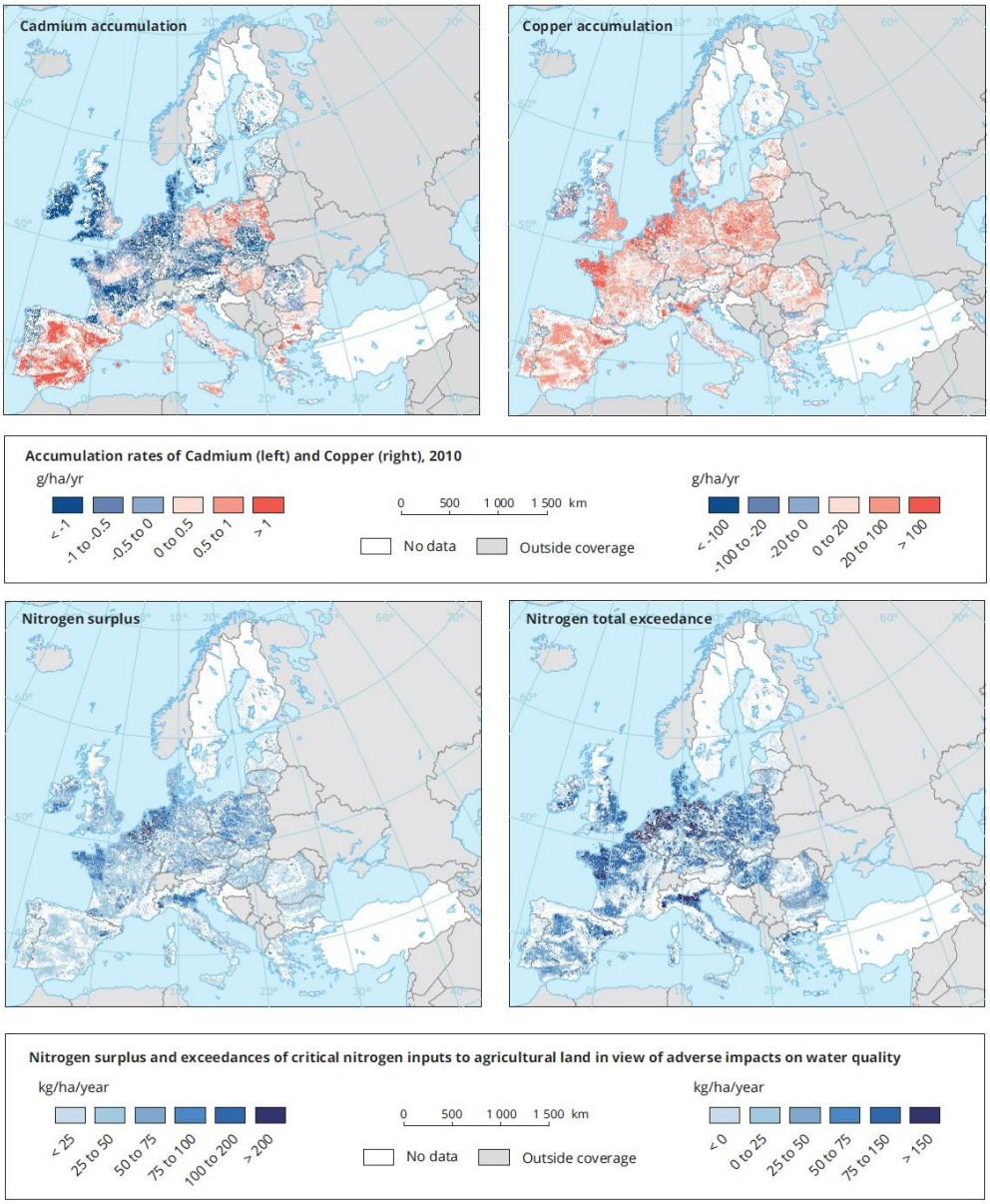


Figure 20: Accumulation rates of cadmium (left) and copper (right) in EU soils (top); calculated nitrogen surplus (inputs vs outputs) (left) and exceedances of critical nitrogen inputs to agricultural land in view of adverse impacts on the environment (right) (down)

Source: [10] and [26]

Soil erosion

Soil erosion describes the loss of soil by water or wind and harvest losses. Erosion of agricultural soils causes loss of soil productivity and function. In addition, due to its proximity to surface waters, erosion leads to the transfer of soil material and pollutants into water systems.

Estimated soil erosion rate by water in EU is 1.6 times higher than the average rate of soil formation. Accordingly, 12.7% of Europe's land area is affected by moderate to high erosion. The total soil loss due to water erosion is estimated at 970 million tons per year. Although there is a downward trend due to a decrease in sugar beet cultivation, crop harvesting practices may increase the overall rate of soil loss in countries such Ireland [10].

Soil erosion by water has the highest incidence in Spain (especially in Andalucía), central and northern Portugal and southern France (Figure 21).

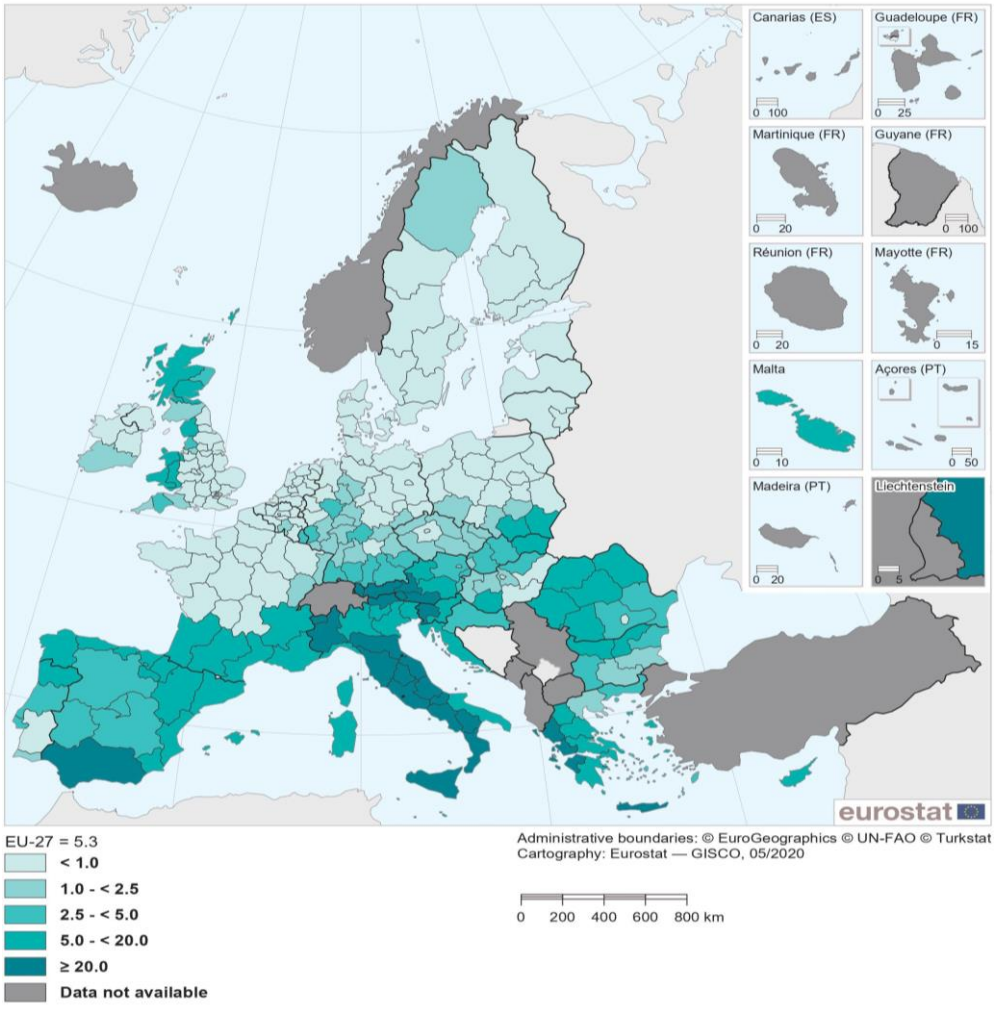


Figure 21: Severe soil erosion by water, 2016 (% by NUTS 2 regions)

Source: [27]

Erosion rates in Atlantic Area countries can be expected to further increase in the future as a result of more extreme rain events, but sectoral changes also play a role. Maintaining and/ or increasing landscape features may reduce the risk of soil erosion [10].

The underlying drivers of soil degradation are not projected to change favourably, so the functionality of soils is under even more pressure. Harmonised, representative soil monitoring across Europe is needed to develop early warnings of exceedances of critical thresholds and to guide sustainable soil management [10].

Coastal erosion

Coastal erosion is the breaking down and carrying away of materials by the sea. Coastal erosion is a result of human activities and natural environment changes making the coastal dynamic action (wave, current, wind) lose balance in the coastal process, and the long-term loss of sediments of coastal zone results in the destruction process of coastline retreat and beach erosion. Europe's coats are suffering from increasing coastal erosion. Storms together with high waves often cause erosion by attacking beaches, dunes and cliffs. In 2004, about 20.000 km of coasts faced serious problems and impacts.

According to Figure 22, in the Atlantic Area the coastal erosion is more visible in central and northern coast of Portugal, south of Spain, northwest of France and east coast of Ireland.

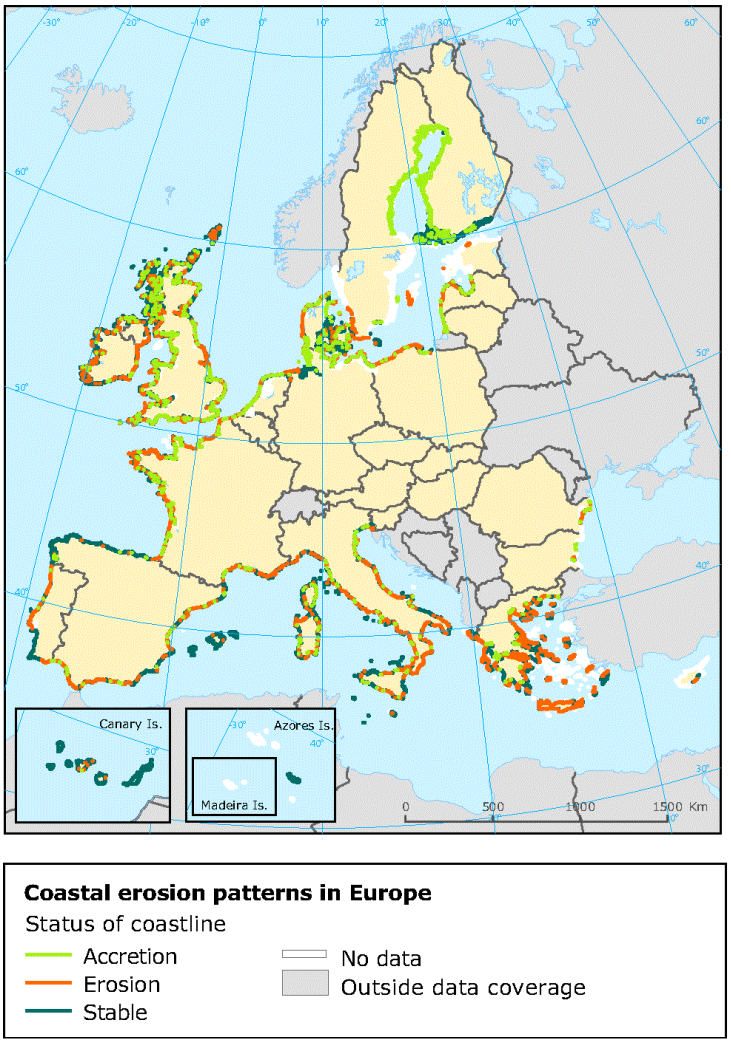


Figure 22: Coastal erosion patterns in Europe.

Source: [28]

Almost half of the world's sandy beaches could be gone by the end of the century. A substantial proportion of the threatened sandy shorelines are in densely populated areas. The moderate scenario of climate change results in 17% less shoreline retreat compared with the high-end scenario in 2050, and 40% less retreat in 2100. This corresponds to a global average of around 42 m of preserved sandy beach width in the moderate scenario by the end of the century. This illustrates the importance of mitigating the emission of greenhouse gasses. A recent study indicates that about one-third of these low-elevation coastal zones will be seriously threatened by erosion by 2050, and more than half of them by 2100.

Regarding Europe, 28% of Europe's sandy and gravel shorelines are eroding. Most of the impact zones (15.100 km) are actively retreating, some of them in spite of coastal protection works. The cost of coastal erosion (coastline protection against the risk of erosion and flooding) has been estimated to average 5.400 million euros per year between 1990 and 2020 [29].

Coastal erosion results in three different types of impacts (or risks):

- Loss of land with economical value;
- Destruction of natural sea defences (usually a dune system) as a result of storm events, which may result in flooding of the hinterland;
- Undermining of artificial sea defences as a result of chronic sediment shortage.

The coastal erosion is an alarming problem. However, a more sustainable management of coastal zones and river basins can prevent some of the erosion.

Waste management

Waste management in the EU is improving but 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 (Figure 23). In the Atlantic Area countries, the situation also varies: France and Ireland have shares above 40% and Portugal is below 30%.

Thus, further efforts (including measures to incentivise separate collection and a more circular use of materials) are needed to reach the EU's specific waste management targets (e.g. reduce landfill to a maximum of 10% of municipal waste generated in 2035).

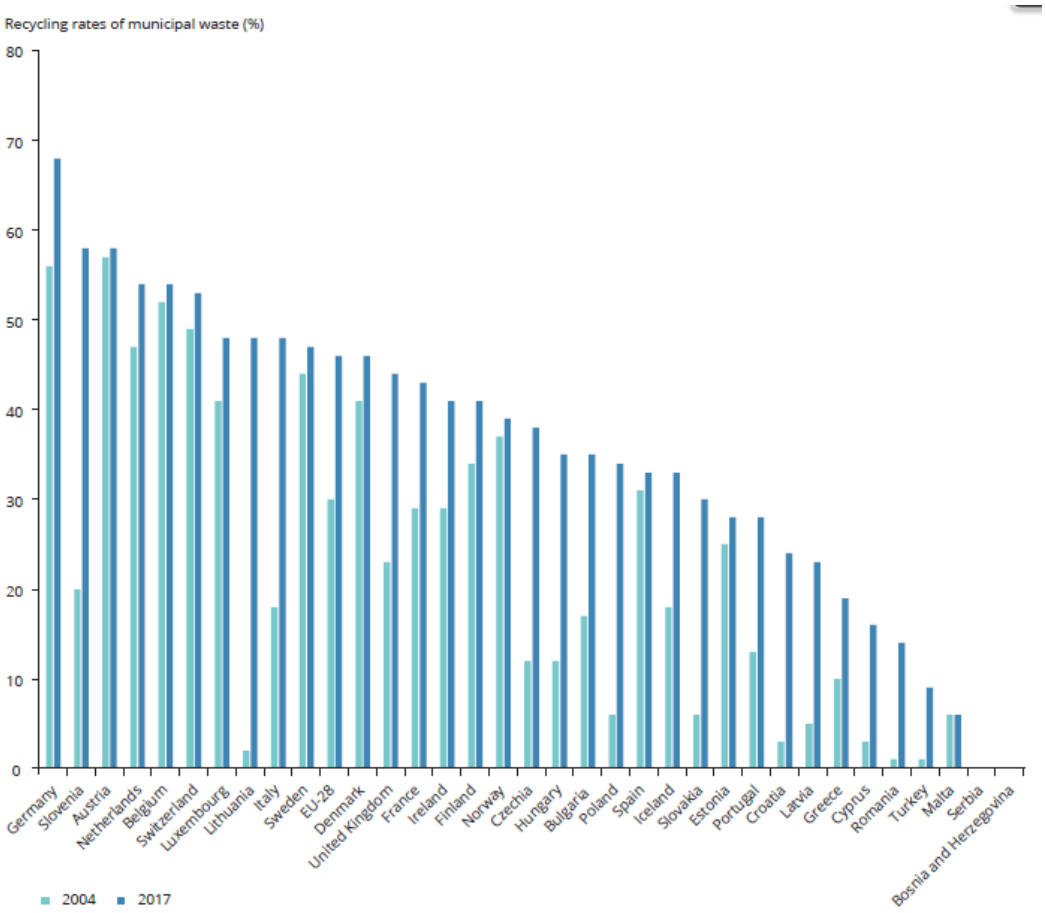


Figure 23: Recycling rates of municipal waste in 2004 and 2017.

Source: [10]

3.5 Biodiversity

Protected areas

The protected areas in the EU (Figure 24), can be divided into two types: the “nationally designated protected areas”, which are protected by national legislation, and the “Natura 2000 network”. Natura 2000 is a network which aims to safeguard Europe’s most valuable and threatened species and habitats, listed under the Birds and Habitats Directives. The Natura 2000 network is the largest network of protected areas in the world. Natura 2000 defines minimum standards for the protection of nature and species in the EU's 27 Member States. By October of 2020, this network included approximately 28,000 sites and covered about 18% of the Member States’ terrestrial area. Although the Natura 2000 areas make up only part of the total protected area in Europe, in some countries they represent a decisive share [10].

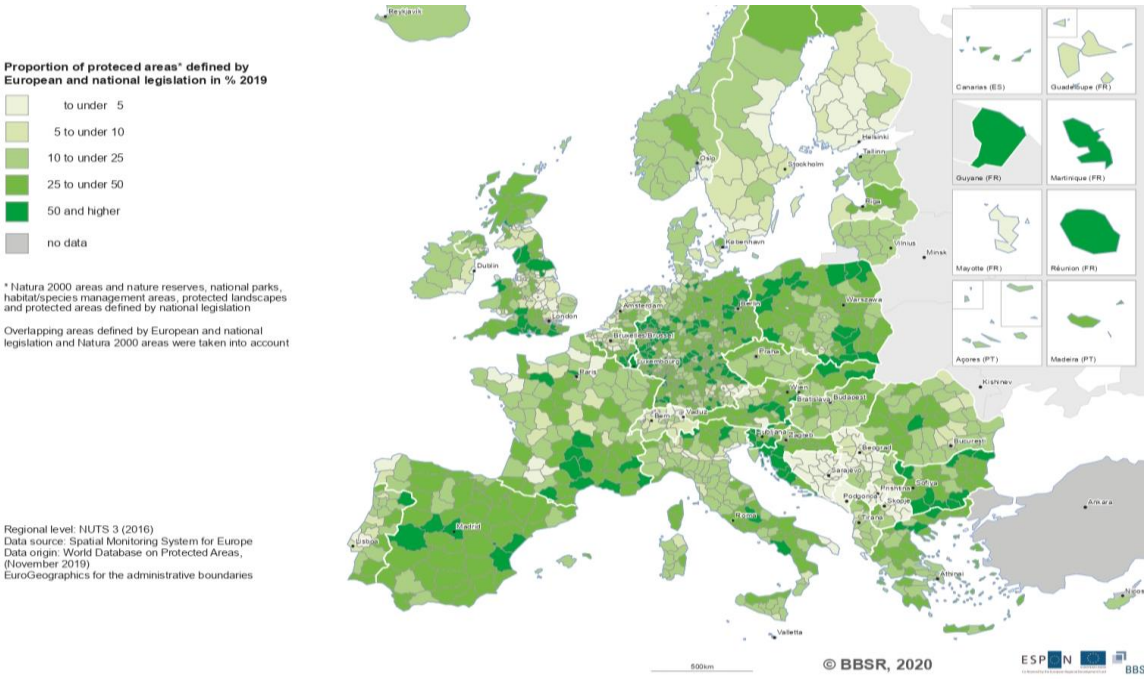


Figure 24: Overview of the protected sites in Europe.

Source: [30]

Sometimes, the Natura 2000 protected areas overlap with nationally designated nature reserves, which are usually larger than the Natura 2000 protected areas. In the EU-27, roughly 1,200,000 km^2, or about 27% of the EU's total area, are designated as nature or landscape conservation areas. About 70% of those conservation areas are also Natura 2000 protected areas.

Focusing on the Atlantic Area, the proportion of terrestrial protected area is lower when compared to the rest of Europe. Most areas range from 5 to 10% of protected area, with some exceptions in the south of Portugal, north of Spain and some regions in France, where 10 to 25% of its land are protected areas.

Regarding marine protected areas (MPAs), by the end of 2016, 10.8% of the surface of Europe's seas had been designated as MPAs. This result meets the Aichi biodiversity target 11 (protecting at least 10% of its sea area within MPA), albeit with some variation between the marine regions. Five out of 10 regional seas are still short of reaching the target (including the Bay of Biscay and the Iberian Coast) (Figure 25).

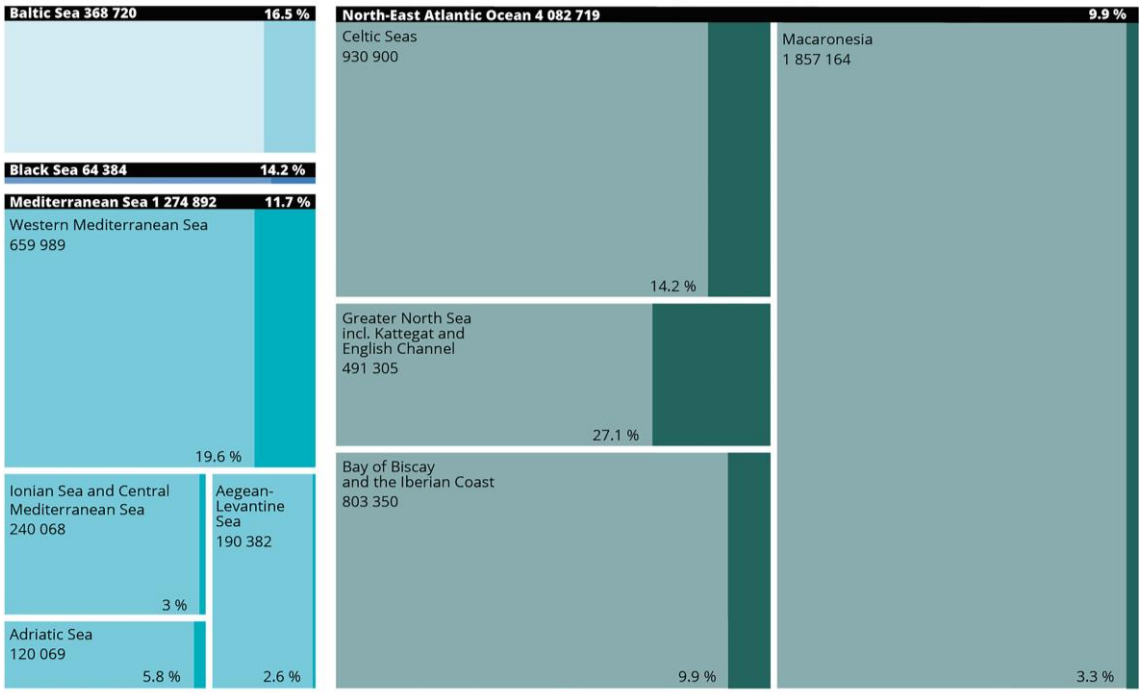


Figure 25: Area covered by MPAs in 2016.

Source: [10]

The Atlantic Area's natural landscapes are unique and varied and deserve protection as part of European identity and diversity. Europe is embedded in global processes and systems, moreover areas of human settlement are expanding. Therefore, it is necessary to find a balance between nature conservation, the sustainable use of natural resources and the economic development. The European Union's nature conservation policy plays a crucial role in maintaining biodiversity.

Protected species and habitats

At the EU level, the assessments of species and habitats protected under the Habitats Directive, in the period 2013-2018, showed predominantly unfavourable conservation status. The assessment showed that only 27.5% of the assessments of species were reported to have favourable conservation status, while 62.4% of species assessments had unfavourable status [31].

The Atlantic Area shows a similar situation in the status of the species and habitats protected. Most habitats and species assessed in the Atlantic Area are considered in poor or bad conservation status, while only 16.86% of habitats and 25.26% of species are considered in good conservation status. Furthermore, comparing the 2007-2012 period to the 2013-2018 period, the proportion of assessments of habitats reported to have good conservation status decreased 2.74

percentage points and the proportion of assessments of species reported to have good conservation status remained practically the same (Figure 26).

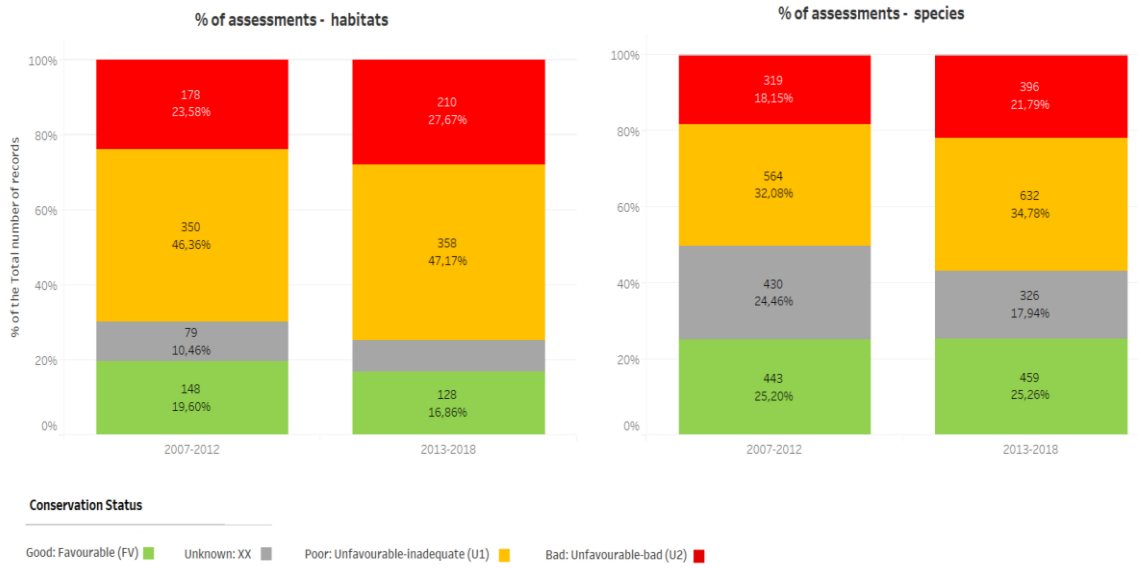


Figure 26: Proportion of assessments in each category of conservation status for 2007-2012 and 2013-2018 reporting periods.

Source: [32]

The different protected species in the Atlantic Area and their conservation status are displayed in Figure 27. Fish are the species with the least proportion of good conservation status, while vascular plants are the species that show the greatest conservation status.

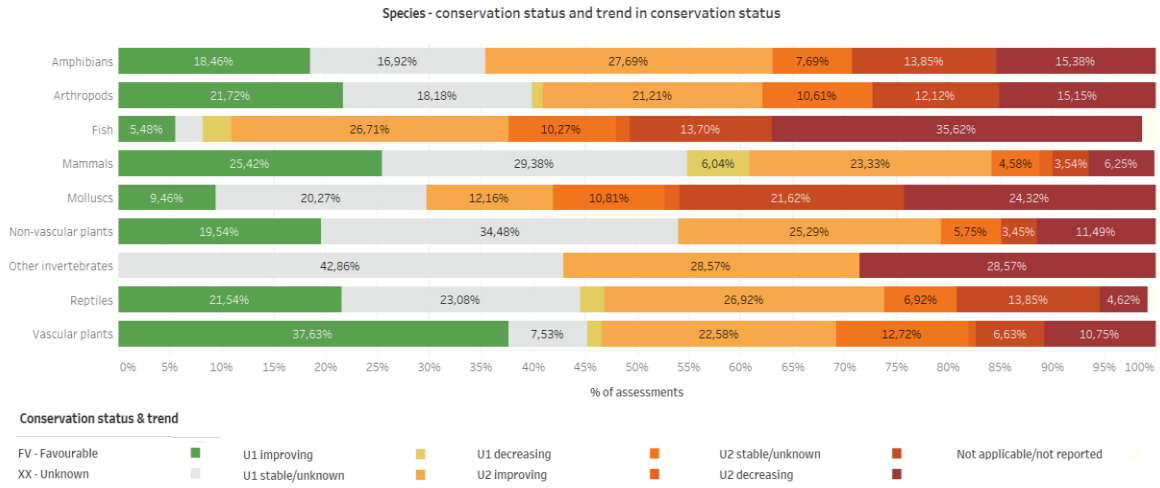


Figure 27: Proportion of assessments in categories of conservation status and conservation status trend (for unfavourable assessments only) by species taxonomic group.

Source: [32]

Ecosystems

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' and they are multi-functional. The western Europe sub-region, where the Atlantic Area is located, has 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 [33].

3.6 Climatic Factors

Temperature increase/ heat waves

Trends in annual global temperatures are an important indicator of the magnitude of climate change and its possible impacts. The annual global average temperature between the years 2009-2018 was about 0.91-0.96°C higher than the pre-industrial (1850-1899) average. The European land area warmed 1.6-1.7°C during the same period, with significant regional and seasonal differences. Average annual land temperatures in Europe have increased considerably faster than global temperatures, and daily maximum temperatures in Europe have increased much faster than average annual temperatures. This means that a given increase in global average temperature is associated with a much larger increase in heat extremes in Europe. It should also be noted that 18 of the 19 hottest years on record worldwide have occurred since 2000. In fact, heat extremes and heat waves in Europe have increased considerably since the 1950s, and in particular after 2000 [10]. Since 2015, all-time national temperature records have been broken, particularly in Spain (in 2017) and France (in 2019) [10].

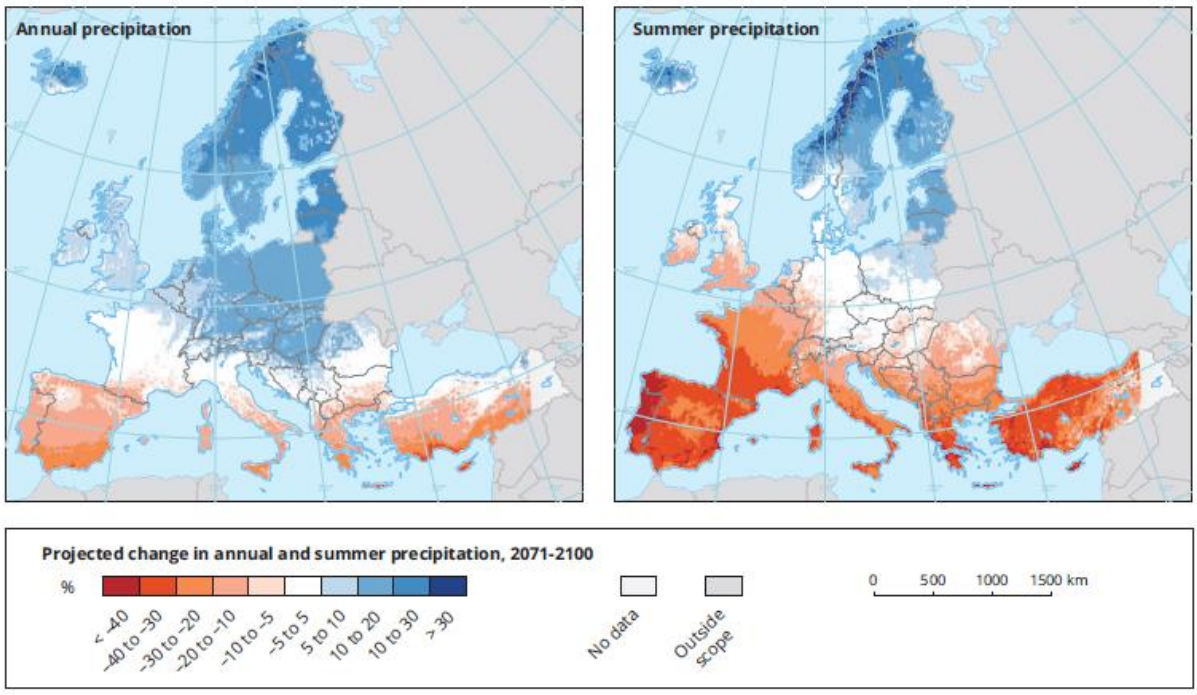
Heat waves are projected to become even more frequent and longer-lasting in Europe. Under a high-emissions scenario, very extreme heat waves are projected to occur as frequently as every 2 years in the second half of the 21st century. The projected frequency of heat waves is highest in southern and south-eastern Europe [10].

Floods and precipitation

The observed and projected changes in Europe's precipitation vary substantially across regions, as well as across seasons. Annual precipitation has increased over most of northern Europe and decreased over parts of southern Europe. These changes are expected to worsen in the future due to climate change and the projected decrease in precipitation is thought to be greatest in southern Europe in summer [10]. Focusing on the Atlantic Area, annual precipitation is projected

to decrease in Portugal and Spain and slightly increase in Ireland (Figure 28). As for summer precipitation, the projections admit a considerable decrease in precipitation across the Atlantic Area, mainly in Portugal, Spain and France.

It should also be noted that the intensity of heavy precipitation, which can cause flooding, has increased in summer and winter in most parts of Northern Europe. The largest increase has been observed for particularly heavy precipitation events. The different indices show diverging trends for Southern Europe. The intensity of daily heavy precipitation events is projected to increase in most parts of Europe, most strongly in north-eastern Europe. The number of very severe flood events in Europe has increased in recent decades, but there is a large interannual variability. Several Europe-wide studies predict that river flooding will become more frequent in the north-western and central-western regions of Europe, while the results differ in other regions. Pluvial floods and flash floods, which are triggered by intense local precipitation events, are likely to become more frequent across Europe [10].



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.

Figure 28: Projected changes in annual and summer precipitation.

Source: [10]

Forest fires

Climate change has also increased the risk of forest fires across Europe. There is a large inter-annual variability, strongly determined by weather conditions. For example, the area burned in

2017 was the second largest ever, in particular due to unprecedented wildfires in Portugal, while the area burned in 2018 was the lowest ever. In fact, severe weather conditions, with droughts and record heat waves have driven many of the recent extreme fire episodes and devastating fire seasons in Europe, as observed in spring and summer of 2017 and 2018, for example [34].

In most European regions fire-prone areas and longer fire seasons are projected to expand, so additional adaptation measures are needed [34].

The Canadian Fire Weather Index (FWI) assesses fire risk based on weather conditions. Comparisons of FWI, for the current climate, indicate that fire danger will increase in most regions, particularly in the Atlantic Area. Portugal and Spain will remain the countries with the highest absolute fire danger, however France and Ireland are projected to have a very considerable increase in the index [34].

Sea level

Since 1970, anthropogenic forcing has been the main cause of the accelerating sea level rise both globally and in European regional seas. Thermal expansion of ocean water was initially the main driver, but the melting of glaciers and disintegration of the Antarctic and Greenland ice sheets have exceeded the effects of thermal expansion since the start of the 21st century [35]

The Global mean sea level has risen about 19 cm since 1900, at an accelerating rate, having reached its highest value ever in 2019. Climate models project that, during the 21st century, the global sea level will rise 0.29 to 0.59 m for a low emissions scenario or 0.61 to 1.10 m for a high one. When considering the faster disintegration of the polar ice sheets, this rise in sea level could become 2.4 m by 2100 [35].

Most European coastal regions have experienced increases in sea level, as shown by Figure 29. Most of the Atlantic coastal areas have had a rise in sea level since 1970, at a rate that mostly ranges from 1 to 3 mm/year, with some exceptions like the east coast of Ireland, where the sea level rises at over 4 mm/year. With these rates, it is projected that, along the Atlantic Coast, the sea level will rise 0.6 to 0.7 m in the 21st century [35].

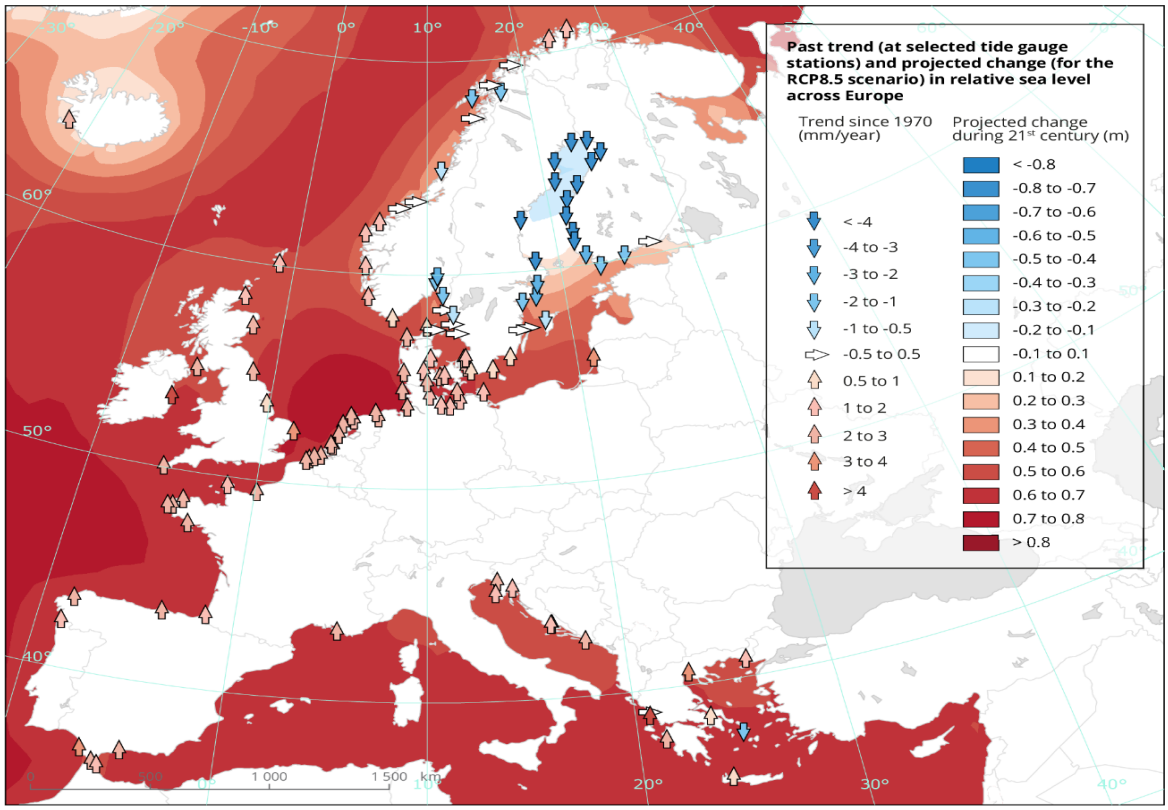


Figure 29: Past trend and projected change in relative sea level across Europe.

Source: [35]

Greenhouse gas emission by industrial sectors

According to recent estimates, GHG emissions in the EU-27 countries were 24% lower in 2019 than in 1990. The decrease in emissions between 2018 and 2019 was 4% - the steepest annual reduction experienced in the last decade. Taking into consideration the climate mitigation targets for 2030, the EU-27's total GHG emissions are expected to continue declining, although at a slower pace than needed to achieve that target. By 2030, the projections based on current and planned measures show a total emission reduction of 36%, which is a rather conservative outlook in the absence of new measures. Further effort would therefore be necessary to achieve the increased emission reduction target of 55 % that has been proposed for 2030 [36].

In the Atlantic Area countries, in 2019, France led the GHG emissions chart, with around 424,104 kilotons of CO_2 equivalent, followed by Spain with 296,093 kilotons of CO_2 equivalent and Ireland with 67,568 kilotons of CO_2 equivalent. Of the four countries that are represented in the Atlantic Area, Portugal had the lowest GHG emissions in 2019, with 60,164 kilotons of equivalent CO_2.

In most sectors, the GHG emissions are on a downward trend, with the biggest decreases in emissions since 1990 occurring in the energy supply, industry and waste sectors. Nevertheless, energy supply is still the top sector responsible for the biggest share of GHG emissions. On the

other side, GHG emissions from biomass use and from transports have increased substantially over the 1990-2017 period (Figure 30).

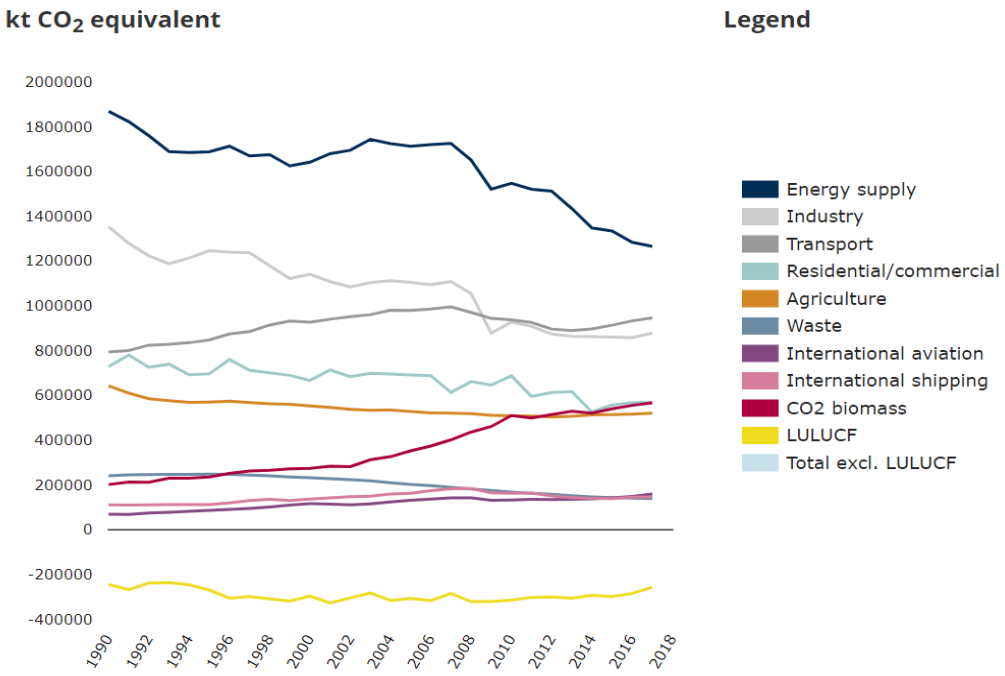


Figure 30: Greenhouse gas emissions by aggregated sector.

Source: [36]

3.7 Population and Human Health

Demographics

In 2020, around 163 million people lived in the EU coastal regions[1]. In the four Interreg AA 2021-2027 Programme Member States, the share of the national population living in a coastal region varies: it's higher than 50% in Ireland (93.9%), Portugal (85.1%) and Spain (59.9%) and less than 50% in France (38.7%) [37].

As previously mentioned, the Atlantic Area population is close to 50 million people (2020). Its population is unevenly distributed among regions, being Área Metropolitana de Lisboa, Norte, Madeira (Portugal), País Vasco (Spain), Bretagne, Pays-de-la Loire, Haute-Normandie (France) and Eastern and Midland (Ireland) the regions with the higher density rates (Figure 31).

[1] Regions having a coastline or more than half of their population living less than 50 km from the sea.

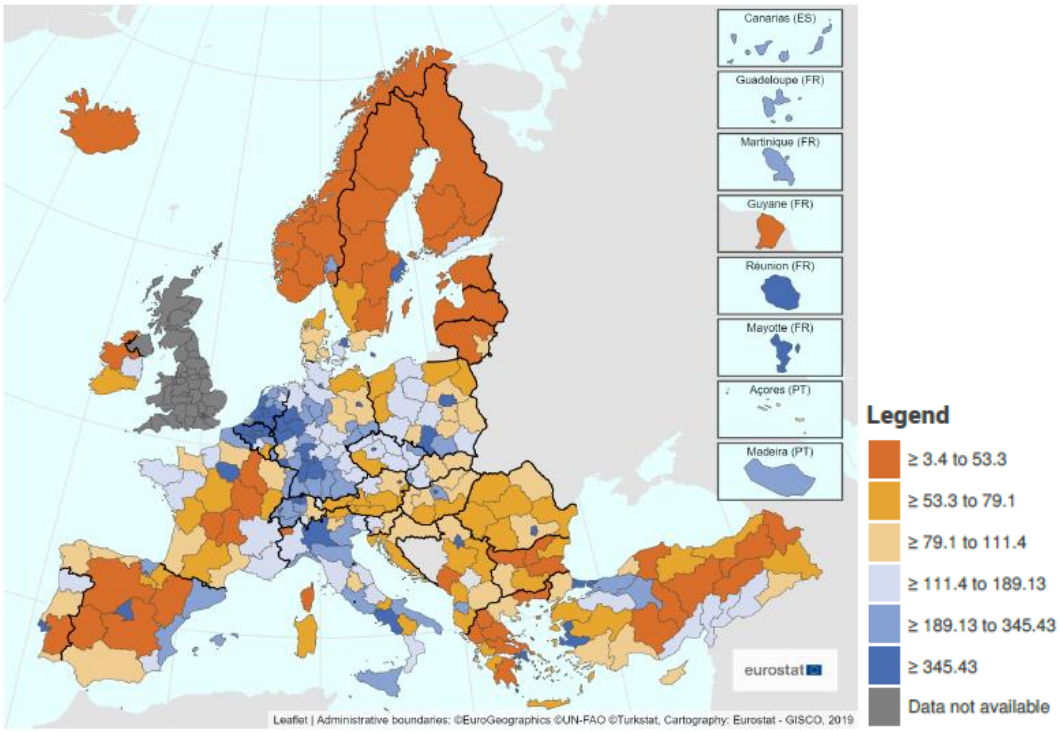


Figure 31: Population density by NUTS 2 regions (2019).

Source: [8]

The average age of the population also has serious disparities. Ireland's regions are the ones with the lowest average - Eastern and Midland region had the lowest average of 36.9 in 2020. On other end, Principado das Asturias (Spain) was the one with the highest average of 50.0 [8]. Thus, the dependency rate varies among regions as well. In 2020, while EU-27 average was 55.5, Portugal scored 55.6, Spain 51.8, France 62.1, and Ireland 53.1. In fact, the territory is starting to face higher dependency ratios, especially concerning old dependency ratio, meaning that, with a decrease on the number of births and higher life expectancy ratios, more elderly population (over 65) exist. Thus, more pressure on the working age, hence increasing the governments' expenditures, especially on health and social security [38]. In all Atlantic Area's four countries, predictions foresee a serious increase on this index by the year 2030 (Figure 32).

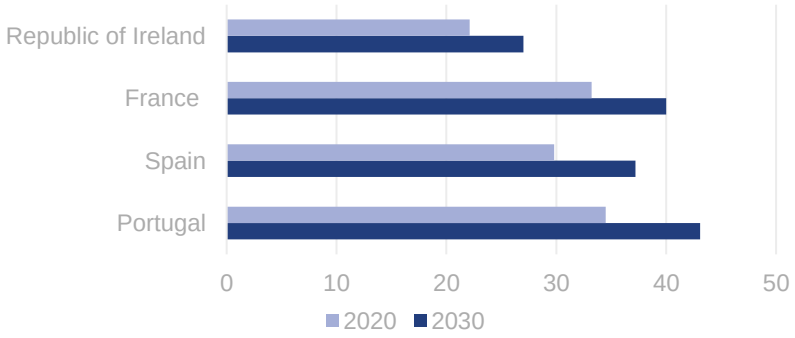


Figure 32: Projected old-age dependency ratio (2020-2030).

Source: [8]

Despite the overall population growth in the Atlantic Area on its whole (1.56% from 2012 to 2020 according to EUROSTAT), there have been many different regional differences, especially concerning the disparities between rural and urban areas [38].

European Social Progress Index EU-SPI

The European Social Progress Index was created to measure social progress for each EU region as a complement to traditional measures of economic progress, focusing only on social and environmental indicators and covering three main areas that include 12 different indicators:

- Basic human needs – nutrition and basic medical care; water and sanitation; shelter; personal security;
- Foundations of well-being – access to basic knowledge; access to information and communication; health and wellness; environmental quality;
- Opportunity – Personal rights; personal freedom of choice; tolerance and inclusion; access to advanced education.

In the 2020 overall score, France's and Ireland's regions got some of the best values, not only within the Atlantic Area but also in the EU context. On the opposite side, Alentejo, Algarve (PT) and Andalusia (ES) got the lowest scores in the Atlantic Area context (Figure 33).

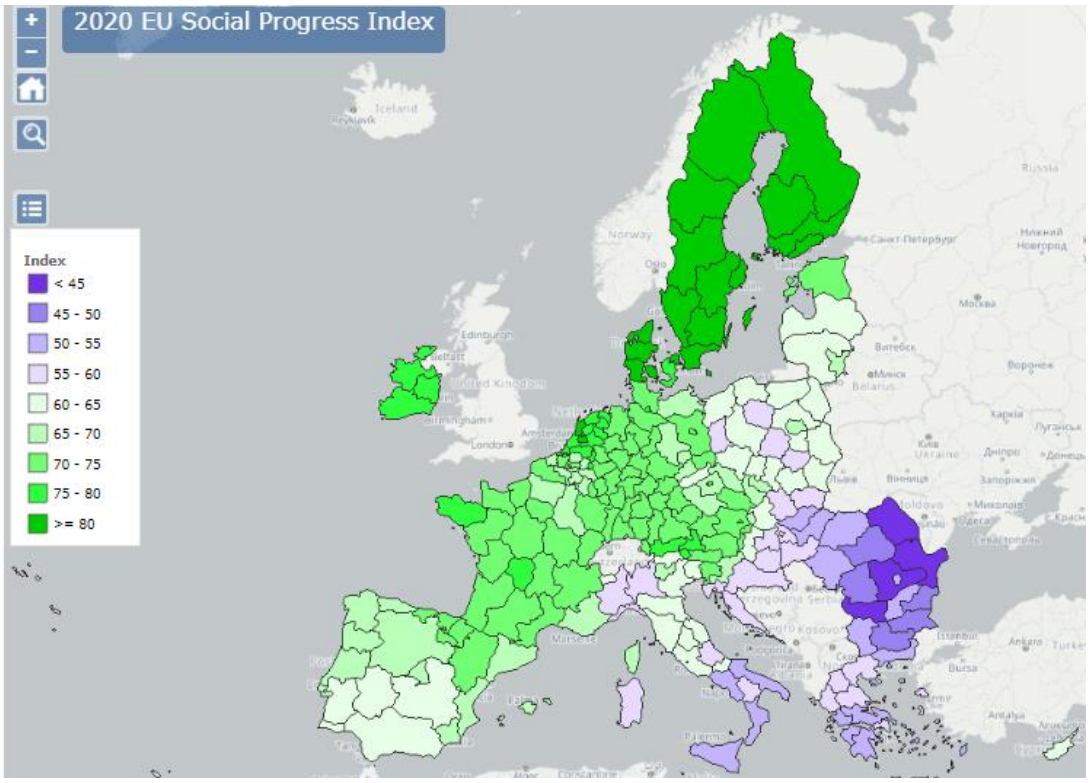


Figure 33: EU Social Progress Index (2020).

Source: [39]

Public health

Life expectancy rate at birth and healthy years at birth are two of the most common indicators used to describe public health.

The 2019 European Union average life expectancy rate at birth is set at 81.3 years. Most of the Atlantic Area regions were above that value, with highest values in the Spanish regions and the lowest in the Portuguese regions, particularly Madeira and the Azores (both 78.8).

Regarding healthy life years at birth, according to 2019 EUROSTAT statistics, the EU27 average was at 64.6. Ireland (69.6) and Spain (69.9) were above this value, whereas France (64.1) and Portugal (59.2) were below that value. As for the main causes of mortality, most Atlantic Area countries' deaths are related to the circulatory system and cancer [40].

Environmental health

Despite most direct causes of death being circulatory system and cancer related, air pollution is the single largest environment health risk, resulting on an estimated 400,000 premature deaths in the EU each year [41]. Fortunately, according to the [42], this is a decreasing phenomenon

happening in most EU countries and in the Atlantic Area in particular, as between 2009 and 2018 every country part of the latter reduced the number of deaths by this cause.

On the other hand, human beings' health has also been affected by chemical pollution, particularly due to its easy spread through food, air, and water, causing a variety of health effects namely respiratory and cardiovascular diseases, allergies and cancer.

Moreover, climate changes' contribution to heatwaves, floods, and changes in the distribution of vector-borne diseases, in the first place, and to the ecosystems' services balance, at a broader level, is also putting in danger the access to freshwater and food production and, thus, resulting on climate change-attributable mortality annual increasing numbers.

Acoustic pollution

Acoustic pollution results mainly from railways, air traffic and industry and its impacts go beyond the lack of quality of life. Not only it is responsible for sleep disturbances but also contributes to health problems, such as non-auditory health effects, ischaemic heart disease (with an estimated impact of 48,000 new cases per year in Europe) and even premature deaths (12,000 estimated in Europe). Additionally, it may affect children's cognitive development in school, particularly due to aircraft noise.

In the case of the countries that are part of the Atlantic Area, Portugal and Ireland had the lower percentage of their population exposed to Lden > 55Db while Spain and France had a higher percentage of their population at risk [43].

3.8 Material Assets

Urbanization areas

There are different degrees of urbanization within the Atlantic Area. Although most of its territory can be considered as rural, on the last two decades one can notice a general increase in the population living in predominantly urban regions and in intermediary regions, being Ireland the most representative case, with an increase of 1.2% and 2.3%, respectively. On the other hand, there has been a population loss in predominantly rural regions in Portugal (-0.5%) and Spain (-0.3%), whereas only in France there has been an increase (0.5%), even though it was lower than the population growth in urban and intermediary regions [38]. This means the Atlantic Area is a territory suffering from a growing pressure on its urban networks, whereas its rural regions are dealing with some desertification issues.

Most of the Atlantic Area's cities and towns are evenly distributed among the territory, although one can notice a particular remarkable spot in the Andalucía area (Spain), due to the presence of important urban centres like Seville or Cadiz (Figure 34).

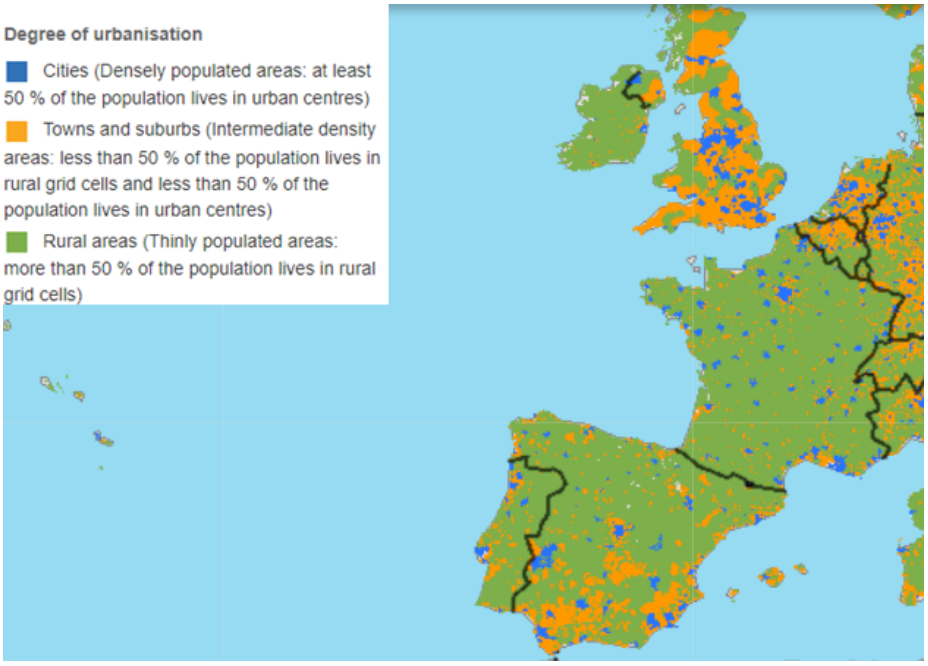


Figure 34: Urban and rural areas within the Atlantic Area.

Source: [27]

Atlantic Area's cities' network includes important urban centres such as Ireland's capital city (Dublin), Portugal's Lisbon, Porto, Viana do Castelo, Aveiro, Sines, Faro, Funchal and São Miguel, País Vasco's Bilbao and Andalucía's Seville (Spain), or France's Bordeaux, Nantes, or Rennes and all these cities' commuting zones. Nonetheless, it is possible to spot some gaps on the network, being non-coastal areas (like the Alentejo (PT) or Ireland's most interior lands) deprived of relevant urban centres.

Infrastructures (transportation grid and maritime routes)

The European Commission is implementing the Trans-European Transport Network (TEN-T) policy, which aims to close gaps, remove bottlenecks and technical barriers, by developing a European network of railway lines, roads, inland waterways maritime shipping routes, ports, airports, and railroad terminals, thus contributing to social, economic, and territorial cohesion among its members [44].

Consisting of a two-phase plan (the Core Network, which will be linking the most important nodes by 2030, and the Comprehensive Network, which will cover all European regions by 2050), the

TEN-T is represented by nine Core Network corridors, being the Atlantic, and the North Sea – Mediterranean corridors the most relevant in the Atlantic Area scope.

Figure 35: TEN-T Projects in the Atlantic Area (Core and Comprehensive).

Source: [45]

The strategic definition of corridors and intermodal connections is crucial to contribute to a more even regional distribution since it favours the connectivity among more developed urban centres and more remote areas. Taking a closer look at Portugal, Spain and western France (Figure 35), one can spot how the presence of new rail-road terminals, airports or ports can improve inter-region connectivity, especially once both Core and Comprehensive Network plans are completed.

In addition to the TEN-T, it's important to mention the Motorways of the Sea, a concept introduced by the European Commission with the 2001 Transport White Paper - European transport policy for 2010: time to decide. The European Commission proposed the development of Motorways of the Sea as a real competitive alternative to land transport. The White Paper also defined that the Motorways of the Sea should be part of the TEN-T and funds should be made available for its development.

Four corridors were designated for the setting up of projects of European interest including the Motorway of the Sea of western Europe leading from Portugal and Spain via the Atlantic Arc to the North Sea and the Irish Sea (Figure 36).

Figure 36: Map of Motorways of the Sea.

Source: [46]

Renewable Energy Resources installed

The European Union has the ambitious goal of becoming the first climate-neutral continent by 2050 (European Green Deal) through a sustainable green transition mainly done by the diversification of energy supplies, especially by the energy from renewable sources over fossil fuel. These include wind power, solar power (thermal, photovoltaic, and concentrated), hydro power, tidal power, geothermal energy, ambient heat captured by heat pumps, biofuels, and the renewable part of waste [47].

Even though the share of renewable energy more than doubled in EU countries between 2004 and 2019, not all countries have put the same effort on this transition, being that difference visible among Atlantic Area countries as well (Figure 37).

The use of renewable energy sources in transport is the indicator with less variations among countries, being the France with the highest share (9.25%) and Spain with the lowest (7.62%). Regarding the use of renewable energy sources in electricity and in heating and cooling, Portugal scored best with 53.77% and 41.65% of share, respectively. While France had the lowest score in the first case (22.38%), Ireland got the lowest on the second (6.32%). In the overall share of the use of renewable energy sources, Portugal scored 30.62%, Spain 18.36%, France 17.22% and Ireland 11.98%.

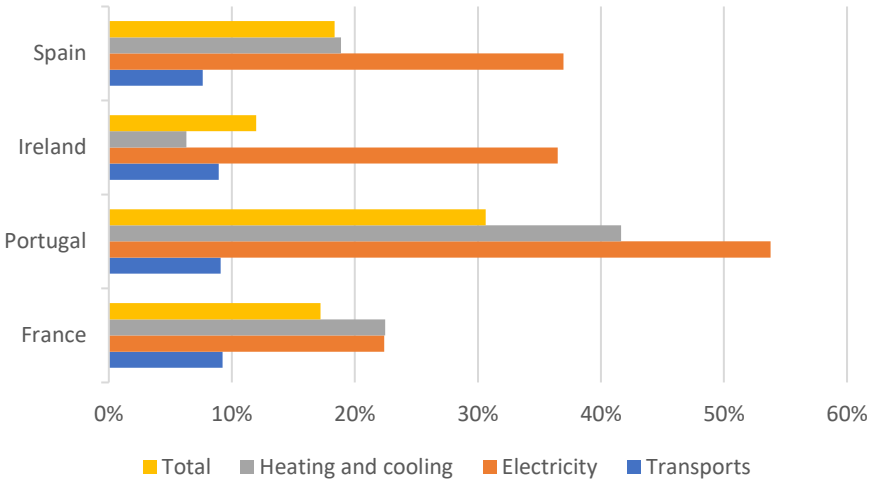


Figure 37: Use of renewable energy sources (2019).

Source: [47]

3.9 Landscape

Landscape protection

Landscape is a basic component of the European natural and cultural heritage. It has a significant role on cultural, ecological, environmental and social fields, thus contributing to the formation of local cultures and, subsequently, to human well-being and the consolidation of the European identity [48]. Given the urbanization sprawl, transport network constructions, agriculture practices, industry and other human-related activities occurring all over Europe, there is an increasing risk of losing such an essential part of our lives.

The need to protect European landscapes has been stated on the European Landscape Convention (2000). The main objective is to promote landscape protection, management and planning, and to organise cooperation among European members [48]. Nevertheless, the big challenges inherent to this matter are the different traditions of administration, government and

the attention given to nature and landscape protection [49], as also the fact they are mostly divided among different bodies and on diverse spatial levels.

Thus, landscapes' protection and management are guaranteed in some countries through their inclusion on cultural heritage sites or through Natural Parks delimitation. However, landscapes that are not covered by any of these regimes are in greater danger of its fragmentation. The European Environmental Agency has been monitoring landscape fragmentation through the Effective Mesh Density method (seff) which measures 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, including medium sized roads. The more FGs fragment the landscape, the higher the effective mesh density hence the higher the fragmentation [50].

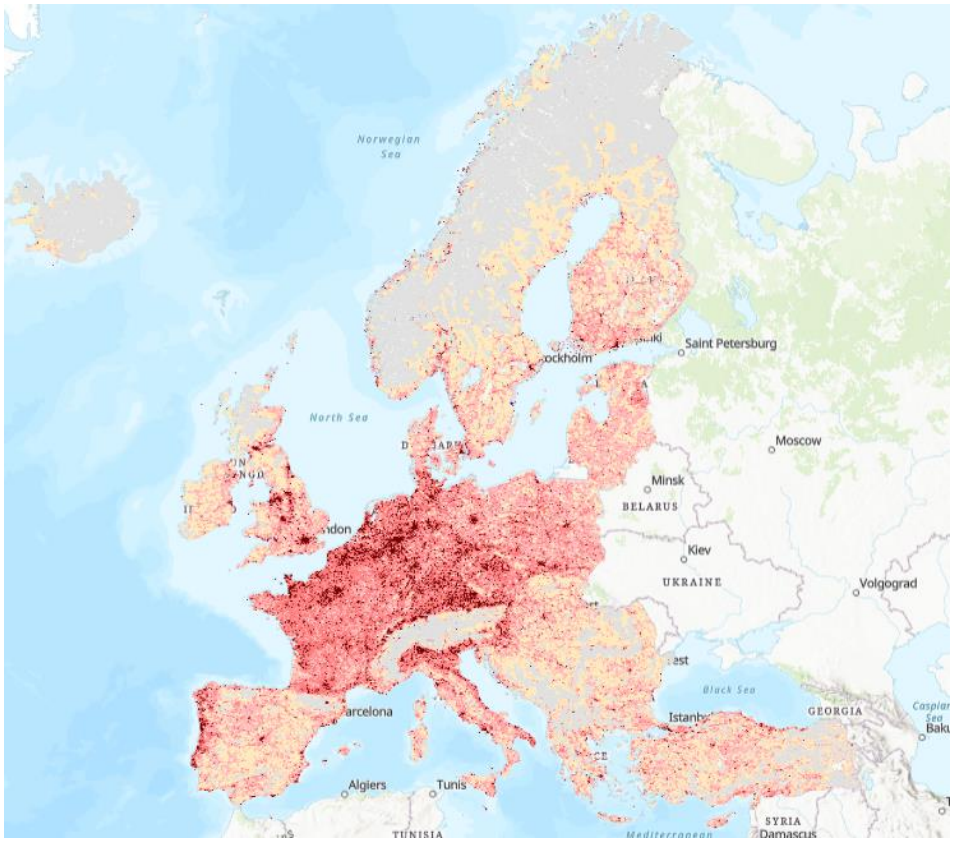


Figure 38: Effective Mesh Density – 2015 time-series.

Source: [50]

In the case of the Atlantic Area, signs of fragmentation are clearly visible all around its members, but mostly in France. It should be noted that river fragmentation is an important part of landscape fragmentation that affects all the aquatic organisms, the sediment and water fluxes of the Atlantic Area. On the other hand, one can notice that there are less signs of landscape fragmentation in

interior Portugal (particularly on the Alentejo), Spanish Galicia, Navarra and Asturias and on the southwestern part of Ireland.

Even though the EU biodiversity strategy 2020 has set the goal to restore up to 15% of its degraded ecosystems and to expand the use of green infrastructures, there are continuing signs of landscape fragmentation, especially on rural and less populated areas. This is particularly alarming given the high potential risk of abandonment predictions for these areas, which point to 11% of EU agricultural lands.

Routes and touristic attractions

One of Europe's richest legacy to the world is its history, present both on tangible and intangible ways. On the Atlantic Area one can find numerous signs of past civilizations, such as the Romans or the Celts, several monuments and masterpieces that have eternalized architecture names, or even its contribution to the culinary world, particularly through some of the most contemporary acclaimed cuisines, namely the Mediterranean and the French.

In this way, the Council of Europe created the Cultural Routes Programme in 1987 with the purpose of binding European citizens together through heritage and invite them to share and explore it, by a journey of space and time [51]. The routes include different thematic subjects, such as Religious/Pilgrim Routes (Santiago de Compostela Pilgrim Route is probably the most iconic one), Archaeological legacy, Historical figures, Nature and biodiversity, Cultural movements or even more bold ones like the European Cemeteries Route or the European Route of Industrial Heritage.

Despite having a more cultural focus, these routes additionally offer the opportunity to observe the diverse Atlantic Area landscape.

3.10 Cultural Heritage

Cultural heritage protection and preservation

Europe's legacy to the world covers several aspects in life, being its cultural heritage one of its most iconic. In fact, it is responsible for bonding European citizens together and providing them a sense of identity, individual well-being, social cohesion, and inclusion. Additionally, they may work as drivers for economic growth, particularly through job creation and tourism revenues [52]. Cultural heritage includes both material objects and intangible aspects, covering traditions, music, dance, rituals, knowledge, and skills, thus contributing to the systems of values, beliefs, traditions and lifestyles.

Since cultural heritage protection and preservation has primarily been made at a local and national level, EU's work on preserving its cultural heritage has been limited (mainly through the Creative Europe Programme and the Work Plans for Culture), being it internationally secured by UNESCO World Cultural and Natural Convention.

Adopted in 1972, UNESCO's Convention Concerning the Protection of the World Cultural and Natural Heritage conceived a World Heritage Committee and a World Heritage Fund as well, whose aim is to protect, conserve and preserve cultural and natural heritage of outstanding universal value included on a List, which covered 1,121 properties in 2019 [52].

Within the context of the Atlantic Area, there are 40 sites included on the UNESCO List, being 90% related to Cultural sites (36) and 10% to Natural sites (4).

Table 12: Number of UNESCO World Heritage Sites within the AA

Atlantic Area member state	Cultural sites	Natural sites	Total sites
France	8	0	8
Portugal	15	1	16
Ireland	2	0	2
Spain	11	3	14
Total	36	4	40

Source: [53]

Furthermore, UNESCO has conceived a List of the World Heritage in Danger. Currently, there is no endangered heritage within the Atlantic Area.

Chapter 4

Possible effects on the environment

4. Possible effects on the environment

This chapter analyses the possible environmental impacts that may arise from the implementation of the Interreg AA 2021-2027 Programme. The assessment was performed considering different factors defined in Annex I of Directive 2001/42/EC, namely: Air, Water, Soil, Biodiversity, Climatic Factors, Population and Human health, Material Assets, Landscape and Cultural Heritage.

The assessment involved matrices with a brief explanation of the potentially impacts of the interventions proposed in the programming document. Impacts were classified using a colour scale: positive impact - green; negative impact - red; no significant impact – grey. The analysis was conducted on an issue-by-issue basis, which facilitated consideration of potential cumulative or synergistic impacts in the end.

The indicative cooperation actions include the development and implementation of joint transnational strategies, action plans, training, pilots and networking. Within this context, the assessment worked with plausible scenarios of best-case and worst-case implications that can result from implementation of the proposed interventions in different settings.

The following topics will describe in more detail the environmental impacts expected regarding the several indicators analysed, along with a brief explanation.

4.1 Air

Table 13: Potential effects for air.

SO		Explanation
1.1		SO 1.1 actions are related with strengthening the competitiveness through innovation to support blue economy activities. The main fields of actions are the blue economy sector and other relevant sectors: green economy, industry 4.0, social innovation and creative industries. At the end, the SO expects to contribute for the SME competitiveness, improve the transfer of knowledge and network innovations on blue economy. Therefore, it is expected to have no significant impacts on air quality. Some indirect positive impacts on air can be expected, due to some actions related with innovation in bioeconomy, namely in industrial or manufacturing processes for a sustainable/ green economy.

SO		Explanation
1.2		The SO 1.2 actions aim to promote digitisation and upskilling of workers on digital technologies related to blue economy sectors. This SO will promote the transition to industry 4.0. The main results expected are related with the improvement of digital skills for on SME and blue economy. At the end, the SO pretends to increase the digital skills of business and upskilling of community in digital technologies. Therefore, it is expected to have no significant impact on air quality.
2.1		This SO is mainly related with strategies and actions to promote a carbon-neutral zone and the reduction of the GHG emission and air pollution. Therefore, several actions promote the development of green energies, energy efficiency and the reduction of air pollution. Therefore, this SO is expected to have a positive impact on air quality and reduction of air pollution in the AA.
2.4		The goal of this SO is to restore polluted environment due to human activities. Therefore, the air quality can profit from the strategies, although there are no actions directly related to the air.
2.6		The actions and projects defined are not related directly with atmosphere and gas emission. However, a circular economy model employs not only waste management, namely recycling and preparation for reuse, but also reuse and responsible manufacturing. These activities could support the development of new industries and jobs, and consequently reduce gas emissions.
2.7		The SO is not related to this theme. However, the air can benefit as a consequence of the actions related with the reduction of pollution.
4.5		This SO main field is related with culture and tourism and the actions foreseen are related with sustainable forms of tourism. Although this SO does not present actions related with the air issues, a more sustainable tourism could indirectly benefit the air quality.
ISO 1		The main objective of this SO is to improve the coordination and complementarity with other actors in the cooperation, including European Territorial Cooperation programmes and national and regional programmes. Therefore, the main actions address initiatives and collaboration strategies taking into account other programmes sharing themes with AA. The strengthening of the AA governance can promote synergies with relevant stakeholders that may generate positive impacts for the air and atmosphere.

4.2 Water

Table 14: Potential effects for water.

SO		Explanation
1.1		This SO is mainly focused on the blue economy and blue sectors, including marine living and non-living resources, ports activities, maritime transport, among others. There are several actions in this SO capable of producing significative positive impacts due to the improvement of the competitiveness in blue economy sectors and the collaboration between SME and other stakeholders. The actions intend to support the innovation in the blue economy sectors, such as fishing and aquaculture through innovation. There is a clear linkage to blue activities and water resources. Despite the positive impacts expected, it will be important to set standards for water use (e.g. activities related to aquaculture) in order to safeguard water resources.
1.2		The SO 1.2 main field are the digitisation and upskilling on blue sectors. The idea is to promote transition/ transformation to digital innovation. There are actions to promote collaborative projects with digital upskilling, tools and processes and on the digitalisation of the blue economy sectors. This SO pretends also the upskilling of the workers and sectors of blue economy sectors, and consequently the maritime sector and their activities can benefit of the transition to a more digital and competitive sector. Besides this, this SO and respective actions intend to improve adaptation to changes in consumer behaviour, towards a sustainable production and consumption models. Therefore, it is expected that water consumption can be positively affected.
2.1		The main thematic of this SO is the transition to a carbon-neutral zone and also the energy efficiency. This SO promotes projects and actions related with renewable and sustainable ocean energy technologies and their application in the AA, as well as measure to increase the energy efficiency in the sectors of blue economy. Moreover, this SO encourages ports and marinas to share good practices, exchanging ideas and tackle problems jointly to reduce energy consumption. As a results, the AA should become an example of marine and maritime energy production technologies. Therefore, positive impacts are expected.
2.4		The thematic of this SO is the climate change adaption. Therefore, the SO include actions to integrate the climate change adaption to water management strategies and to mitigate the impact of the main economic sectors such as fishery. Hence, the water can present positive impacts.

SO		Explanation
2.6		This SO is focused on the circular economy and reduction of natural resources. Several actions and strategies are related with a better use and more conscient of water, as well as waste reduction and prevention practices directly or indirectly linked to the ocean. Considering that the actions should be related with blue economy, a positive impact in the water is expected. The SO intends to raise awareness of stakeholders to the needs for the transition to a circular economy in the blue economy sectors.
2.7		The protection and preservation of environment is the main theme of this SO. This SO predicts pilot actions to innovative solution for the recovery of degraded marine ecosystems and close to the coast. Moreover, this SO promotes garbage fishing actions. These actions might impact positively the water and aquatic systems.
4.5		The actions of this SO intends to tackle the diversification of tourist activities and the adaption to consumer changes after Covid-19 towards less populated destination, natural and coastal tourism. Several sustainable tourism actions are promoted, some of them related with blue sector and marine environment, such as nautical sports, boat trips to see seals or offshore wind-farms.
ISO 1		This SO is mainly focused on better governance in the AA. A better coordination with the Maritime Atlantic Strategy and other relevant stakeholders of the Atlantic Area is expected. Therefore, the water systems, especially related with blue sectors, are positively impacted.

4.3 Soil

Table 15: Potential effects for the soil.

SO		Explanation
1.1		SO 1.1 actions are related with strengthening the competitiveness through innovation to support blue economy activities. The main fields of actions are the blue economy sector and other relevant sectors. At the end, the SO expects to contribute to the SME competitiveness, improve the transfer of knowledge and network innovations on blue economy. Therefore, it is expected to have little or no significant impact on soil.
1.2		Indirect impacts are expected but not very relevant. The actions on this SO may improve the competitiveness of PME towards a sustainable production and consumption models. In case the consumers change some consumption habits, the soil usage and quality can expect positive impacts, but it is not clear.

SO		Explanation
2.1		The promotion of energy efficiency and reduction of gas emissions are the focus of this SO. Hence, this SO does not include actions and strategies related with the soil. Therefore, no significant impacts are expected.
2.4		The SO promotes actions for: strengthening capacity and raising awareness to address environmental impacts in order to change behaviour in the use of natural resources, including agricultural practices; and tacking the negative impacts of economic sectors such as agriculture. Also, coastal protection measures against natural risks are promoted. Hence, the soil usage and also the soil erosion are positively impacted.
2.6		The circular economy theme is very present in this SO, which contributes to the creation of new projects, businesses and services with less impact in the environment. This SO intends to increase the efficient use of natural resources, such as soils. In addition, there are measures to support eco-innovative business models, including agriculture sector.
2.7		The SO is mainly focused on the preservation and protection of nature and biodiversity and does not include actions and strategies related with the soil use. Therefore, no significant impacts are expected.
4.5		The main topic of this SO is the culture and tourism and the promotion of sustainable tourism. There is no relation between the soil and the main actions promoted under this SO. Therefore, no significant impacts are expected.
ISO 1		The main objective of this SO is to improve the coordination and complementarity with other actors in the cooperation, including European Territorial Cooperation programmes and national and regional programmes. Therefore, the main actions address initiatives and collaboration strategies taking into account other programmes sharing themes with AA. These actions may generate positive impacts for the soil management and land use.

4.4 Biodiversity

Table 16: Potential effects for biodiversity.

SO		Explanation
1.1		This SO is focused on the main thematic field of blue sectors. Actions of this SO also intend to support knowledge transfer between the entities in order to implement a sustainable and greener economy. Moreover, the fishery sector should be strengthened through innovation, as well as blue bioeconomy. Several actions may improve these fields and promote use and valorisation of marine and maritime (co)products. These actions are expected to indirectly favour the biodiversity in the AA.

SO		Explanation
1.2		The actions supported under SO 1.2 are directed to improving skills and knowledge, there is no direct benefits or risks on biodiversity.
2.1		The biodiversity is not directly related with this SO thematic. However, it might benefit indirectly through the projects and actions developed in the scope of this SO. The promotion of projects and actions to establish a carbon-neutral zone and the implementation of green and efficient energies are some of the examples. Moreover, this SO intends to reduce the environmental impact of the energy production, taking into consideration the potential impacts on the marine environment.
2.4		This SO is mainly related with climate change adaption and risk prevention. The prevention of disasters and preservation of the environmental status, as well as restoration of polluted environment due to human activities are the main objectives under this SO. Therefore, several actions are promoted which are not directly related to the biodiversity but can benefit biodiversity indirectly. For instance, the support of marine observation to increase the knowledge and ability to forecast the behaviour of the ocean and its ecosystem. It's also important to mention that the protection of nature and biodiversity has synergies with the restoration of polluted environment / ecosystems in the mitigation of climate change effects that should be valued.
2.6		The circular economy is the main theme of this SO. In this sense, there are several actions related to the reuse of materials and preparation for reuse and recycling of waste, as well as its efficient management. Besides that, the SO focus on actions and behaviour that lead to waste reduction resulting from human and industrial activities. There is a clear spotlight on solutions and services with low environmental impact in order to reduce the gas emissions and the increase of efficient use of natural resources. The SO has no actions or projects directly related to the biodiversity. However, it can indirectly benefit as a consequence of the actions to promoted.
2.7		The SO is mainly focused on the preservation and protection of nature and biodiversity. Therefore, several actions are planned. Some of them include: restauration of degraded ecosystems, strengthening of transnational links to protect and restore areas covered by the Natura 2000 network and marine protected areas, improvement of biodiversity and reducing threats to fauna and flora, and promoting nature-friendly practices. Therefore, the biodiversity, fauna and flora are positively impacted by these actions.
4.5		Biodiversity benefits indirectly. Through the promotion of a more sustainable tourism, the protection of marine biodiversity can be promoted.
ISO 1		This SO does not address biodiversity, fauna and flora. However, other relevant programmes can contribute to environmental policy objectives with a positive impact.

4.5 Climatic Factors

Table 17: Potential effects for the climatic factors.

SO		Explanation
1.1		This SO may support innovation in blue economy namely related with the industrial processes and manufacturing, energy production, biological waste prevention and recycling through technology and the use and valorisation of marine and maritime (co)products. These actions can generate positive impacts in climate change adaption and mitigation.
1.2		This SO intends to use digital tools and skills to promote the competitiveness of the services and businesses and foster the resilience of the territory. The main actions intend to promote digitisation of blue economy sectors for climate change adaptions. Therefore, there is a clear benefit expected with the implementation of this particular SO for the climatic factors.
2.1		The global climate will benefit positively from this SO. This SO intends to promote the transition to a carbon-neutral zone. The main pilot actions and strategies stimulates the reduction of GHG emissions, the development of sustainable and green energies and the reduction of air pollution.
2.4		Climate change adaption and risk prevention are the main topics addressed under this SO. The main objective is to support public authorities achieving effective planning and financing for climate change adaption. Several actions and strategies related with adaption and mitigation to climate change are included. Some of the actions promote territorial plans for adaption or mitigation of the effects of climate change, as well as tackle the negative impacts of main economic sectors and tools on adaption to climate change. Therefore, it is expected to have a positive impacts on climate factors.
2.6		The circular economy is the main theme of this SO. In this sense, there are several actions related to the reuse of materials and preparation for reuse and recycling of waste, as well as its efficient management. These actions benefit the environment and consequently support the mitigation of climate change.
2.7		The SO is mainly focused on the preservation and protection of nature and biodiversity and it does not include actions and strategies related with the climatic factors. Therefore, no significant impacts are expected.
4.5		The main fields of this SO are culture and tourism. Therefore, this SO promotes a transition towards a more sustainable tourism taking into account climate change challenges.
ISO 1		This SO promotes collaboration and coordination actions to promote a better governance in the cooperation area. Several European programmes promote the climate change adaption and mitigation processes. Therefore, the actions can generate benefits for the climatic factors.

4.6 Population and Human Health

Table 18: Potential effects for population and human health.

SO		Explanation
1.1		The main topics of this SO are related with blue sectors. However, actions are also planned to improve innovation in the blue bioeconomy, which can promote health and pharmaceutical products through the use of marine products. Also, actions are expected on the development of new products and applications in food, cosmetics, nutraceuticals, which can promote health and increase the quality of life. Thus, it can promote positive impacts in the human health.
1.2		The main objective of this SO is the digitisation and upskilling actions in the blue sector. In that sense, digitisation of the blue services and also the upskilling of workers are promoted. Several actions are indicated for improving skills in digital tools. These actions might benefit the population by improving their quality of life, as well as their access to ICT and advanced training.
2.1		The population and specially the human health can be positively impacted by this SO. The transition towards a carbon-neutral society and consequently a reduction of atmospheric pollution are positive aspects for the human health and also to the improvement of quality of life.
2.4		The SO expects the involvement of citizens in the topic of adaption and prevention of climate change. The set of actions promoted will benefit the population and their quality of life. Besides that, the population will be less exposed to natural risks that can happen due to climate change.
2.6		The theme of the circular economy is very present in this SO. As such, several actions will be promoted, particularly associated with the blue economy. The SO also intends to promote the involvement of citizens. The actions promote: awareness to reduce the plastics use and other materials, development of sustainable alternatives for the use of plastics and other materials and raise awareness of the need to transition to a circular economy. As a result, it is expected to lead to citizens more involved in a more sustainable consumption approach.

SO		Explanation
2.7		The SO is mainly focused on the preservation and protection of nature and biodiversity. The set of actions included in this SO will benefit the population and human health as, according to the Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "*nature is essential for human existence and good quality of life. Most of nature's contributions to people are not fully replaceable, and some are irreplaceable. Nature plays a critical role in providing food and feed, energy, medicines and genetic resources and a variety of materials fundamental for people's physical well-being*" **[54]**.
4.5		The population can benefit through training systems. This SO support online training systems to promote professional skills in the AA priorities and the introduction of digital tools in tourism.
ISO 1		The SO main objective is to generate greater impact of the programme's investments in the Atlantic area. This SO's actions promote the capitalisation on specific and limited strategic thematic for the AA with key stakeholders, networks and initiatives taking into account the other cooperation programmes sharing themes/ areas with the AA programme. Therefore, it clearly provides the opportunity to address population and human health issues.

4.7 Material Assets

Table 19: Potential effects for the material assets.

SO		Explanation
1.1		This SO may support innovation in blue economy namely related with the energy production. Therefore, the implementation in the increase in renewable energies, especially from waves and tides can promote a positive impact on the environment.
1.2		This SO support digitisation and upskilling of blue economy sectors. This SO does not address the issue of "material assets" with proposed interventions. Therefore, no significant impacts are expected.
2.1		Although the Programme does not have the resources to invest in renewable energies, it will promote a set of actions and pilot projects to encourage green and more efficient energy sources. This SO supports pilot actions and measures to increase the energy efficiency in the blue economy and the integration of green energies, such as hydrogen, methanisation, among others. Therefore, the energy resources installed in the AA can benefit from this SO.

SO		Explanation
2.4		Climate change adaption and risk prevention are the main topics addressed under this SO. The SO does not include actions and strategies related with the material assets. Therefore, no significant impacts are expected.
2.6		The ports are infrastructures susceptible to have great impact in terms of circular economy by reducing their waste and creating circular loops. The actions of this SO promote the networking of green ports to jointly address common problems. Therefore, material assets, especially the ports can be positively impacted.
2.7		The SO is mainly focused on the preservation and protection of nature and biodiversity. The SO does not include actions and strategies related with the material assets. Therefore, no significant impacts are expected.
4.5		The main topic of this SO is the culture and tourism and the promotion of sustainable tourism. There is no relation between the material assets and the main actions promoted under this SO. Therefore, no risks or benefits are expected.
ISO 1		The main objective of this SO is to improve the coordination and complementarity with other actors in the cooperation, including European Territorial Cooperation programmes and national and regional programmes. Therefore, the main actions address initiatives and collaboration strategies taking into account other programmes sharing themes with AA. These actions may generate positive impacts for the material assets.

4.8 Landscape

Table 20: Potential effects for landscape.

SO		Explanation
1.1		SO 1.1 actions are related with strengthening the competitiveness through innovation to support blue economy activities. The SO expects to contribute for the SME competitiveness, improve the transfer of knowledge and network innovations on blue economy. There are no direct benefits or risks on landscape.
1.2		The actions supported under SO 1.2 are directed to improving skills and knowledge on digital tools. Therefore, there are no direct benefits or risks on landscape.
2.1		The promotion of energy efficiency and reduction of gas emissions are the focus of this SO. Hence, this SO does not include actions and strategies related with the landscape. Therefore, neither risks nor benefits are expected for the landscape.

SO		Explanation
2.4		This SO is mainly related with climate change adaption and risk prevention. The actions intend to promote coastal protection measures against natural or technological risks compatible with landscape protection. Therefore, landscape can be positively affected.
2.6		The circular economy is the main theme of this SO, which involves the reuse of materials and preparing for reuse and recycling of waste, as well as its efficient management. There are no actions related with the landscape. Therefore, no significant impacts are expected.
2.7		The AA is rich in natural heritage resources that constitute a wealth and contribute to its tourist attractiveness. This SO main goal is to improve the management of natural resources and increase the sustainability and resilience of natural habitats. In this SO, it is intended to give great prominence to AA landscape, promoting several actions that will bring benefits to the AA landscape. There are actions to promote the reduction of landscape fragmentation and the improvement of habitats connectivity. As a results, it is expected an improvement of ecological connections and expansion of protected areas.
4.5		This SO main field is related with culture and tourism. The actions of this SO are related with sustainable forms of tourism. Although, there are no actions related with the landscape, a more sustainable tourism and the promotion of sustainable activities can benefit the landscape and the preserved areas.
ISO 1		The main objective of this SO is to improve the coordination and complementarity with other actors in the cooperation, including European Territorial Cooperation programmes and national and regional programmes. Therefore, the main actions address initiatives and collaboration strategies taking into account other programmes sharing themes with AA. The strengthening of the AA governance can promote synergies with relevant stakeholders that may generate positive impacts for the landscape.

4.9 Cultural Heritage

Table 21: Potential effects for cultural heritage.

SO		Explanation
1.1		The actions of this SO are related with projects that support the cultural and creative industries. The cultural heritage is indirectly impacted in a positive way.
1.2		This SO includes actions related with the beneficial aspects of digitisation on tourism. Therefore, positive impacts can be expected on cultural heritage.

SO		Explanation
2.1		The promotion of energy efficiency and reduction of gas emissions are the focus of this SO. Hence, this SO does not include actions and strategies related with the cultural heritage. No significant impacts are expected for the cultural heritage.
2.4		Climate change adaption and risk prevention are the main topics addressed under this SO. Hence, this SO does not include actions and strategies related with the cultural heritage. Therefore, no significant impacts are expected.
2.6		The circular economy is the main theme of this SO, which involves the reuse of materials and preparing for reuse and recycling of waste, as well as its efficient management. There are no actions related with the cultural heritage. Therefore, no significant impacts are expected.
2.7		The main field of this SO is the protection and preservation of heritage and natural resources of the AA. Thus, the main objective is to promote a harmonious development and balance of uses between the protection of preserved enclaves and the development of economic activities that stimulate local economies. As an example, there are actions related with measures to protect World Heritage Sites, as well as explore and promote the linkage between natural heritage and sustainable tourism. The cultural heritage is expected to benefit from the actions taken in this SO.
4.5		The SO is focused on culture and tourism. There are several actions related with a sustainable tourism and the protection of cultural heritage. As example, there are plans for designing and promoting sustainable tourism in the AA, actions for developing innovative solutions and new business models in creative and cultural industries and tourism. Moreover, actions to improve the adaption of traditional tourism mobility to a sustainable mobility aligned with natural and sustainable destinations. Therefore, the cultural heritage is present in the actions of this SO.
ISO 1		The SO main objective is to generate greater impact of the programme's investments in the AA. The actions promote the capitalisation on specific and limited strategic thematic for the AA with key stakeholders, networks and initiatives taking into account the other cooperation programmes sharing themes/ areas with the AA programme. Therefore, it clearly provides the opportunity to address cultural heritage governance issues.

4.10 Overview of the environmental impacts

In general, and considering the nature of the Programme, negative effects or impacts are not expected due to the nature of the programme and considering the priorities and objectives of the

programme, which are in line with the EU programmes and EU policies. In contrast, the orientations and actions planned should promote positive effects on the AA environment.

Considering the overview of the environmental effects for each indicator (Table 22), it can be concluded that the Interreg AA Programme is clearly oriented towards a sustainable environment with a special focus on water, climatic factors and population and human health. Besides that, some of the actions promoted can also produce indirect positive impacts in some of the environmental indicators.

However, it is important to reflect on the impacts for air, soil, biodiversity and landscape. There are limited positive impacts from the Programme in these factors. Therefore, it is important to consider some actions that could produce positive impacts on them, especially with a synergic or cumulative effects with other environmental aspects.

Table 22: Overview of the environmental effects expected with the implementation of the Interreg AA 2021-2027 Programme.

SO	Air	Water	Soil	Biodiv	Climat. Fact.	Pop. and Human Health	Material Assets	Landsc.	Cultural Heritage
1.1									
1.2									
2.1									
2.4									
2.6									
2.7									
4.5									
ISO 1									

The current assessment of the environmental effects has been prepared to determine the need for a full SEA for the Interreg AA Programme 2021-2027. The screening has been made in accordance with the EU Directive 2001/42/EC. According to the Annex II of the Directive (see Table 23), which sets out the assessment criteria for considering significant environmental effects, the Interreg AA Programme has no negative impacts foreseen on the environment.

The detailed screening has looked in detail at the context and likely effects of the Interreg AA Programme 2021-2027. At the end of the screening process, it is possible to conclude that a full SEA is not required for the Interreg AA Programme. Due to the nature of the measures and actions proposed in the Programme, it is unlikely that the Interreg AA Programme will cause significant negative effects on the environment (as seen previously in this chapter). Moreover, the influence that the programme may have is certainly positive and does not increase the likelihood that other plans and programmes will cause significant negative effects.

As expected, considering the nature of the Programme, the priorities and objectives defined as well as the indicative type of actions, no significant negative impacts are foreseen during the implementation of the Interreg AA Programme for the period 2021-2017.

Table 23: Criteria to determine the likely significance of effects on the environment according to Annex II of Directive 2001/42/EC.

Criteria for determining the likely significance of effects	Programme characteristics
1(a) the degree to which the programme sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources	The Interreg AA Programme does not set a framework for future development consent of projects listed in the Annexes I and II of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The programme does not contain criteria which could guide the development of projects with regards to location, nature, size and operating conditions. Regarding the allocating resources, the programme does not finance the implementation of large-scale projects.
1(b) the degree to which the programme influences other plans and programmes including those in a hierarchy	The Interreg AA Programme may influence positively other plans or programmes through the complementarity with other European policies, namely the Atlantic Maritime Strategy - Atlantic Action Plan 2.0. Besides that, there are complementary areas between the AA Programme and the European Green Deal.
1(c) the relevance of the programme for the integration of environmental considerations in particular with a view to promoting sustainable development	The Programme integrates environmental concerns into territorial plans or strategies. Moreover, the programme defines a set of actions of environmental character, namely related with climate adaption, transition to a circular economy, protection of nature and biodiversity.
1(d) environmental problems relevant to the plan or programme	There are environmental problems in the AA region, some of which are global issues, some which are specific. The major environmental problems are related with the blue environment and also climate change, such as: - Marine pollution with chemical and toxic substances (including oil spills and sulphur pollution), plastics and nutrients; - Increase of sea level, storms, floods;

Criteria for determining the likely significance of effects	Programme characteristics
	- Air pollution; - High greenhouse gas emissions; - Reduced renewable energies installed; - Reduced use of circular economy principles; - Biodiversity loss. Any influence that the programme has on helping to address these problems is positive and does not increase the likelihood of significant negative effects.
1(e) the relevance of the plan or programme for the implementation of Community legislation on the environment (for example, plans and programmes linked to waste management or water protection)	The Interreg AA helps to promote actions related with the blue sector, especially in the Atlantic region. Some of the actions are also relevant in view of the implementation of European environmental policies, such as European Green Deal, Atlantic Maritime Strategy - Atlantic Action Plan 2.0, EU Blue Economy Strategy and EU Biodiversity Strategy for 2030, among others. Any influence that the programme has on implementation of community legislation is positive and does not increase the likelihood that other plans and programmes will cause significant negative effects.
2(a) the probability, duration, frequency and reversibility of the effects	It is unlikely that the Interreg AA Programme will cause significant negative effects on the environment (as explained previously).
2(b) the cumulative nature of the effects	In case of any adverse effects, it is expected to be minimal or reduced.
2(c) the trans-boundary nature of the effects	The Interreg AA programme is a transnational cooperation programme, which involves regions from several countries of the EU forming bigger areas. In this case, the actions are limited by the Atlantic Area, which is a transboundary territory (France, Ireland, Portugal and Spain). Therefore, negative effects of transnational nature are not expected. However, it is important to refer that some of the actions (e.g. focused on the reduction of pollution of Atlantic Ocean) may have positive effects on a transboundary nature.

Criteria for determining the likely significance of effects	Programme characteristics
2(d) the risks to human health or the environment (for example, due to accidents)	It is not foreseen any negative effects for human health, neither for the environment. In fact, the type of actions foreseen go in the opposite direction, i.e., encourage a more sustainable environment and consequently intend to promote the well-being and human health.
2(e) the magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected)	It is expected that the effects will only be verified in the Atlantic area, taking into account the nature of the actions and projects identified. Moreover, the effects will only affect the population of this area.
2(f) the value and vulnerability of the area likely to be affected due to— **(i) special natural characteristics or cultural heritage;** **(ii) exceeded environmental quality standards or limit values; or** **(iii) intensive land-use**	According to Chapter 5, the AA has a rich natural heritage with vast protected areas. In this Programme, several actions on protection and preservation of nature and ecosystems will be promoted. Moreover, the Programme has some specific actions dedicated to the promotion of a sustainable tourism, considering the richness of the AA in cultural and natural heritage. Also, the quality of the environment should not suffer negative effects. There are several actions to support the improvement the environmental quality. Regarding the soil usage, no negative effects on the intensity level of soil exploitation are anticipated. Therefore, the implementation of the Programme will not have negative effects on the natural and cultural heritage, environmental quality and intensity of land-use.
2(g) the effects on areas or landscapes which have a recognised national, Community or international protection status	The AA is a very rich area of protected environments and Natura 2000 Network sites. Considering this characteristic, during the implementation actions on the protection and restoration of the areas covered by Natura 2000 network and marine protected areas. Therefore, no negative effects on the areas or landscapes with recognized protection are anticipated.

Chapter 5

Proposed mitigation and enhancement measures

5. Proposed mitigation and enhancement measures

As stated in the previous chapter (Possible effects on the environment), the Interreg AA Programme is not expected to generate negative impacts on environment. The impacts expected are classified as positive or not significant. Regarding the several Priorities of the Programme, the positive impacts are mainly related with Priority 1 and 2 especially the SO 1.1, 2.1, 2.4 and 2.6. Considering the environmental indicators, the water, climatic factors and population and human health are expected to be positively impacted with the implementation of the Programme.

Although no negative impacts are expected with the implementation of the Programme, it is important to propose mitigation and enhancement measures for several SO.

Regarding the SO 1.1, the main aim is to increase capacity of and supported knowledge sharing between public authorities and private stakeholders to implement a sustainable and greener economy in the Atlantic Area. However, the indicative type of actions is mainly related with blue economy sector. The Programme must convey a clear message that positive environmental impact is a key element of the programme's approach, and that competitive communities should be based on high environmental standards. Therefore, in the development of blue economy innovation projects an assessment of their impact in other environmental aspects, such as air and soil should be taken into consideration. The innovation should also have in consideration the environmental aspects.

The digital transition, the use of digital tools and the upskilling on digital technologies can help foster sustainable production and consumption models. The digital skills should improve the competitiveness of businesses and improve the adaptation to changes. Otherwise, negative effects on land use, biodiversity and air it may arise. Therefore, the transition to digital technologies will also have to take into consideration the development of business and services in a sustainable manner, not only limited to the increase in the competitiveness of companies.

The Programme also focuses on promotion of energy efficiency, climate change adaption and risk prevention, transition to circular economy and protection and preservation of biodiversity. Therefore, it is essential to ensure that projects address improvements in energy efficiency and sustainable renewable energy scenarios. The promotion of renewable energies has to take into consideration the landscape and cultural heritage. The wind farms are increasingly associated with problems related to aesthetics, operational noise and social acceptability, and the construction of facilities can cause disturbance to habitats and local biodiversity. Therefore, special attention must be given to the projects related with renewable energy. Besides that, the projects should ensure that the production of renewable energy consider their potential impacts on biodiversity and Natura 2000 species and habitat, hydro-morphology, water-use, landscape, noise, vibrations and other potential impacts. Regarding the projects related with climate change

risk (e.g. floods) and with pilot actions in real conditions, the hidro-morphological impacts and the environmental impacts should be considered, respectively.

Some of the actions of the Interreg AA Programme promote the growth of tourism, which might generate negative environmental impacts. It is especially relevant to increase awareness on the management of natural and cultural heritage. In addition, ports contain potential risks for negative impacts, especially as increased traffic will bring associated environmental burdens that need to be estimated and prevented or appropriately managed. Moreover, the AA cooperation area is rich in biodiversity, contributing to the tourism attractiveness. Hence, it is paramount to foster a sustainable development of the economic activities (including tourism) considering the protected species and habitats. In addition, it is important to ensure that the projects to be financed under the Programme do not exert an increased pressure on nature and biodiversity, taking also into account the cumulative effects of the actions that will be implemented. Further, it is essential to guarantee an integrated vision of the projects to be financed, ensuring that they enhance nature and biodiversity conservation, or at least do not put it at risk, in line with the objectives of the EU Biodiversity Strategy 2030 and the Post-2020 Global Biodiversity Framework to be adopted at COP15 of the Convention on Biological Diversity.

As a final remark, there is a need to ensure a balanced consideration of the different dimensions of sustainable development, preventing the prevalence of a factor over the others. This Programme is mainly related with blue sector, therefore more positive impacts are expected in water or marine sectors. Hence, the knowledge, methodologies and strategies must create a clear awareness of the significance and means of maintaining equilibrium between competing economic, social and environmental interests.

Chapter 6

Monitoring measures foreseen by the Interreg AA 2021-2027

6. Monitoring measures foreseen by the Interreg AA 2021-2027

Directive 2001/42/EC requires the monitoring of the significant environmental effects regarding the Programme implementation, in order to identify at an early-stage unforeseen adverse impacts and to be able to undertake appropriate corrective actions.

The common output and result indicators were established for ERDF by the Annex I of Regulation (EU) 2021/1058. In accordance with the ERDF regulation, the Interreg Programme includes a set of output and result indicators for each programme SO in order to monitor, report and evaluate the programme's performance.

The monitoring system of the Interreg AA 2021-2027 has a set of indicators that allows the evaluation of the progress of the Programme, according to the milestones for 2024 and 2029.

The following table (Table 24) presents the output indicators included in the Draft Programme of Interreg AA 2021-2027. These indicators will allow monitoring, reporting on and evaluating the performance during the implementation of the Programme as well as the assessment of the established environmental objectives.

Table 24: Output indicators of the Interreg AA 2021-2027.

Priority	SO	Output Indicators
1, 2 & 3	All	Joint strategies/ action plans developed or implemented
		Joint pilot activities implemented in projects
		Organisations cooperating across borders
		Jointly developed solutions
4	ISO 1	Participations in joint actions across borders
		Organisations cooperating across borders
		Jointly developed solutions

Source: AA 2021-2027 – Cooperation Programme (Draft)

Regarding the results indicators, for all the priorities and specific objectives, the Interreg AA Programme presents the following results indicators:

- Joint strategies and action plans taken up by organisations;
- Solutions taken up or up-scaled by organisations.

In the programme, for each SO, a middle (for 2024) and a final milestone (for 2029) were set, in order to help the monitoring and evaluate the performance of the Programme.

In addition to the output and result indicators included in the Draft Programme of Interreg AA 2021-2027, a set of indicators aiming to monitor the Programme's environmental performance has been identified. These indicators (Table 25) are structured in the different factors defined in Annex I of Directive 2001/42/EC (analysed in the chapter 4) and related to the MSFD, notably the indicator "Joint marine observation projects to increase knowledge and ability to forecast the behaviour of the ocean developed".

Table 25: Monitoring indicators.

Indicator	Unit	Source
Air		
Common strategies to reduce GHG emissions in the industrial sectors and housing and transports in the AA developed or implemented	Nº	Interreg AA information system
Joint local, regional and/or sectoral action plans to reduce GHG emissions developed or implemented	Nº	Interreg AA information system
Water		
Joint maritime training programmes developed or implemented	Nº	Interreg AA information system
Joint water management strategies that integrate adaptation to climate change developed or implemented	Nº	Interreg AA information system
Joint marine observation projects to increase knowledge and ability to forecast the behaviour of the ocean developed	Nº	Interreg AA information system
Soil		
Jointly developed coastal protection measures/ nature-based solutions/ ecosystem services against natural and/ or technological and/ or man-made hazards compatible with landscape protection	Nº	Interreg AA information system
Joint action plans including resilience and mitigation measures in coastal areas and close to the coast developed or implemented	Nº	Interreg AA information system
Biodiversity		

Indicator	Unit	Source
Joint plans to improve and promote biodiversity and reduce threats to AA flora and fauna developed or implemented	Nº	Interreg AA information system
Joint projects to create blue and green corridors to foster biodiversity developed	Nº	Interreg AA information system
Climatic factors		
Collaborative projects (including digital upskilling, tools and processes) to adapt to climate change developed	Nº	Interreg AA information system
Joint sectoral or territorial plans to adapt or mitigate the effects of climate change developed or implemented	Nº	Interreg AA information system
Joint risks management plans to increase climate resilience of critical infrastructures developed or implemented	Nº	Interreg AA information system
Population and human health		
Joint innovation projects in the blue economy to develop new healthcare and pharmaceutical applications	Nº	Interreg AA information system
Material assets		
Pilot actions to test production of decentralised renewable energy developed	Nº	Interreg AA information system
Landscape		
Joint measures for the protection of natural heritage (including World Heritage Sites) developed or implemented	Nº	Interreg AA information system
Joint strategies for sustainable tourism that valorises the AA natural heritage developed or implemented	Nº	Interreg AA information system
Cultural heritage		
Jointly developed innovative sustainable solutions in culture/ creative and cultural industries and tourism	Nº	Interreg AA information system
Jointly developed cultural events and cultural routes	Nº	Interreg AA information system

The above basic arrangements provide a sufficient and adequate framework for monitoring the Interreg AA 2021-2027 Programme implementation in order to identify at an early-stage

Chapter 7

Final remarks

7. Final remarks

The current screening has been prepared to determine the need for a full SEA for the Interreg AA Programme 2021-2027. The screening has been made in accordance with the EU Directive 2001/42/EC and has looked in detail at the context and likely effects of the Interreg AA Programme 2021-2027.

At the end of the screening process, **it is possible to conclude that a full SEA is not required for the Interreg AA Programme. This is also the conclusion reached by Agência Portuguesa do Ambiente based on the feedback received** (for further contributions from Agência Portuguesa do Ambiente and other environmental authorities see section 7.2). Due to the nature of the measures and actions proposed in the Programme, it is unlikely that the Interreg AA Programme will cause significant negative effects on the environment (as presented in Chapter 4). Moreover, the influence that the programme may have is certainly positive and does not increase the likelihood that other plans and programmes will cause significant negative effects.

7.1 European Regulation – Horizontal principles and the do no significant harm principle

Horizontal principles

The draft Programme is consistent with the horizontal principles of promotion of equality between men and women, non-discrimination and sustainable development. In accordance with the EU regulation 2021/241 establishing the Recovery and Resilience Facility (RRF), article 5 states that funds from the Facility should respect the principle of additionality and the principle of 'do no significant harm' (explained below). In addition, in accordance with Article 9(4), "the objectives of the Funds shall be pursued in line with the objective of promoting sustainable development as set out in Article 11 TFEU, taking into account the UN Sustainable Development Goals, the Paris Agreement and the "do no significant harm" principle".

The Interreg Atlantic Area Programme ensures the promotion of equity between men and women, gender mainstreaming and the integration of a gender perspective during its preparation, implementation and evaluation. Additionally, during the preparation phase, Member States prevent any discrimination based on gender, racial and ethnic origin, religion or belief, disability, age or sexual orientation.

The Interreg AA 2021-2027 Programme also defined priorities and specific objectives with environmental character in line with EU strategies for protecting the environment. The Programme

promotes the production of renewable energy (mainly green/blue energy systems), fosters the reduction of air pollution, stimulates a joint response to mitigate climate change and the protection, fostering and development of natural and cultural heritage. Furthermore, it supports the exploitation of synergies with regional Operational Programmes, as well as policy instruments of the Union, that serve to reduce climate change and improve adaptation, protecting the environment and efficient use of resources.

"Do no significant harm" principle

The Regulation establishing the RRF provides that no measure included in the Recovery and Resilience Plan (RRP) should lead to significant harm to environmental objectives within the meaning of Article 17 of the Taxonomy Regulation [2].

The "Do no significant harm" principle (DNSH) should be interpreted within the Article 17 of the Taxonomy Regulation. According to the Article, there are six environmental objectives that defines what constitutes 'significant harm', namely:

- **climate change mitigation**, in which the activity leads to significant greenhouse gas emissions;
- **climate change adaptation**, in which the activity leads to an increased adverse impact of the current climate and the expected future climate, on the activity itself or on people, nature or assets;
- **sustainable use and protection of water and marine resources**, in which the activity is detrimental:
    i. to the good status or the good ecological potential of bodies of water, including surface water and groundwater; or
    ii. to the good environmental status of marine waters;
- **circular economy**, including waste prevention and recycling, in which:
    i. the activity leads to significant inefficiencies in the use of materials or in the direct or indirect use of natural resources such as non-renewable energy sources, raw materials, water and land at one or more stages of the life cycle of products, including in terms of durability, reparability, upgradability, reusability or recyclability of products;

[2] Regulation (EU) 2020/852 of the European Parliament and of the council on the establishment of a framework to facilitate sustainable investment.

ii. the activity leads to a significant increase in the generation, incineration or disposal of waste, with the exception of the incineration of non-recyclable hazardous waste; or

iii. the long-term disposal of waste may cause significant and long-term harm to the environment;

- **pollution prevention and control**, in which the activity leads to a significant increase in the emissions of pollutants into air, water or land, as compared with the situation before the activity started; or
- **the protection and restoration of biodiversity and ecosystems**, in which the activity is:

  i. significantly detrimental to the good condition and resilience of ecosystems; or

  ii. detrimental to the conservation status of habitats and species, including those of Union interest.

The above-mentioned criteria should also be considered to evaluate if an economic activity is significantly harm. When assessing an economic activity, both the environmental impact of the activity itself and the environmental impact of the products and services provided by that activity throughout their life cycle shall be taken into account, in particular by considering the production, use and end of life of those products and services.

A screening of the Strategic Environmental Assessment (SEA) for the future Interreg Atlantic Area (AA) 2021-2027 Programme was conducted in accordance with the EU Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. The purpose of the screening performed was to assure that the environmental consequences of the AA 2021-2027 were identified and assessed during the Programme elaboration and before its implementation.

Focusing on Chapter 4, it is demonstrated that negative effects or impacts are not expected due to the nature of the Programme and considering the priorities and objectives of AA 2021-2027, which are in line with the EU programmes and EU policies.

Although the screening supports that no negative effects are expected, this strategy does not exclude automatically the possibility to define types of actions which do not comply with the DNSH Principle. Therefore, a dedicated assessment has to be carried out during the programming phase (present stage) to prevent the inclusion of activities or types of actions in the programme that could do significant harm. While the screening SEA procedure identifies the measures to prevent, reduce or mitigate any significant adverse effect in the environment, it does not automatically entail compliance with the DNSH principle. In this sense, a complementary analysis between the

SEA findings and the assessment of the DNSH principle should be performed in order to reduce and mitigate the risks to the environment.

In case that potential risks to the compliance with the DNSH principle are identified, the proposed action should be adjusted taking into account necessary mitigating measures that will be implemented to prevent and offset any significant harm with regard to the six environmental objectives covered by the Taxonomy Regulation. If this is not possible, the type of action concerned should be removed from the Programme.

The Interreg Atlantic Area Programme is divided in eight specific objectives. Each one of them has a set of indicative type of actions in order to attain their main objectives and the expected results. The indicative cooperation actions include the development and implementation of joint transnational strategies, action plans, training, pilots and networking. In order to ensure that the programme complies with the DNSH principle, the following scheme should be analysed for each type of action:

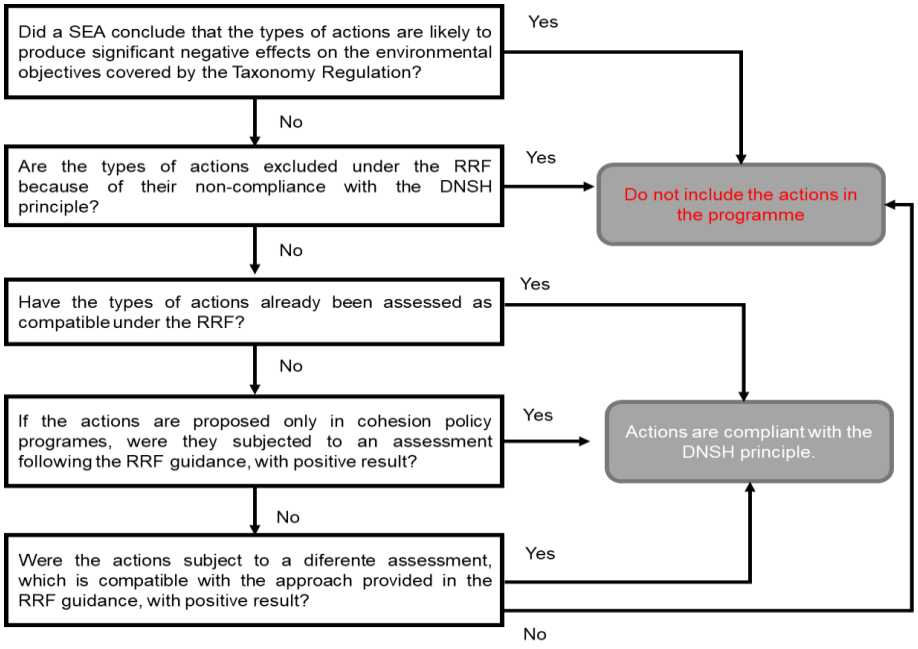


Figure 39: Scheme of questions to evaluate the compatibility of the programme with the DNSH principle.

Considering the nature of the Programme, the type of actions has been assessed as compatible with the DNSH principle. In fact, the actions planned promote positive effects on the environment as well as on the six environmental objectives defined:

- **Climate change mitigation** – Natural risks, in coastal areas and close to the coast, are a permanent shared issue in the Atlantic area with increased effects due to the climate

change. In addition, risks linked to human activities are also an issue to tackle. Accordingly, there is therefore the necessity to anticipate potential human and natural risks ensuring effective adaptation and mitigation measures. Several actions are encouraged to boost renewable energies (related to waves and tidal currents). The actions also intend to increase the capacity to manage risks and prevention or mitigation measures. In fact, priority 2 of the Programme is focused on the promotion of energy efficiency, climate change adaption and risk prevention, transition to circular economy and protection and preservation of biodiversity. Therefore, there are several actions related to the reuse and recycling of waste, as well as its efficient management. These actions benefit the environment and consequently support the mitigation of climate change;

- **Climate change adaptation** – Climate change is one of the major problems faced worldwide. The Atlantic Area also has several problems and the Programme also intends to focus on climate change adaption, in line with the European goals. The type of actions established under specific objective (SO) 2.4 are mainly related with climate change adaption and risk prevention. The SO 2.4 aims to: prevent from disasters and preserve the environmental status and support stakeholders achieving effective planning and financing climate change adaption. Some of the actions promote territorial plans for adaption or mitigation of the effects of climate change, as well as tackle the negative impacts of main economic sectors and tools on adaption to climate change. Moreover, the actions promote the integration of climate change adaption to water management strategies and mitigation of the impact of the main economic sectors;
- **Sustainable use and protection of water and marine resources** – The Programme is based on the Atlantic Area and its resources, mainly focusing on the blue sector. The cooperation area is rich in biodiversity and cultural and natural heritage resources. Moreover, coastal areas and inland areas close to the coast are highly exposed to the effects of climate change on natural environments, heritage and current forms of economic activity. In this sense, a balanced development between the protection of natural areas and economic activities that stimulate local economies must be attained. The type of actions defined promote solutions to build climate resilience, guarantee the sustainability of economic activities and preserve the existing fauna and flora from short, medium and long-term changes. Besides that, the Programme promotes several actions to change consumer behaviour towards a sustainable production and consumption models. Therefore, it is expected that water consumption and marine and water resources can be positively affected;
- **Circular economy** – The Atlantic Area is a territory that must conciliate economic development with the preservation of its rich natural and cultural heritage. A circular economy model employs not only waste management, but also reuse, recycling and

responsible manufacture could support the development of new industries and jobs, reducing emissions and increasing efficient use of natural resources, including energy, water and materials. The circular economy is particularly important in resource-intensive industrial sectors (construction, industry, plastics, marine waste) and is supported by the digitisation and efficiency of production chains. The actions taken under SO 2.6 are focused on the theme of circular economy. As such, several actions will be promoted, particularly associated with the blue economy. As an example, the actions intend to promote: awareness to reduce the plastics use and other waste, development of sustainable alternatives for the use of plastics and other waste and raise awareness of the need to transition to a circular economy. The actions are expected to lead citizens to be more involved in a more sustainable consumption approach;

- **Pollution prevention and control** – The Programme also has a strong connection with the restoration of polluted environment, namely through actions related with the circular economy (explained before). Some of the actions taken under the Programme promote fighting pollution on the ocean through collection and recycling (plastics) but also preventing inland waste discharge into the ocean to tackle a good quality environment;
- **Protection and restoration of biodiversity and ecosystems** – The Atlantic Area is very rich in natural and cultural protected areas. The marine biodiversity is a wealth for the cooperation area that must be preserved. At the same time, this natural heritage is a vector of attraction and well-being for the territory that must be used to support economic activities, such as tourism. Therefore, several actions are focused on the preservation and protection of nature and biodiversity. Some of them include: restauration of degraded ecosystems, strengthening of transnational links to protect and restore areas covered by the Natura 2000 network and marine protected areas, improvement of biodiversity and reducing threats to fauna and flora, and promoting nature-friendly practices. Therefore, the biodiversity, fauna and flora are positively impacted by these actions.

A complementary analysis of the environmental impacts that may arise from the implementation of the AA 2021-2027 Programme is available on Chapter 4. The assessment of the possible effects on the environment and the compliance with the DNSH principle should be analysed jointly, considering the topics and the information analysed.

7.2 Feedback from environmental authorities and consultation: contributions and complementary references

Environmental authorities and public consultation

The screening of the SEA for the future Interreg AA 2021-2027 Programme was conducted in accordance with EU Directive 2001/42/EC and Annex 1 of the Directive. The main goal is to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes.

Within the context of the screening of strategic environmental assessment of the Interreg AA Programme, in accordance with the article 7 of Decree-Law nº 232/2007 of 15 June, the Environmental Report was submitted to consultation of environmental authorities. The article 7 states that the project plan or program and the respective environmental report should be provided to the entities, which shall submit their contributions within a period of 30 days.

In the framework of the elaboration of the future Interreg AA Programme 2021-2027, the Managing Authority submitted to several national and regional Environmental Authorities the environmental report of the Draft Programme. The consultation enabled receiving opinions and contributions on the Environmental Assessment and its respective integration in the AA 2021-2027 Programme. In that sense, the Managing Authority provided a standardised feedback form (https://forms.gle/DRt3oSmNdm7qPMBX6) in order to facilitate the compilation of all remarks and comments.

The environmental entities contacted were the following:

- **France:** Ministère de la Transition Écologique (Conseil général de l'environnement et du développement durable (CGEDD)).
- **Ireland:** Environmental Protection Agency; Minister for Housing, Local Government and Heritage; Minister for Tourism, Culture, Arts, Gaeltacht, Sport and Media; Minister for Environment, Climate and Communications; Minister for Agriculture, Food and the Marine.
- **Spain:** Ministerio para la Transición Ecológica y el Reto Demográfico.
- **Portugal:** Agência Portuguesa do Ambiente; Instituto da Conservação da Natureza e das Florestas; Comissões de Coordenação e Desenvolvimento Regional; and Direção-Geral de Recursos Naturais, Segurança e Serviços Marítimos.

The consultation was conducted between 25th October and 22nd November 2021. Table 26 presents the contributions of the environmental authorities and the comments from the evaluation team.

Table 26: Contributions of the Environmental Authorities.

Environmental Authority	Contribution/ Considerations (most relevant aspects for SEA)	Comments

Environmental Protection Agency (Ireland)	• Refer relevant plans and programmes in Ireland to consider where appropriate, namely:
	  ○ National Marine Planning Framework;
	  ○ National Planning Framework;
	  ○ Regional Spatial and Economic Strategies;
	  ○ Climate Action Plan 2021;
	  ○ National Adaptation Framework;
	  ○ Offshore Renewable Energy Development Plan;
	  ○ Grid 25 Implementation Plan;
	  ○ National Policy Framework on Alternative Fuels Infrastructure for Transport;
	  ○ draft National Hazardous Waste Management Plan;
	  ○ Nitrates Action Programme;
	  ○ Rural Development Programme;
	  ○ Food Vision 2020;
	  ○ National Biodiversity Action Plan;
	  ○ National Strategic Aquaculture Plan;
	  ○ Seafood Operational Programme.
	• Refer also relevant flood risk management plans.
	• Aspects to consider also include the implications associated with implementation of the Maritime Spatial Planning Directive and Ireland's National Marine Spatial Plan.
	• Relevant port and harbour masterplans should also be taken into consideration.
	• Refer some relevant tools, applications and reports developed by EPA.
		• The comments include some relevant information and complementary references, especially in the case of Ireland. However, the focus of the present environmental report and the screening is the Atlantic Area. Therefore, the references were added in this annex as a complementary document to be considered, when appropriate.

Minister for Environment, Climate and Communications (Ireland)	• Recommend the use of several data sets, when conducting the Environmental Impact Assessment Report (EIAR), SEA, planning and scoping processes. • Include a list and recommend to refer any datasets relevant to our assessment.	• The comments also include some relevant datasets which we include bellow in the section of complementary references.
Minister for Agriculture, Food and the Marine (Ireland)	• "Commercial sea fishing is a long standing, pre-existing and traditional activity in the marine environment. It is essential that any negative impacts on fisheries are avoided. The evaluation of potential impacts on any commercial sea fishing activities needs to be given consideration as part of any planning/proposal process and during the development process itself. It is imperative that engagement should be sought with the fishing industry and other relevant stakeholders at as early a stage as possible to discuss any changes that may affect them to afford a chance for their input. Fishers' interests and livelihoods must be fully recognised, supported, and taken into account."	• The team agrees with the comments and would like to highlight some relevant information present in the Programme that pretend to support the fishery sector and their activities. • The cooperation area has a large percentage of the coastal and near-shore territory with some kind of environmental protection. The territory has strong economic sectors such as fishing, fisheries, aquaculture, ports and water projects and naval sector. The Atlantic Area ports are key stakeholders and act as economic drivers. In fact, this presents a challenge between the need to exploit marine and maritime resources and the preservation of protected environments and biodiversity. • Hence, improved catching techniques, new and less polluting materials, energy efficiency, collaboration of the fishing sector in cleaning up the ocean, the use of technologies for selecting fish catches, etc. are ways of making both approaches complementary.

		• Likewise, the ports, as poles of development and concentration of maritime activities, are necessary actors to establish measures that influence the fishing and shipment sector towards a green transition as entities of dialogue with the research and innovation centres of the territory. • There are several type of actions that intends to support the innovation in the blue economy sectors, such as fishing and aquaculture through innovation, namely: Supporting eco-innovative business models directly or indirectly linked to the ocean; and Driving diverse forms of sustainable coastal and close to the coast tourism.
Agência Portuguesa do Ambiente (Portugal)	• "Investments in renewable energies are large and the Interreg Atlantic Area Programme does not have the resources to fund them, and the types of action identified are mostly of an immaterial nature. In the case of "pilot projects under real conditions", their environmental effects should be considered prior to a funding decision."	• The team agrees with the comment and has included a reference in the chapter 5 (Proposed mitigation and enhancement measures).
	• "The analysis on the environmental status of the marine environment was not carried out, under the terms of the Marine Strategy Framework Directive. The theme of coastal erosion has not been addressed either. Since the scope of the Programme seems to cover the coastal zone, it is necessary to take into account the phenomena of erosion caused by the sea and the changes of the coastline."	• The team agrees with the comments. Analysis of the marine environmental status and coastal erosion have been included in the chapter 3 (Relevant aspects of the current state of the environment).

• "It is recommended that this environmental assessment provides opportunities for public consultation on the Interreg Atlantic Area Programme and its environmental assessment."	• The team agrees with the comment and would like to highlight that a public consultation was conducted between 26th January and 28th February 2022. A reference to this public consultation was included in section 1.2 (SEA methodology).
• "There is some overlap between what is said on the geographical context (3.1) and on population (3.7). With regard to population and human health, it is relevant to mention the percentage of inhabitants of each country occupying the coastline (as this information is relevant to the assessment of coastal risks)."	• The team agrees with the comments. A revision of the geographical context in sections 3.1 and 3.7 has been made. In addition, information about the share of national population living in a coastal region has been included in section 3.7.
• "As regards the characterisation of Portuguese urban centres of importance in the Atlantic area, in addition to Lisbon mentioned in the characterisation (3.8), the importance of Porto, Viana do Castelo, Aveiro, Sines, Faro, Funchal and São Miguel should be highlighted."	• The team agrees with the comment and has included a reference in section 3.8 to Porto, Viana do Castelo, Aveiro, Sines, Faro, Funchal and São Miguel.
• "The characterisation of infrastructures - transport and maritime routes (3.8) only presents what exists in the North of Portugal and should be extended to the rest of the national territory and include maritime routes and not only river routes."	• The team agrees with the comment and has revised section 3.8 to extend the analysis to the rest of the national territory and include the maritime routes (Motorways of the Sea).
• "Chapter 6 should expressly include measures specifically related to the types of projects likely to be funded by the Programme. This is the case of the acquisition of oceanographic or sedimentological data that allow the calibration of models used in the environmental impact assessment of coastal works or of projects related to the increase of port competitiveness."	• The team agrees with the comment and has included in chapter 6 a set of indicators aiming to monitor the Programme's environmental performance.
• "On page 23, where it says "A circular economy model, which employs not only waste management, but reuse, recycling and responsible manufacture could	• The team has accepted the suggestion.

	support the development of new industries and jobs, reducing emissions and increasing efficient use of natural resources, including energy, water and materials.”, it is suggested to change it to “A circular economy model, which employs not only waste management, namely recycling and preparation for reuse, but also waste prevention, through the reuse of materials and responsible manufacture could support the development of new industries and jobs, reducing emissions and increasing efficient use of natural resources, including energy, water and materials.””	
	• “On page 23, where it says “Awareness actions to reduce the use of plastics and other waste and their discharge into the ocean, and developing sustainable alternatives to the use of plastics and other waste by supporting the development of biodegradable organic substitutes or composites”, it is suggested to change it to “Awareness actions to reduce the use of plastics and other materials and their discharge, as waste, into the ocean, and developing sustainable alternatives to the use of plastics and other materials by supporting the development of biodegradable organic substitutes or composites.””	• The team has accepted the suggestion.
	• “On page 24, where it says “Supporting sustainable practices for waste reduction and prevention (over packing, focus on plastic) directly or indirectly linked to the ocean”, it is suggested to change it to “Supporting sustainable practices for waste reduction and prevention (overpackaging, focus on plastic) directly or indirectly linked to the ocean.””	• The team has accepted the suggestion.
	• “On page 77, where it says “However, a circular economy model employs not only waste management, but also reuse, recycling and responsible manufacturing.”, it is suggested to change it to “However, a circular economy model employs not only waste management, namely recycling and preparation for reuse, but also reuse and responsible manufacturing.””	• The team has accepted the suggestion.

	• "On pages 81 and 82, where it says "The circular economy is the main theme of this SO. In this sense, there are several actions related to the reuse and recycling of waste, as well as its efficient management.", it is suggested to change it to "The circular economy is the main theme of this SO. In this sense, there are several actions related to the reuse of materials and preparation for reuse and recycling of waste, as well as its efficient management.""	• The team has accepted the suggestion.
	• "On page 83, where it says "The actions promote: awareness to reduce the plastics use and other waste, development of sustainable alternatives for the use of plastics and other waste and raise awareness of the need to transition to a circular economy.", it is suggested to change it to "The actions promote: awareness to reduce the plastics use and other materials, development of sustainable alternatives for the use of plastics and other materials and raise awareness of the need to transition to a circular economy.""	• The team has accepted the suggestion.
	• "On page 85, where it says "The circular economy is the main theme of this SO, which involves the reuse and recycling of waste, as well as its efficient management.", it is suggested to change it to "The circular economy is the main theme of this SO, which involves the reuse of materials and preparing for reuse and recycling of waste, as well as its efficient management.""	• The team has accepted the suggestion.
	• "On page 87, where it says "The circular economy is the main theme of this SO, which involves the reuse and recycling of waste, as well as its efficient management.", it is suggested to change it to "The circular economy is the main theme of this SO, which involves the reuse of materials and preparing for reuse and recycling of waste, as well as its efficient management."	• The team has accepted the suggestion.
Instituto da Conservação da	• "In section 3.5, the entire approach is focused on terrestrial ecosystems, with no mention of classified marine areas or reference to coastal and marine	• The team agrees with the comment and has included an analysis of the marine protected areas.

Natureza e das Florestas (Portugal)	habitats and species, which would appear to be important for the characterisation in the context of the Atlantic Area."	
	• "In section 3.5, there is an apparent disparity between the text and Figure 13 "Proportion of assessments in each category of conservation status for 2007-2012 and 2013-2018 reporting periods". In fact, it is mentioned that comparing the 2007-2012 period with the 2013-2018 period, both the number of habitats and species in good conservation status in the AA has tripled, which indicates the efforts that are being carried out to preserve the species and their habitats, which does not seem to follow from the figure presented."	• The team agrees with the comment and has revised the sentence.
	• "In Table 16, SO 2.4, it is considered that it would be important to highlight the importance of viewing this objective from the perspective that the protection of nature and biodiversity and the restoration of ecosystems can and should be important allies in adapting to and mitigating the effects of climate change, and the synergies involved should be valued."	• The team agrees with the comment and has highlighted the mentioned issue in the table.
	• "In Table 18, SO 2.7, it is important to recognise the close relationship between the protection of nature and biodiversity and human and global health. Pandemics of zoonotic origin are a good, current example of this. Indeed, nature is essential to human existence and good quality of life. It plays a fundamental role in providing food, energy, medicines and genetic resources, clean air, fresh water, climate regulation, pest and disease regulation, disaster risk reduction, as well as spiritual and cultural values, all of which are fundamental to people's physical and mental wellbeing and the maintenance of culture (IPBES. Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Germany: Bonn. 2019).	• The team agrees with the comment and has revised the text and changed the impact to positive.

	Thus, SO 2.7 is considered to be of the utmost importance for the descriptor population and human health."	
	• "In Table 23, criteria 1(d) environmental problems relevant to the plan or programme, it is suggested to include biodiversity loss".	• The team agrees with the comment and has included biodiversity loss in the table.
	• "In chapter 5, mitigation measures are not exactly identified, given that it was considered that the programme is not expected to generate negative impacts on the environment, but only positive or non-significant ones. To mitigate possible negative effects on nature and biodiversity: - It is up to us to reinforce the importance of knowledge, information and awareness on the state of conservation of nature and biodiversity and its accelerated decline (…). - It is considered fundamental that in its implementation the programme guarantees an integrated vision in the approach of the actions to be financed, ensuring that these can generate positive impacts, or at least that they do not generate negative impacts on nature and biodiversity, valorising synergic or cumulative effects with other environmental aspects. This is the only way to ensure alignment with the objectives of the EU Biodiversity Strategy 2030 and the Post 2020 Global Framework (GBF) to be adopted at the COP15 of the Convention on Biological Diversity."	• The team agrees with the comment and has included some mitigation measures related with the biodiversity.
	• In chapter 6, it is not clear how the impact of actions and projects will be assessed for the different descriptors, namely for nature protection and biodiversity.	• The team agrees with the comment and has included in chapter 6 a set of indicators (structured in the different factors) aiming to monitor the Programme's environmental performance.

In addition to the consultation of the Environmental Authorities, a consultation of the general public of the Member States was conducted between 26th January and 28th February 2022. Table 27 presents the contributions received and the comments from the evaluation team.

Table 27: Contributions of the general public.

Contribution/ Considerations (most relevant aspects for SEA)	Comments
• "A synthesis of the coastal erosion in this report could be useful in the same section as the sea level rise. Insights on the marine protected areas at sea might be relevant too along with protected areas on lands. The river fragmentation is an important part of the landscape fragmentation that affect all the aquatic organisms, the sediment and water fluxes of the Atlantic Area. It should be acknowledged."	• The team agrees with the comments and has included an analysis of the coastal erosion in section 3.4 and of the marine protected areas in section 3.5. In addition, has included a reference to river fragmentation in section 3.9.
• "In relation to air quality, maps of annual averages of pollutants could be included or a reference map (NO_2 or PM_{10}) could be chosen to know the situation in each region. Aspects related to the circular economy are missing. A map with separate collection data for each region could be included."	• The team agrees with the comments and has included a reference map (NO_2) in section 3.2 and a figure with the recycling rates of municipal waste by country in section 3.4.
• "In section 4.2, SO 1.1, the positive impact of blue activities on water resources may be clearer. In the case of aquaculture, an activity that is taking its first steps in the Azores, this is an activity that may cause environmental disturbances. Freshwater aquaculture uses scarce and valuable water resources, especially in an island region, for cultivation and later for the rejection of residual waters. Various studies have also demonstrated the possible impacts of aquaculture effluents on aquatic ecosystems, such as algal blooms, eutrophication and changes in benthic communities. Thus, the establishment of standards for water use will be fundamental to safeguard water resources."	• The team agrees with the comment and has included a sentence highlighting the importance of setting standards for water use in order to safeguard water resources.
• "Regarding section 4.4, SO 4.5, in the case of the Azores, the expansion of tourism and agriculture (including cattle grazing), were classified as the greatest threats to biodiversity, according to stakeholders consulted under the BEST III initiative, in which the FRCT participated. Thus, it is considered important to create a strategy and other Interreg Atlantic Area projects within the theme of sustainable tourism."	• The team agrees with the comment but would like to highlight that SO 4.5 already includes actions focused on the promotion of a transition towards a more sustainable tourism.

Complementary references

The consultation of the regional and national Environmental Authorities was very useful and allowed the compilation of additional references to be considered, which are specific for some countries.

The main focus of the environmental assessment report is the Atlantic Area. In this sense, the evaluation of the current state of the environment, performed and detailed in the Chapter 3, took into consideration references which involve the four countries of the Atlantic Area. However, in this section are detailed several references, tools, applications, datasets and reports highlighted in the inputs received from the Irish environmental authorities (the only one which provided timewise and concrete contributions):

- **Environmental Sensitivity Mapping (ESM) WebTool** – Decision support tool to assist SEA and planning processes in Ireland (www.enviromap.ie). These maps can help planners examine environmental considerations, anticipate potential land-use conflicts, and help identify suitable development locations while also protecting the environment.
- **State of the Environment Report – Ireland's Environment 2020** – Recommendations, key issues and challenges described for the Ireland.
- **Available Guidance & Resources** – Guidance notes and other resources available at Environmental Protection Agency website, including: SEA process guidance and checklists, Inventory of spatial datasets relevant to SEA, among others. Available at: https://www.epa.ie/our-services/monitoring--assessment/assessment/strategic-environmental-assessment/sea-topic-and-sector-specific-guidance-/
- **EPA SEA WebGIS Tool –** Tool to support public authorities to produce an indicative report on key aspects of the environment in a specific geographic area. The tool intends to assist public authorities in SEA screening and scoping exercises. Available at: https://gis.epa.ie/EPAMaps/SEA.
- **EPA WFD Application –** Application to provide access to water quality and catchment data from the national WFD monitoring programme. Available at: www.catchments.ie
- **EPA AA GeoTool –** Tool that allows users to select a location, specify a search area and gather available information for each European Site within the area. Available at: https://gis.epa.ie/EPAMaps/AAGeoTool
- **Datasets[3] provided by the Geological Survey Ireland (Department of the Environment, Climate and Communications):**
  - **County Geological Sites (CGSs)** - include sites of national importance, but which were not selected as the very best examples for Natural Heritage Areas designation. CGSs are now routinely included in County Development Plans and in the GIS of

[3] More information about dataset are provided in the Table 2.

planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage (https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228)

- **Groundwater** - provides advice, data and maps relating to groundwater distribution, quality and use, which is especially relevant for safe and secure drinking water supplies and healthy ecosystems. Groundwater maps include: wells, drinking water source protection areas, national map suite – aquifer, groundwater vulnerability. Groundwater recharge and subsoil permeability maps. For areas underlain by limestone, should be used the karst specific data layers (karst features, tracer test database; turlough water levels (gwlevel.ie).
- **Geological Mapping** - online datasets of bedrock and subsoils geological mapping.
- **Geohazards** - information available on landslides in Ireland via the National Landslide Database and Landslide Susceptibility Map.
- **Physiographic Units** - cartographic representations of the broad-scale physical landscape of a region. They are valuable for regional land-use planning and in studies of the influence of physical landscape on the ecological environment.
- **Marine and Coastal Unit** - Geological Survey Ireland's Marine and Coastal Unit in partnership with the Marine Institute, jointly manages INFOMAR, Ireland's national marine mapping programme; providing key baseline data for Ireland's marine sector. INFOMAR also produces a wide variety of seabed mapping products that enable public and stakeholders to visualize Ireland's seafloor environment (https://www.infomar.ie/maps/downloadable-maps/maps). Story maps provides a different perspective of some of the bays and harbours of the Irish coastline (https://www.infomar.ie/maps/story-maps/exploring-dingle-bay-different-perspective).
- **Coastal Vulnerability Index -** Maps providing an insight into the relative susceptibility of the Irish coast to adverse impacts of sea-level rise through the use of a Coastal Vulnerability Index (CVI). Detailed information and maps are available here.
- **Geochemistry of soils, surface waters and sediments -** provides baseline geochemistry data for Ireland as part of the Tellus Programme. Baseline geochemistry data can be used to assess the chemical status of soil and water at a regional scale and to support the assessment of existing or potential impacts of human activity on environmental chemical quality. Data is available at https://www.gsi.ie/en-ie/data-and-maps/Pages/Geochemistry.aspx.
- **Culture and Tourism –** provides a description of the current Ireland geoparks and geotourism projects. Ireland currently has three UNESCO Global Geoparks: Burren and Cliffs of Moher UNESCO Global Geopark, Cuilcagh Lakelands UNESCO Global

Geopark and Copper Coast UNESCO Global Geopark. There are a number of other geotourism projects, namely: the Joyce Country and Western Lakes aspiring UNESCO Global Geopark project in South Mayo and North Connemara area of County Galway. UNESCO Global Geoparks are areas of internationally important geology focused on tourism, education and sustainability.

Table 28: Geological Survey Ireland's Publicly Available Datasets Relevant to Planning, EIA and SEA processes

Dataset	Geological Survey Ireland Programme	Relevant Topic	Link to Geological Survey Ireland map viewer
Landslide: National landslide database and landslide susceptibility map	Geohazards	Land & Soil/Climate/Landscape	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b68cf1e4a9044a5981f950e9b9c5625c
Groundwater Flooding (Historic)	Geohazards	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Groundwater Flooding (Predictive)	Geohazards	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Radon Map	Geohazards	Lands & Soils/ Air	http://www.epa.ie/radiation/radonmap/
County Geological Sites	Geoheritage	Land & Soils/Landscape	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228
Bedrock geology	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Bedrock geology	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Quaternary geology: Sediments	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Quaternary geology: Geomorphology	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

Dataset	Geological Survey Ireland Programme	Relevant Topic	Link to Geological Survey Ireland map viewer
Physiographic units:	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=afa76a420fc54877843aca1bc075c62b
GeoUrban: Spatial geological data for the greater Dublin and Cork areas	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9768f4818b79416093b6b2212a850ce6&scale=0
Geotechnical database	Geological Mapping	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=a2718be1873d47a585a3f0415b4a724c
Historical data sets including geological memoirs and 6" to 1 mile geological mapping records	Goldmine	Land & Soils/Water	https://secure.dccae.gov.ie/goldmine/index.html
Groundwater resources (aquifers)	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater recharge	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater vulnerability	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Group scheme and public supply source protection areas	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef

Dataset	Geological Survey Ireland Programme	Relevant Topic	Link to Geological Survey Ireland map viewer
Groundwater Protection Schemes	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Catchment and WFD management units	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Karst specific data layers	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Wells and Springs	Groundwater & Geothermal	Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater body Descriptions	Groundwater & Geothermal	Water	https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-unit/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx
Geothermal Suitability maps	Groundwater & Geothermal	Land & Soils/Water	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9ee46bee08de41278b90a991d60c0b9e
INFOMAR - Ireland's national marine mapping programme	Marine & Coastal Unit	Water	https://secure.dccae.gov.ie/GSI/INFOMAR_VIEWER/
CHERISH - Coastal change project (Climate, Heritage and Environments of Reefs, Islands, and Headlands)	Marine & Coastal Unit	Water	http://www.cherishproject.eu/en/

Dataset	Geological Survey Ireland Programme	Relevant Topic	Link to Geological Survey Ireland map viewer
Coastal Vulnerability Index (CVI)	Marine & Coastal Unit	Water /Land & Soils	https://www.gsi.ie/en-ie/programmes-and-projects/marine-and-coastal-unit/projects/Pages/Coastal-Vulnerability-Index.aspx
Aggregate potential	Minerals	Land & Soils/Material Assets	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Active quarries	Minerals	Land & Soils	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Historic mines	Minerals	Land & Soils/Cultural Heritage	https://gis.epa.ie/EPAMaps/default?easting=?&northing=?&lid=EPA:LEMA_Facilties_Extractive_Facilities https://www.epa.ie/enforcement/mines/
Geochemical data: multi-element data for shallow soil, stream sediment and stream water	Tellus	Land & Soils	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754
Airborne geophysical data including radiometrics, electromagnetics and magnetics	Tellus	Land & Soils	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754
Urban geochemistry mapping (Dublin SURGE project)	Tellus	Land & Soils	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754

References

References

[1] European Parliament and of the Council, *Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment,* 2001, pp. 30-37.

[2] ENI CBC, “Guidance on Strategic Environmental Assessment in Interreg Next Programmes,” ENI CBC, 2020. [Online]. Available: https://tesim-enicbc.eu/download/guidance-on-strategic-environmental-assessment-in-interreg-next-programmes/. [Acedido em 19 08 2021].

[3] Interreg Atlantic Area, “Welcome!,” Interreg Atlantic Area, [Online]. Available: https://www.atlanticarea.eu/. [Acedido em 17 08 2021].

[4] European Comission, “European Regional Development Fund,” European Comission, [Online]. Available: https://ec.europa.eu/regional_policy/en/funding/erdf/. [Acedido em 17 08 2021].

[5] European Commission, “A European Green Deal,” European Comission, 2021. [Online]. Available: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en. [Acedido em 2021 08 20].

[6] European Commission, “Energy, Climate change, Environment,” European Commission, 2021. [Online]. Available: https://ec.europa.eu/info/energy-climate-change-environment_en. [Acedido em 2021 08 20].

[7] European Commission, “Communication from the Commission,” *The European Green Deal,* pp. 1-24, 11 12 2019.

[8] EUROSTAT, “Eurostat - Your key to European statistics,” European Commission, 2020. [Online]. Available: https://ec.europa.eu/eurostat. [Acedido em 2021].

[9] European Environment Agency, “The Atlantic Region and The Mediterranean Region,” *Europe's biodiversity - biogeographical regions and seas,* 2002.

[10] European Environment Agency, “The European environment — state and outlook 2020: knowledge for transition to a sustainable Europe,” pp. 1-499, 2019.

[11] European Environment Agency, “Water Exploitation Index+ 2015 and water consumption per capita (m3/year),” 2020. [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/water-exploitation-index-and-water.

[12] European Environment Agency, *European waters - Assessment of status and pressures 2018,* 2018.

[13] European Environment Agency, 2015. [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/proportion-of-classified-surface-water-3.

[14] "Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)," *Official Journal of the European Union,* 2008.

[15] European Environment Agency, "Europe's marine biodiversity remains under pressure," 2021. [Online]. Available: https://www.eea.europa.eu/publications/europes-marine-biodiversity-remains-under-pressure.

[16] European Environment Agency, "Trends in marine non-indigenous species," 2019. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/trends-in-marine-alien-species-mas-3/assessment.

[17] European Environment Agency, "Status of marine fish and shellfish stocks in European seas," 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/status-of-marine-fish-stocks-5/assessment.

[18] M. I. S. f. Europe, "Food Webs," 2020. [Online]. Available: https://water.europa.eu/marine-and-freshwater-water/state-of-europe-seas/state-of-biodiversity/food-webs.

[19] European Environment Agency, "Mapping of eutrophication 'problem'- and 'non-problem' areas in European seas," 2020. [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/mapping-of-eutrophication-problem-and.

[20] OSPAR Assessment Portal, "Extent of Physical Damage to Predominant and Special Habitats," 2017. [Online]. Available: https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/habitats/extent-physical-damage-predominant-and-special-habitats/.

[21] European Environment Agency, "European sea surface temperature," 2022. [Online]. Available: https://www.eea.europa.eu/ims/european-sea-surface-temperature.

[22] European Environment Agency, "Hazardous substances in marine organisms in European seas," 2019. [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/aggregated-assessment-of-hazardous-substances-3.

[23] European Environment Agency, “Distribution of marine litter by material type,” 2018. [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/distribution-of-marine-litter-by.

[24] EMODnet, “Human Activities,” 2022. [Online]. Available: https://www.emodnet-humanactivities.eu/view-data.php.

[25] European Environment Agency, “Land take in Europe,” European Environment Agency, 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/land-take-3/assessment.

[26] W. de Vries, S. Lofts, T. Ed, M. Markus, J. E. Groenenberg e G. Schütze, “Impact of soil properties on critical concentrations of cadmium, lead, copper, zinc, and mercury in soil and soil solution in view of ecotoxicological effects.,” *Reviews of Environmental Contamination and Toxicology,* vol. 191, pp. 47-49, 2007.

[27] Eurostat, “Eurostat regional yearbook 2020,” 2020. [Online]. Available: https://ec.europa.eu/eurostat/statistical-atlas/gis/viewer/?config=RYB-2020.json&mids=BKGCNT,C12M05,CNTOVL&o=1,1,0.7&ch=C01,ENV,C12,NUTS&center=45.43988,17.62989,3&lcis=C12M05&.

[28] European Environment Agency, “Coastline dynamics in Europe,” [Online]. Available: https://www.eea.europa.eu/data-and-maps/figures/coastal-erosion-patterns-in-europe-1. [Acedido em 02 03 2022].

[29] Climate Change Post, “Coastal erosion: European scale,” Climate Change Post, January 2022. [Online]. Available: https://www.climatechangepost.com/europe/coastal-erosion/. [Acedido em 01 27 2022].

[30] V. Schmidt-Seiwert, C. Duvernet, A. Hellings, R. Binot , L. Kiel e M. Gauk, *Atlas for the Territorial Agenda 2030 - Maps on European Territorial Development,* Berlin: Federal Ministry of the Interior, Building and Community, 2020.

[31] European Environment Agency, “Data visualization - Conservation status of species at EU level, 2013-2018,” European Environment Agency, 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/daviz/conservation-status-of-species-at#tab-chart_1. [Acedido em 25 08 2021].

[32] European Environment Agency, “Dashboard (Tableau) - Conservation status and trends of habitats and species,” European Environment Agency, 2019. [Online]. Available: https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-

national-summary-dashboards/conservation-status-and-trends. [Acedido em 2021 08 25].

[33] M. Fischer, M. Rounsevell, A. Torre-Marin Rando e A. Mader, *Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for Europe and Central Asia,* 2018.

[34] European Environment Agency, “Forest Fires in Europe,” EEA, 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/forest-fire-danger-4/assessment. [Acedido em 09 08 2021].

[35] European Environment Agency, “Global and European sea level rise,” EEA, 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/sea-level-rise-7/assessment. [Acedido em 09 08 2021].

[36] European Environment Agency, “Total greenhouse gas emission trends and projections in Europe,” EEA, 2021. [Online]. Available: https://www.eea.europa.eu/data-and-maps/indicators/greenhouse-gas-emission-trends-7/assessment. [Acedido em 09 09 2021].

[37] Eurostat, “Demographic balance and crude rates by other typologies [urt_gind3],” [Online]. Available: https://ec.europa.eu/eurostat/web/coastal-island-outermost-regions/data/database. [Acedido em 03 03 2022].

[38] BBSR, “Maps on European Territorial Development,” *Atlas for the Territorial Agenda 2030,* pp. 1-92, 12 2020.

[39] European Commission, “European Social Progress Index,” European Commission, 2020. [Online]. Available: https://ec.europa.eu/regional_policy/en/information/maps/social_progress2020/.

[40] OECD and European Union, Health at a Glance: Europe 2020 - State of Health in the EU Cycle, Paris: OECD Publishing, 2020.

[41] OECD and European Union, Health at a Glance: Europe 2018: State of Health in the EU Cycle, Paris: OECD Publishing, 2018.

[42] European Environmental Agency, “Air Pollution: how it affects our health,” EEA, 2020. [Online]. Available: https://www.eea.europa.eu/themes/air/health-impacts-of-air-pollution.

[43] European Environment Agency, “Environmental noise in Europe — 2020,” *EEA Report Nº 22/2019,* pp. 1-104, 2019.

[44] European Commission, “Trans-European Transport Network (TEN-T),” European Commission, 2021. [Online]. Available: https://ec.europa.eu/transport/themes/infrastructure/ten-t_en.

[45] European Commission, “TENtec Interactive Map Viewer - Mobility and Transport,” European Commission, 2021. [Online]. Available: https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html.

[46] European Commission, “Motorways of the Sea,” [Online]. Available: https://transport.ec.europa.eu/transport-modes/maritime/motorways-sea_en. [Acedido em 03 03 2022].

[47] Eurostat, “Renewable energy statistics,” Eurostat, 2020. [Online]. Available: Eurostat.

[48] Council of Europe, “European Landscape Convention,” *European Treaty Series - No. 176,* pp. 1-7, 2000.

[49] K. &. Á. S. &. J. S. &. V. I. Filepné Kovács, “Landscape in the spatial planning system of European countries,” em *Conference: Fábos Conference on Landscape and Greenway Planning: Pathways to Sustainability*, University of Massachusetts, 2013.

[50] European Environment Agency, “Landscape fragmentation Effective Mesh Density time-series: major and medium anthropogenic fragmenting elements (FGA2-S),” European Environment Agency, 2019. [Online]. Available: https://www.eea.europa.eu/data-and-maps/data/landscape-fragmentation-effective-mesh-density.

[51] Council of Europe, “Cultural Routes of the Council of Europe programme,” Council of Europe, 2021. [Online]. Available: https://www.coe.int/en/web/cultural-routes.

[52] Eurostat, Culture statistics, Luxembourg: European Union, 2019.

[53] UNESCO, “World Heritage List,” UNESCO, 2020. [Online]. Available: https://whc.unesco.org/en/syndication.

[54] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, “Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services,” Bonn, 2019.

Annex I – Policy Objectives of ERDF

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Table 29: Policy objectives and their respective specific objectives.

Policy objectives	Specific objectives
PO1: a more competitive and smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity	i. developing and enhancing research and innovation capacities and the uptake of advanced technologies; ii. reaping the benefits of digitisation for citizens, companies, research organisations and public authorities; iii. enhancing sustainable growth and competitiveness of SMEs and job creation in SMEs, including by productive investments; iv. developing skills for smart specialisation, industrial transition and entrepreneurship; v. enhancing digital connectivity.
PO2: a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility	i. promoting energy efficiency and reducing greenhouse gas emissions; ii. promoting renewable energy in accordance with Directive (EU) 2018/2001, including the sustainability criteria set out therein; iii. developing smart energy systems, grids and storage outside the Trans-European Energy Network (TEN-E); iv. promoting climate change adaptation and disaster risk prevention and resilience, taking into account eco-system-based approaches; v. promoting access to water and sustainable water management; vi. promoting the transition to a circular and resource efficient economy; vii. enhancing protection and preservation of nature, biodiversity and green infrastructure, including in urban areas, and reducing all forms of pollution; viii. promoting sustainable multimodal urban mobility, as part of transition to a net zero carbon economy.

Policy objectives	Specific objectives
PO3: a more connected Europe by enhancing mobility	i. developing a climate resilient, intelligent, secure, sustainable and intermodal TEN-T; ii. developing and enhancing sustainable, climate resilient, intelligent and intermodal national, regional and local mobility, including improved access to TEN-T and cross-border mobility.
PO4: a more social and inclusive Europe implementing the European Pillar of Social Rights	i. enhancing the effectiveness and inclusiveness of labour markets and access to quality employment through developing social infrastructure and promoting social economy; ii. improving equal access to inclusive and quality services in education, training and lifelong learning through developing accessible infrastructure, including by fostering resilience for distance and on-line education and training; iii. promoting the socioeconomic inclusion of marginalised communities, low-income households and disadvantaged groups, including people with special needs, through integrated actions, including housing and social services; iv. promoting the socio-economic integration of third country nationals, including migrants through integrated actions, including housing and social services; v. ensuring equal access to health care and fostering resilience of health systems, including primary care, and promoting the transition from institutional to family-based and community-based care; vi. enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation.
PO5: a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives	i. fostering the integrated and inclusive social, economic and environmental development, culture, natural heritage, sustainable tourism and security in urban areas; ii. fostering the integrated and inclusive social, economic and environmental local development, culture, natural heritage, sustainable tourism and security in areas other than urban areas.
PO6: a better cooperation governance	i. enhancing the institutional capacity of public authorities, in particular those mandated to manage a specific territory, and of stakeholders;

Policy objectives	Specific objectives
	ii. enhancing efficient public administration by promoting legal and administrative cooperation and cooperation between citizens, civil society actors and institutions, in particular with a view to resolving legal and other obstacles in border regions; iii. building up mutual trust, in particular by encouraging people-to-people actions; iv. enhancing institutional capacity of public authorities and stakeholders to implement macro-regional strategies and sea-basin strategies, as well as other territorial strategies; v. enhancing sustainable democracy and support civil society actors and their role in reforming processes and democratic transitions;
PO7: A safer and more secure Europe	i. border crossing management and mobility and migration management, including the protection and economic and social integration of third-country nationals, for example migrants and beneficiaries of international protection.

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