

**Draft Environmental Report**  
**(Based on version 1 of the draft OP, 9.7.2014)**

# Strategic Environmental Assessment Adriatic-Ionian Operational Programme 2014- 2020



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Strategic Environmental  
Assessment Adriatic-Ionian  
Operational Programme 2014-  
2020



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## Non technical summary

The Task Force for the preparation of the Adriatic-Ionian Programme (AIO) has developed a draft Operational Programme (OP) for transnational cooperation in line with Art. 6 of the ERDF Regulation<sup>7</sup>. According to SEA Directive (2001/42/EC) a Strategic Environmental Assessment (SEA) has been carried out. The present Environmental Report has been prepared in line with the provisions of Annex I of the SEA Directive.

### Environmental status quo

The current state of the environment within which the Adriatic-Ionian transnational cooperation programme is proposed is briefly described and considered against the basis of European status reports on the environmental situation. Efforts are still needed to make improvements in respect to general soil conditions, water resources, air quality, fauna, flora and biodiversity. Technological improvements to reduce emissions are cancelled out by increasing energy and transport demand. The diversity of the natural heritage is one of the biggest assets of the programme area. Although the NATURA 2000 network has been established in most Member States during the last ten years, the loss of biodiversity has not come to a halt. Cultural landscape and heritage sites represent part of Central Europe's identity and the integration of these values into economic activities is just at the beginning.

### Programme objectives and priorities

In the light of the Community Strategic Guidelines (Lisbon/Gothenburg) the overall strategic goal of the programme is to strengthen territorial cohesion, to promote internal integration and to enhance the competitiveness of the Adriatic-Ionian programme area. To achieve this goal the OP proposes the following five priorities:

Priority Axis 1 – Innovative Region – will increase transnational activity of innovative cluster and networks of key sectors of the AIO area.

Priority Axis 2 – Resourceful Region – will raise capacity for better management of energy in public buildings at transnational level, increase the share of renewable local energy sources in energy mix strategies and plans in AIO territories and increase capacity to use existing low carbon transport systems and multimodal connections among them.

Priority Axis 3 – Endowed Region– will enhance sustainable development policies for more efficient valorisation of natural resources and cultural heritage in coastal and adjacent maritime areas and maintain biodiversity and natural ecosystems through strengthening the management and networking of protected areas.

Priority Axis 4 – Cooperating on transport to better connect AIO regions – will promote a system of sustainable transport services to improve links in the Adriatic-Ionian area (intermodality of maritime, land and air transport).

Priority Axis 5 –EUSAIR Governance – will support the process of strengthening and developing multilateral coordination frameworks in the AIO for joint responses to common challenges identified from the EUSAIR.

<sup>7</sup> Council Regulation (EC) No 1083/2006 of 11 July 2006

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### **Methodology of impact assessment**

The impact assessment analysis focused on the most likely significant effects of the AIO programme on the environment. There is a significant degree of uncertainty in the assessment, as the AIO programme only defines the framework and type of actions and/or projects to be supported by the programme. The implementation of the actions and the projects to be funded, and their precise nature and scope are not yet known. The analysis therefore focused on an estimate of potential and non-quantifiable impacts. The effects of these potential risks will depend on the precise characteristics of the projects, as well as on external forces.

As a transnational cooperation programme, the AIO programme will neither support heavy investments or the development of large infrastructures, nor scientific and technology research. Investment in small-scale facilities or infrastructure might be supported in the case of pilot projects and for exchange of territorial experiences. The AIO programme supports in particular intangible or 'soft' actions with potentially longer-term effects and a higher visibility for the programme area (such as, studies and research, networking, dissemination of knowledge and data, etc.).

For each area of intervention possible effects on the relevant environmental matters were analysed, with reference to 'guiding' questions and environmental protection objectives, based on legislation and strategic policies on international, state or community level. As none of the areas of intervention are described in sufficient detail to allow a quantitative assessment, the assessment concentrated on a qualitative description of possible impacts (positive, neutral, mixed or negative) on relevant environmental matters according to SEA Directive (2001/42/EC). The list of questions is not exhaustive.

The answers to these 'guiding' questions allowed us to describe the likely impact of the programme's actions depending their nature.

Moreover, this estimation was complemented for each potential impact by the following considerations:

- With which probability may this impact occur?
- If it happened, would the impact be frequent and/or occur in numerous areas (frequency throughout space and/or time)?
- If it happened, would it be of a long-term or short-term duration?
- If it happened, would the impact be reversible (or not)?
- If it happened would the impact have any cross-border effects (outside AIO programme area)?

Therefore the assessment that has been carried out by this report is a strategic and qualitative assessment of potential environmental effects of the AIO programme.

### **Possible environmental impact of the programme**

The programme addresses the most important environmental issues of the Adriatic-Ionian programme area in a positive way.

The following table summarises the potential impact ratings regarding the nature of incidence:

Priority axes and objectives		Positive impact (+)	Negative impact (-)	Neutral impact (o)	Mixed impact (+/-)	No rating (=)
PA 1	TO1 - SO 1.1	10	0	15	1	0
PA 2	TO4 - SO 2.1	7	1	18	0	0
PA 3	TO6 - SO 3.1	3	5	16	2	0
PA 3	TO6 - SO 3.2	10	0	16	0	0
PA 4	TO7 - SO 4.1	9	0	11	6	0
PA 5	TO11 - SO 5.1	0	0	0	0	26
<b>Total</b>		<b>39</b>	<b>6</b>	<b>76</b>	<b>9</b>	<b>26</b>

The impacts will all be of an indirect nature due to the objectives of the AIO programme and its support for 'soft' actions. The above table shows that the general environmental impact of the AIO programme is neutral-to-positive with no Specific Objective (SO) having an overall negative impact. It should be highlighted that an overall 39 rankings of the assessments of the impact of the AIO programme are positive to the environment, while the SEA identified only six negative impacts for the whole programme.

The 'mixed' or 'negative' ratings concern mostly the SOs related to tourism (SO 3.1) and transport (SO 4.1). The drafting of PA 5 - SO 5.1 is particularly wide. Without more (environmental) targeting, it was not possible to assess potential impacts.

Further negative impacts on environmental issues could not be excluded, if the programme were to support the preparation of additional transport infrastructure (road, rail, waterways). This could lead to an increase in land take, fragmentation of habitats and additional impact through air and noise pollution in sensitive areas. Such impacts should be taken into account in the project selection criteria.

### Main results and recommendations

Most of the programme priorities and areas of intervention will have positive or neutral impacts on the relevant environmental matters. Significant negative impacts on the environment can be prevented, as recommended in this SEA, during project selection by setting up criteria in line with the overall AIO programme objectives and its priorities.

Programme implementation should focus on key issues of long-term balanced development in a transnational context, such as reducing negative impacts of climate change, management of natural resource, sustainable transport systems and reduced emissions, in line with the general principle of 'sustainability' as defined in the OP.



## 1 Introduction

The European Parliament and the Council agreed on the directive 2001/42/EG on the assessment of the effects of certain plans and programmes on the environment (referred as SEA directive). The directive shall contribute to a high level of environmental protection and shall support sustainable development by integrating environmental considerations into the preparation and adoption of certain plans and programmes with a view to promoting sustainable development (Art.1).

### 1.1 Objectives of the SEA

The **major elements for a SEA** required in the SEA directive are the **Scoping** (Art. 3) that aims to define the geographical area of relevance, the period of time to be relevant for trends and effects and the relevant environmental issues, which should be considered within the SEA. Furthermore the method of assessment and a method of generating and assessing reasonable alternatives shall be defined. According to the directive the environmental authorities must be consulted on a scoping report.

**Based on the Environmental Assessment (Art. 5 and 8 and Annex I) an environmental report has been prepared which includes information about:**

- the contents and level of detail in the plan or programme
- the geographical scope of the plan or programme
- a description of the methods of assessment
- the likely significant effects on the environment of implementing the plan or programme
- reasonable alternatives taking into account the objectives
- mitigation measures for likely negative significant environmental effects
- its stage in the decision making process

### 1.2 Background and methodology

The environmental report and the opinions expressed during the consultation shall be taken into account during the preparation of the OP and before its adoption.

The draft programme and the environmental report prepared will be made available in the course of **Consultations** (Art. 6 and 7) to the authorities, the public and neighbouring Member States, that are likely to be affected by the environmental impacts.

Member States shall monitor the significant environmental effects of the implementation of plans and programmes in order, inter alia, to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action (**Monitoring** (Art. 10)).

The elaboration of the environmental report evolved out of a continuous discussion process in constant interaction with the drafting team of the Cooperation Programme. Changes in the Programme were therefore also influenced by the feedback of the SEA-experts. The on-going approach of interaction between the drafting team, the Task Force as well as the ex-ante evaluation and SEA team has led to steady improvements regarding the sustainability of the Programme.

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### **1.3 Data sources**

The OP AIO 2014-2020 is a transnational programme, including regions from the eight mentioned Member States, but potentially affecting the environment of a much wider area. Thus the focus is set primarily on international agreements and conventions (e.g. UN, OECD) and relevant EU Directives and Regulations. See as well reference list.

## 2 Summary of the programme

The main goal of the AIO is to set the objectives and strategies for the cooperation area in order to fulfil the objectives of the European Territorial Cooperation in the programming period 2014-2020. Hereby the Programme is considered by the Programme partners to be 'a policy driver for transnational cooperation, and develop policy recommendation and instruments for sustainable solution'.

### 2.1 Background of ETC regulation

Referring to the 'European Territorial Cooperative Objective' of the European Regional Development Fund (ERDF) shall focus its assistance – among others - on the establishment and development of transnational cooperation through the financing of networks and of actions conducive to integrated territorial development (EC 1080/2006).

These shall be concentrated primarily on the following priorities:

- a) innovation: the creation and development of scientific and technological networks, and the enhancement of regional RTD and innovation capacities, where these have a direct contribution to the balanced economic development of trans-national areas.
- b) environment: water management, energy efficiency, risk prevention and environmental protection activities with a clear trans-national dimension
- c) accessibility: activities to improve access to and quality of transport and telecommunications services where these have a clear trans-national dimension
- d) sustainable urban development: strengthening polycentric development at trans-national, national and regional level, with a clear trans-national impact

Of high relevance for the AIO are also *The Community Strategic Guidelines for Cohesion Policy (2014-2020)*, which are strongly oriented along the Europe 2020 goals, which comprise of three mutually reinforcing priorities:

- Smart growth: Developing an economy based in knowledge and innovation
- Sustainable growth: Promoting a more resource efficient, greener and more competitive economy
- Inclusive growth: Fostering a high-employment economy delivering social, economic and territorial cohesion

### 2.2 Priority axes, thematic objectives and investment priorities, specific objectives and measures of the programme

This summary is based on the 1<sup>st</sup> draft OP dated with 9<sup>th</sup> July 2014. In the light of the Community Strategic Guidelines (Lisbon/Gothenburg) the overall strategic goal of the programme is to strengthen competitiveness, innovation and attractiveness of the AIO Programme area.

Related to the national strategic reference frameworks and programmes in neighbouring cooperation areas the strategic orientation is specified via the **programme objectives**:

- The diagnosis and needs identified for the AIO regions and the possible policy reaction;
- The lessons learnt from the SEE OP, IPA Adriatic and Med OP 2007-2013;

- The application of thematic concentration on a smaller amount of priorities related to the Europe 2020 strategy and to the 'evaluability' of results
- The complementarity with the related EU MRS and in particular with EUSAIR
- The specificities of transnational cooperation programmes and the 'feasibility filter' imposed by that frame and
- the scope of addressing a specific thematic objective in the AIO 2014-2020.

### OP Priorities and areas of intervention

The Priorities and Areas of intervention of the AIO take into account the new directions of the European Union's territorial cohesion policy. The Programme emphasises its support of the Lisbon and Gothenburg objectives and reaches out to new stakeholders in the field of innovation and economic development. In addition, it is built upon past experiences gained from the South East Europe Programme (SEE) 2017-2013 and the management of available knowledge in order to add value to existing knowledge.

#### Priority Axis 1: 'Innovative Region'

- **Thematic Objective 1:** Strengthening research, technological development and innovation through:
  - **IP 1b:** Promoting business investment in innovation and research, and developing links and synergies between enterprises, R&D centres and higher education, in particular product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in Key Enabling Technologies and diffusion of general purpose technologies
  - **SO 1.1:** Support the development of innovation networks and clusters among regions, academia and enterprises in the AIO region

#### Priority Axis 2: 'Resourceful Region'

- **Thematic Objective 4:** Supporting the shift toward a low-carbon economy in all sectors
  - **IP 4e:** Promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multi-modal urban mobility and mitigation relevant adaptation measures
  - **SO 2.1:** Enhance the potential for the integration of renewable energy sources in integrated transnational and regional low carbon policies, strategies and action plans in the AIO region

#### Priority Axis 3: 'Endowed Region'

- **Thematic Objective 6:** Protecting the environment and promotion resource efficiency
  - **IP 6c:** Conserving, protecting, promoting and developing natural and cultural heritage
  - **SO 3.1:** Promote the sustainable valorisation of natural and cultural assets as growth assets in the AIO Region

- **IP 6d:** Protecting and restoring biodiversity, soil protection and restoration and promoting ecosystem services including NATURA 2000 and green infrastructures;
- **SO 3.2:** Enhance the capacity in transnationally tackling environmental vulnerability, fragmentation and the safeguarding of ecosystem services in the AIO Region

#### Priority Axis 4: Cooperating on transport to better connect AIO regions

- **Thematic Objective 7** Promoting sustainable transport and removing bottlenecks in key network infrastructures
  - **IP 7c** Developing and improving environment-friendly and low-carbon transport systems including [...] inland waterways and maritime transport, ports [...] multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility
  - **SO 4.1:** Enhance capacity for integrated transport and mobility services and multimodality in the AIO Region

#### Priority Axis 5: EUSAIR Governance

- **Thematic objective 11:** Enhancing institutional capacity and an efficient public administration by strengthening of institutional capacity and the efficiency of public administrations and public services related to implementation of the EUSAIR
  - **IP 11:** JAP (Joint action Plan)
  - SO 5.1:** Support the implementation and the governance of the EUSAIR Action Plan

#### General Principles

**Sustainability:** The principle of sustainability aims at providing relevant development conditions to the living generation, without decreasing the development possibilities for future generations.

**Innovation oriented approach:** Projects implemented in the framework of this OP will contribute to building-up of the information society.

**Equal opportunities and non-discrimination:** In the framework of the OP an equal status of men and women will be observed and persons regarding to sex, race and origin will not be discriminated.

#### Strategic Implementation Principles

The strategic implementation of the Programme is also expressed in terms of horizontal **strategic implementation principles:**

- to emphasis on the availability of relevant and up-to-date knowledge and tools to project partnerships
- to reach out to relevant stakeholders and professional and to ensure effective networking beyond existing partnerships
- to follow an output and result-oriented approach that places much emphasis on the development of concrete, relevant and visible outputs and results (e.g. future initiatives and/or concrete investments)

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### **Programme Area**

The geographical area of relevance to define the current state of the environment, trends, also to assess possible positive or negative effects of objectives, priorities and proposed measures, covers the space of the following regions: The whole territory of Albania, Bosnia and Herzegovina, Croatia, Greece, Montenegro, Serbia and Slovenia, and 14 Italian regions.

### **2.3 Interaction to other programmes**

The AIO Programme highlights the value of specific natural resources for the core areas but also for the whole of Europe, and the value of specific economic systems of the Alpine Space. Furthermore, the Programme raises attention to environmental vulnerabilities of the area and considers social and natural transalpine connections as well as functional relations with surrounding areas.

### 3 Environmental objectives

The following chapter gives a review of international environmental objectives, laws and regulations with relevance to the transnational programme for the AIO. The selection concentrates on environmental issues, which were identified in accordance with the SEA directive (see chap. 2). Objectives and targets outlined in the international legislation are summarized in so called 'main SEA objectives'. For the assessment 'Guiding Questions', derived on the main objectives, will form the baseline.

Generally, the overall objectives for all environmental aspects rely on the 6<sup>th</sup> Environment Action Programme of the European Community 2002-2012 (6<sup>th</sup> EAP)<sup>2</sup>, which identifies four environmental areas for priority actions: 'Climate Change', 'Nature and Biodiversity', 'Environment, Health and Quality of Life' and 'Natural Resources and Waste' (EP 2002).

The European Council was engaged by the EAP to prepare seven Thematic Strategies which represent the next generation of environment policy:

- Air Pollution (adopted 21/09/2005)
- Prevention and Recycling of Waste (adopted 21/12/2005)
- Protection and Conservation of the Marine Environment (proposed 24/10/2005)
- Soil (adopted 22/09/2006)
- Sustainable Use of Pesticides (adopted 12/07/2006)
- Sustainable Use of Resources (adopted 21/12/2005)
- Urban Environment (adopted 11/01/2006)

The target was to create positive synergies between the seven strategies, as well as to integrate them with existing sectoral policies, the Lisbon Strategy and the Sustainable Development Strategy.

Beyond that, the subsequent overview of relevant national and international environmental objectives and regulations considers the documents listed in section 8 references as well as other national internet sources (see Internet sources) listed in section 8 references.

Given the numerous international, national and regional regulations, the following list constitutes merely a selection and cannot provide a complete overview. The issues were selected in accordance with the SEA directive and the topics raised, as a result of SEA-evaluation of the SEE Programme 2007-2013 as well as in accordance with an update of assessments on environmental law, which had been conducted during previous projects.

#### 3.1 Biodiversity

To halt loss of biodiversity and decline of ecosystems and their services within EU and raise EU contribution to international protection of biodiversity are the main aims of the **EU 2020 Biodiversity Strategy (COM (2011) 0244)**. In addition, green infrastructure is also to be promoted. This strategy is in line with the international commitment of the **UN Convention on Biological Diversity (CBD, 1992)** including the CBD Strategic Plan 2011-2020 and the Nagoya-Protocol 2010 which aim mainly in the conservation of biological diversity and the sustainable use of the components of biological diversity (CBD).

<sup>2</sup> European Parliament and Council 2002

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The **Pan-European Biological and Landscape Diversity Strategy (PEBLDS) 1995** was set up following the adoption of the United Nations Convention on Biological Diversity. The principal aim of the Strategy is to find a consistent response to the decline of biological and landscape diversity in Europe and to ensure the sustainability of the natural environment.

The protection of endangered species is another protection objective. The **IUCN Global Species Programme** plays an important role in this regard, as it provides the 'Red List of Threatened Species'. In order to help protect endangered species the 'Red List' assesses the conservation status of various species at the global level and highlights the degree to which they are endangered and threatened by extinction.

Additionally, the **Bern Convention** is a binding international legal instrument in the field of nature conservation, which covers most of the natural heritage of the European continent and extends to some States of Africa. Its aims are to conserve wild flora and fauna and their natural habitats and to promote European co-operation in that field. The Convention places a particular importance on the need to protect endangered natural habitats and endangered vulnerable species, including migratory species.

The **EU Habitats Directive (92/43/EEC)** generally aims to protect and promote biodiversity by ensuring the survival of Europe's most valuable species and habitats. Together with the **EU Birds Directive (2009/147/EC)** which was adopted accordingly to protect wild birds and their natural habitats, the two Directives form the vital basis for nature protection within the EU. The Habitats Directive has resulted in the establishment of the EU-wide network of protected areas NATURA 2000, a European network of more than 26,000 protected sites (bird and habitats), which aims to promote and assure the long-term protection of threatened species and habitats.

**Main SEA Objectives (Resume):**

- Conservation of biodiversity/reduction of loss of biodiversity
- Raise area and category of protected areas to protect and restore habitats and halt the loss of biodiversity and degradation of ecosystem services
- Improvement of nature protection infrastructure (NATURA 2000 and Emerald network) and management
- Raise greater public awareness of biodiversity issues

**Derived guiding questions for the assessment:**

- Does the OP support the EU 2020 objective to stop the loss of biodiversity?
- Will the OP improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?

### 3.2 Soil

A limitation of rural-urban land conversation is the explicit goal of the 6th EAP and is also addressed in the new 7<sup>th</sup> EU EAP<sup>3</sup>. Besides, there are several thematic documents related to it, such as the Commission *Communication 'on Thematic Strategy on the Urban Environment'* (Commission of the European Communities 2006), the *EU Strategy for Sustainable Development* (Commission of the European Communities 2001) and its review (Commission of the European Communities 2009), the new general regulation for the Structural Funds (Council Regulation EC no 1260/1999), the guidelines for INTERREG IV (Council of the European Union 2006) and the *ESDP Action programme* (European Commission 1999) and *ESPON 2013 programme* (ESPON 2007).

The protection of soils against pollution and erosion is another objectives of the **6<sup>th</sup> and 7<sup>th</sup> EAP** and likewise of the **Thematic Strategy for Soil Protection**. The Strategy consists a Communication from the EC to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment (COM 2006 231).

The **EU waste policy** has the potential to contribute to reducing the overall negative environmental impact of resource use. Preventing waste generation and promoting recycling and recovery of waste will increase the resource efficiency of the European economy and reduce negative environmental impacts of use of natural resources. The basic objectives of EU waste policy are to prevent waste and promote re-use, recycling and recovery so as to reduce the negative environmental impact. For the EU the long-term goal is to become a recycling society that seeks to avoid waste and uses waste as a resource (COM 2005 666).

The **UN Convention to Combat Desertification** (UNCCD) includes a reporting obligation and the preparation of national, sub-regional or regional action programmes for its implementation. As of December 2002, 185 countries worldwide had ratified the convention<sup>4</sup>.

The overall objective of the **Thematic Strategy on the sustainable use of natural resources** is to reduce the negative environmental impacts generated by the use of natural resources in a growing economy (COM 2005 670).

The latest document giving indices of the current status quo of European soils is the thematic assessment on soil as part of the above mentioned **SOER – The European Environment State and Outlook 2010** (EEA 2010).

<sup>3</sup> European Parliament and Council 2012, European Parliament and Council 2013

<sup>4</sup> <http://www.unccd.int/>

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Main SEA Objectives (Resume):

- Decrease of land conversation in accordance with the objectives of European spatial-development policies and the 7th Environmental Action Programme
- Protection against erosion and pollution
- Reduction of the negative environmental impacts (e.g. land filling) generated by the use of natural resources in a growing economy
- Preservation of the natural protection functions of soils in order to prevent natural disasters

Derived guiding questions for the assessment:

- Will the OP help to protect soil attributes and soil sealing?
- Will the OP have effects on the state of contaminated sites?
- Will the OP promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?

### 3.3 Water

The international main objective is the protection of water bodies also ground- and surface water according to the **EU Water Framework Directive**(2000/60/EC) and national regulations. Rational use of water resources, the protection of ground water as a source of drinking water, the protection of the water resources by means of an integrated management at the basin level and the improvement of the chemical and ecological state of contaminated water bodies by 2015 are targets of the European water protection policy. Member states had to adopt management plans in order to achieve the 'good state' demanded by the EU.

Furthermore, there is the **Groundwater Directive**(European Parliament and Council 2006) designed to prevent and combat groundwater pollution and the **Directive on technical specifications for chemical analysis and water status monitoring** (Commission of the European Communities 2009). Other European regulations which have an indirect impact on water bodies are the **Nitrates Directive** (91/676/EEC) aimed at reducing nitrate and organic matter pollution from agricultural land, the **Urban Waste Water Treatment Directive** (91/271/EEC) aimed at reducing pollution from sewage treatment works and certain industries, the Integrated Pollution Prevention and Control Directive **IPPC** (96/61/EEC) aimed at controlling and preventing the pollution of water by industry and the **Drinking Water Directive** (98/83/EC).

The European Commission has launched a new **EU Strategy for the Adriatic and Ionian Region** on 17 June 2014. The strategy mainly revolves around the opportunities of the maritime economy - 'blue growth', land-sea transport, energy connectivity, protecting the marine environment and promoting sustainable tourism – sectors that are bound to play a crucial role in creating jobs and boosting economic growth in the region. The starting point for this is the Maritime Strategy for the Adriatic and Ionian Seas, adopted by the Commission on 30 November 2012 and now incorporated into the Strategy.

The **Thematic Strategy on the Protection and Conservation of the Marine Environment** aims to achieve good environmental status of the EU's marine waters by 2021 and to protect the resource base upon which marine-related economic and social activities depend on (COM 2005 505).

The **Marine Strategy Framework Directive 2008/56/EC** aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. It is the first EU legislative instrument related to the protection of marine biodiversity, as it contains the explicit regulatory objective that 'biodiversity is maintained by 2020', as the cornerstone for achieving GES. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use.

The first European bathing water legislation, Directive **76/160/EEC concerning the quality of bathing water** came into force in 1975. Its main objectives are to safeguard public health and protect the aquatic environment in coastal and inland areas from pollution. Bathing waters can be coastal waters or inland waters (rivers, lakes). New European legislation on bathing water was adopted in 2006. The 'New Bathing Water Directive' **Directive 2006/7/EC concerning the management of bathing water quality** provides a more proactive approach to informing the public about water quality using four quality categories for bathing waters — 'poor', 'sufficient', 'good' and 'excellent'.

#### **Main SEA Objectives (Resume):**

- Protection of water bodies, ground- and surface water by rational, balanced use of water resources
- Improvement of the chemical and ecological state of European water bodies
- Reduction of pollution from agriculture, sewage treatment works and certain industries
- Protection of the marine environment
- Protection of bathing waters

#### **Derived guiding questions for the assessment:**

- Will the OP influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?
- Will the OP affect the hydro-morphology of river basin systems?
- Will the OP create impact on the sustainable use of water resources?
- Will the OP strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?

### **3.4 Air, Climate**

The United Nations Economic Commission for Europe (UNECE) has addressed via the **Convention on Long-range Trans-boundary Air Pollution** (CLRTAP) some of the major environmental problems of the UNECE region through scientific collaboration and policy negotiation. The aim of the Convention is that parties shall endeavour to limit, gradually reduce and prevent air pollution including long-range trans-boundary air pollution (acidification, eutrophication and ground-level ozone). It has been extended by eight protocols that identify specific measures to be taken by parties to cut their emissions of air pollutants. Parties develop policies and strategies to combat the

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discharge of air pollutants through exchanges of information, consultation, research and monitoring. The protocols furthermore provide critical loads of the entry of S and N compounds and heavy metals as well as critical levels of ozone for forests and agricultural plants (UNECE 2006).

The **National Emission Ceilings for certain pollutants directive** (NECD) sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (SO<sub>2</sub>, NO<sub>x</sub>, VOCs and NH<sub>4</sub>), but leaves it largely to the Member States to decide which measures to take in order to comply (2001/81/EC).

The **Thematic Strategy on Air Pollution** sets objectives for reducing certain pollutants and reinforces the legislative framework for combating air pollution with improving environmental legislation and integrating air quality concerns into related policies (COM 2005 446).

Climate change is addressed by the United Nations Framework Convention on Climate Change and the additional **Kyoto Protocol** (UNFCCC 1997), which targets for 2008-2012 following emissions reductions from 1990 levels in Europe: 8 % (EU-15, Czech Republic, Slovakia, Slovenia), 6 % (Hungary, Poland), and 0 % (Ukraine) (DECISION 280/2004/EC).

The Parties, meanwhile all Carpathian Nations (Czech Republic, Hungary Poland, Romania, Serbia, Slovak Republic, Ukraine), of the **Carpathian Convention**<sup>5</sup> shall pursue a comprehensive policy and cooperate for the protection and sustainable development of the Carpathians (UNEP 2003). The Parties of the Carpathian Convention (Art. 8) shall pursue policies of sustainable transport and infrastructure planning and development, which take into account the specificities of the mountain environment, by taking into consideration the protection of sensitive areas, in particular biodiversity-rich areas, migration routes or areas of international importance, the protection of biodiversity and landscapes, and of areas of particular importance for tourism. Furthermore they shall promote cleaner production technologies, in order to adequately prevent, respond to and remediate industrial accidents and their consequences, as well as to preserve human health and mountain ecosystems. The Parties shall pursue policies aiming at introducing environmentally sound methods for the production, distribution and use of energy, which minimize adverse effects on the biodiversity and landscapes, including wider use of renewable energy sources and energy-saving measures, as appropriate.

#### **Main SEA Objectives (Resume):**

- Reduction of emissions of GHG and emissions responsible for acidification, eutrophication and ground-level ozone
- Strengthening of renewable energy sources
- Improving energy efficiency and realising estimated savings energy potential
- Force sustainable mobility and transport systems

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<sup>5</sup> also <http://www.carpathianconvention.org/status.htm>

**Derived guiding questions for the assessment**

- Will the OP lead to reduction of air pollutants?
- Will the OP lead to reduction of GHG?
- Will the OP increase energy efficiency?
- Will the OP change the role of renewable energy sources?
- Will the OP lead to reduction of transport related emissions?
- Will the OP lead to improve climate change adaptation?

**3.5 Landscape and, Cultural Heritage including Functional utilizations**

The **Pan-European Biological and Landscape Diversity Strategy (PEBLDS) 1995** was set up following the adoption of the United Nations Convention on Biological Diversity. The principal aim of the Strategy is to find a consistent response to the decline of biological and landscape diversity in Europe and to ensure the sustainability of the natural environment.

The aim of the **European Landscape Convention 2000** is to respond to the public's wish to enjoy high quality landscapes. Its purpose is therefore to further the protection, management and planning of European landscapes, and to organise European co-operation in this field. The scope of the Convention is extensive as it applies to the entire territory of the Parties and relates to natural, urban and peri-urban areas, whether on land, water or sea.

Moreover, the **EU Thematic Strategy on the Urban Environment** (COM (2005) 718) takes up issues ranging from urban sprawl to intensified soil sealing, as both can affect the appearance of urban landscapes and their surrounding areas.

The **UNESCO World Cultural and Natural Heritage Convention 1972** is today still the main policy for the protection and preservation of cultural and natural heritage at the international level. The convention initiated the World Heritage Programme which promotes the conservation of several tangible and intangible significant sites.

The **Convention for the Protection of the Archaeological Heritage of Europe 1992** (Valletta Convention) is a Europe-wide international treaty which establishes the basic common principles to be applied in national archaeological heritage policies. It supplements the general provisions of the UNESCO World Heritage Convention 1972.

The **Framework Convention on the Value of Cultural Heritage for Society 2005** (Faro Convention) is innovative in linking the concept of the 'common heritage of Europe' to human rights and the fundamental freedoms for which the Council of Europe remains one of the historic guardians. The Faro Convention provides an original contribution to the issues related to 'living together', quality of life and the living environments where citizens wish to prosper.

**Main SEA Objectives (Resume):**

- Protection and preservation as well as sustainable management and planning of the European natural landscape
- Protection and preservation of cultural heritage

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**Deriving guiding questions to the assessment:**

- Will the OP facilitate protection of cultural heritage?
- Will the OP support conservation or reconstruction of valuable cultural landscape?
- Will the OP support sustainable urban and regional development?
- Will the OP influence the demand of land take for urban development?
- Will the OP enhance protection against natural hazards?

### 3.6 Human health/population

A number of environmental induced adverse effects can pose a threat to human health such as airborne pollutants – cause or exacerbate respiratory diseases, allergies, poisoning and cancer; unsafe environments – can be responsible for accidents, injuries and reluctance to be physically active; and other factors - chemicals, food contamination and allergies, soil pollution, housing quality, planning decisions, noise, water, sanitation, etc.

On an international level, the 1979 **Geneva Convention on Long-range Transboundary Air Pollution** is an important mechanism aiming to improve air quality and reduce the effects of air pollution on health and ecosystems in most of the WHO European Region and beyond. Further, the **Protocol on Water and Health** to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes is the first major international legal approach for the prevention, control and reduction of water-related diseases in Europe. The **Parma Declaration on Environment and Health 2010** formulated by the World Health Organization (WHO), is pledging to reduce the adverse health impact of environmental threats in the next decade. Through the Declaration and Commitment to Act, participating governments agreed to implement national programmes to provide equal opportunities to each child by 2020 by ensuring access to safe water and sanitation, opportunities for physical activity and a healthy diet, improved air quality and an environment free of toxic chemicals.

In June 2003, the European Commission adopted a **communication on a European Environment and Health Strategy** (COM (2003) 0338 final) in order to foster effective policy making regarding environment and health issues. In particular the strategy seeks to reduce the disease burden caused by environmental factors in the EU; identify and prevent new health threats caused by environmental factors and strengthen EU capacity for policy-making in this area. It focuses on prevention measures as well as on an integrated approach which will enable health, environment and research policies to work in synergy.

The **EU Environmental Noise Directive** (END) (2002/49/EC) was adopted having as an aim to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to the exposure to environmental noise. It furthermore aims at providing a basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery. Similarly, the WHO also considers the adverse affects noise pressures exert on human health. As specified in its **2009 Night Noise Guidelines for Europe** specific threshold values necessary to ensure good health are recommended.

**Main SEA Objectives (Resume):**

- Prevention / Reduction of diseases / negative health effects caused by environment-related threats
- Prevention from / Reduction of environmental noise exposure

**Deriving guiding questions to the assessment:**

- Will the OP support endeavours to reduce environmental related health risks?
- Will the OP catalyse the reduction of the share of population exposed to noise?

### **3.7 Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources**

Due to the **directive on the promotion of electricity produced from renewable energy sources (RES) in the internal electricity market** the member states shall take appropriate steps to encourage greater consumptions of electricity from RES up to 22 % for EU-25 in the year 2010. The directive also includes national indicative targets (2001/77/EC).

The **Action Plan for Energy Efficiency** outlines a framework of policies and measures with a view to intensify the process of realising the over 20% estimated savings potential, equivalent to EUR 60 billion per year, in EU annual primary energy consumption by 2020 (COM 2006 545). The **Directive on the energy performance of buildings** builds on the target to improve energy efficiency as laid down in earlier directives and focuses to increase the energy performance of public, commercial and private buildings in all Member States (2002/91/EC).

Due to the **White Paper European transport policy 2010** a modern transport system must be sustainable from an economic and social as well as an environmental viewpoint. One of the results of the **Mid-term review of the EC's 2001 Transport White Paper** was that mobility must be disconnected from its negative side effects using a broad range of policy tools. The potential for technology to make transport more environmentally friendly must be enhanced, in particular in relation to greenhouse gas emissions. Furthermore, shifts to more environmentally friendly modes must be achieved where appropriate, especially on long distance, in urban areas and on congested corridors (COM 2001 370 and COM 2006 314).

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**Main SEA Objectives (Resume):**

- Improve resource efficiency concepts and innovation
- Improve more environmental friendly transport systems
- Increase the diversification of renewable energy and sources

**Deriving guiding questions to the assessment:**

- Will the OP support the resource efficiency concepts and innovation in the region?
- Will the OP promote environmentally friendly transport?
- Will the OP promote the use of the locally available renewable energy sources?
- Will the OP promote the combination of energy systems in the region?

## 4 Environmental status quo

The OP Adriatic-Ionian 2014-2020 is a transnational programme which includes regions from the eight aforementioned Member States, but potentially has an impact on the environment of a much wider area. Thus the focus is set primarily on international agreements and conventions (e.g. UN, OECD) and relevant EU Directives and Regulations. The information regarding integrated data for the whole region as well as specific country data was abstracted from the European Environment Agency (EEA) and international organizations like IUCN, UNEP, and UNESCO. Particular sources for country specific information are presented in section 8.

### 4.1 Biodiversity

#### 4.1.1 Description

Both the Adriatic and the Ionian regions are characterized by rich **biodiversity**. The Adriatic is home to nearly half (49%) of the recorded Mediterranean marine species and is the most unusual subregion of the Mediterranean due to its shallowness, restricted flows, and large degree of influence of rivers<sup>6</sup>. Thanks to the unique nature of the Adriatic there is an abundance of endemic flora and fauna.

The Ionian Sea is also characterized by high species and habitat diversity. Similarly to the whole Mediterranean, biodiversity hotspots in the Ionian Sea are characterized by relatively high levels of endemism. This high biological diversity is to be related to the specific geomorphological and hydrographical features of the Mediterranean basin, its geological history and its position as interface between temperate and tropical biomes that allow it to host both cold- and hot-affinity species<sup>7</sup>.

The biodiversity of the Adriatic and the Ionian is relatively high, and several **protected areas** (including marine ones) have been established by the surrounding countries. The NATURA 2000 network includes the protected areas in the European Union. Additionally, the Emerald Network is conceptually similar to the NATURA 2000 network, but it incorporates a wider group of countries, including most of the members of the Council of Europe. It is an ecological network of Areas of Special Conservation Interest (ASCIs) set up by the Contracting Parties to the Bern Convention — the Convention on the Conservation of European Wildlife and Natural Habitats. The Emerald Network works as an extension to non-EU countries of NATURA 2000. The sites of the NATURA 2000 network and the Emerald network, both terrestrial and marine, for the countries of the AIO region are presented in the following Figure.

<sup>6</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.80.

<sup>7</sup> UNEP MED ECAP Assessment, 2010. Part 2, p.54.

Figure 1: The NATURA 2000 and the Emerald networks, December 2011.



Source: EEA, No5/2012. Protected Areas in Europe – an overview.

Half of the European plant species can be found in **Italy**. In terms of animal species, a third of all species that are currently present in Europe can be found in Italy as well. There are overall 24 national parks, 14 of which within AIO regions. AIO Italian regions include 1,085,059 hectares out of 1,465,681 hectares of areas, which are officially protected by national legislation. Italian national parks are distributed from the northern to the southern part of the country, mainly on the Alps and Apennines and particularly in the central-south part of the Italian territory. Calabria for instance accounts for more than 241.764 ha of national park territories.

The great Italian biodiversity is also reflected in the NATURA 2000 areas, as well as the Special protected areas (SPA) and Site of Community Interest (SCI). Almost 77% of Italian SPAs and SCIs are in AIO regions, accounting for about 3.400.000 ha. At the forefront is Abruzzo, with only 5 SPAs but with more than 36% of its land located in NATURA 2000 areas. At the back is Emilia Romagna. Generally, Italian NATURA 2000 areas are of continental type (for AIO regions from Gargano in Puglia towards north) or of Mediterranean one (for AIO regions: from Gargano in Puglia towards the south).

AIO Italian regions account also for a significant amount of marine and coastal protected areas; indeed more than half of Italian marine protected surface is located in Italian AIO regions. Apart from Friuli Venezia Giulia, with the Riserva naturale marina di Miramare, all other Italian AIO marine protected areas are located in the central and southern Italian regions. Sicilia for instance includes 5 protected areas for a total marine surface of 76.875 ha.

Over 6,000 plant species have been recorded so far in **Greece**. The freshwater fish fauna is one of the richest in Europe: 107 species, of which 37 are endemic, in the standing and running water systems of the country. The herpeto fauna is also one of the richest in Europe, with at least 18 species of amphibians and 59 species of reptiles, approximately 60% of which inhabit the broader areas of the Greek wetlands. About 407 bird species have been recorded, of which 240 nest in Greece (59% of the total). Some species (e.g. *Pelecanus crispus*) nest only in Greece of all EU countries. The mammals of Greece include 116 species, of which 57 belong to IUCN endangered species categories. Finally, the number of invertebrate species has been estimated at 25,000.

Greece includes at its National List 241 Sites of Community Importance (SCI) and has declared 202 Special Protected Areas (SPA). The marine protected areas located in the Ionian Sea, either exclusively marine or incorporating marine parts, include of the National Marine Park of Zakynthos, the National Park of Messolonghi – Etoliko, Amvrakikos gulf, Kotychi lagoons, Messolonghi lagoons, Pefkia Xylokastro Korinthias, the natural monument and landmark of the evergreen broadleaf forest at the island Sapientza Messinias and the controlled hunting area of Sapientza Kalamatas<sup>8</sup>.

**Slovenia** is host to an estimated 26,000 species of animals and plants.<sup>9</sup> This number represents 17% of the total species described for Europe. Of the 1,231 species assessed that occur in Slovenia, the groups comprising the highest number of species are vascular plants, butterflies and saproxylic beetles. Of the total number of species assessed in the country 6% are considered to be threatened and 7% are near threatened at the European level. Many of these species are endemic to Europe and are found nowhere else in the world.

Slovenia accounts for the largest proportion of its national land territory covered by NATURA 2000 sites with 35.5 %. The protected areas include 1 national park, 3 regional parks, 44 landscape parks and 1 strict nature reserve, 54 nature reserves and 1276 nature monuments. Protected area covers 256,315 ha or 12.64% of the country surface (2012).<sup>10</sup> There are 12 marine and coastal habitat types in Slovenia. In 2007, the conservation status of habitat types has been assessed. A total of 58% of marine and coastal habitat types have been characterised as good, while the remaining types were assessed to be insufficient. In Slovenia, the marine and coastal protected nature areas are the Sečovlje Salina Landscape Park, Strunjan Landscape Park, Škocjan Inlet Nature Reserve, and the Debeli Rtič, Cape Madona and Lakes in Fiesa natural monuments.

<sup>8</sup> <http://www.mpatlas.org/region/nation/GRC/>.

<sup>9</sup> IUCN 2013, Slovenia's biodiversity at risk.

<sup>10</sup> <http://www.arso.gov.si/narava/zavarovana%20območja/>.

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The Nature Protection Act in **Croatia** protects 433 areas, of which the most beautiful and valuable areas are placed under protection in eight national parks and 11 nature parks which in total cover 515,093 hectares. All eight national parks are located in the Mediterranean region (Adriatic River Basin) of Croatia: National park Brijuni, National park Kornati, National park Krka, National park Mljet, National park Paklenica, National park Plitvičkajezera, National park Risnjak and National park Sjeverni Velebit. Seven of the 11 nature parks are also located in this region: Nature park Biokovo, Nature park Kopačkirit, Nature park Lastovskootočje, Nature park Telašćica, Nature park Učka, Nature park Velebit, Nature park Vranskojezero.<sup>11</sup>

There are seven marine protected areas in Croatia: Brijuni and the Lim Canal off the Istria peninsula's coast, near Pula and Rovinj respectively; Kornati and Telašćica in the Middle Adriatic basin, near Šibenik; and Lastovo, Bay of Mali Ston (Croatian: Malostonskizaljev) and Mljet in southern Dalmatia. In addition, there is a Ramsar wetland reserve in Croatia – the Neretvariver's delta.

**Albania** is rich in forest and pastures resources. The forests cover 1,030,000 ha or 36% of the country's territory and pastures about 400,000 ha or 15%. The coastal forests are dominated by the Mediterranean pine. The coastal lagoons or the wetlands in the coast are the most significant ecosystems for the Albanian biodiversity and for their social and economic value. In only 3 % of the national territory covered by these ecosystems as much as 70 % of the Albanian vertebrates are contained.

In Albania there are 25 canyons part of the national list of the Nature Monuments designed to be protected for their nature value. The coastal lagoons or the wetlands on the Albanian coast follow the coastal zone, ranging from the north to the south Velipoje, the system of Kune-Vain, Patok, Rrushkull, Karavasta, narta, Orikum, Butrint etc.

In 2010, Albania established its first marine protection area, the Karaburun-Sazan National Marine Park at the Karaburun Peninsula where the Adriatic and Ionian Seas meet. Two additional marine protection areas are planned in Albania: the Cape of Rodon (Albanian: Kepi iRodonit) and Porto Palermo. In addition, Albania is home to two Ramsar wetland reserves: Karavasta Lagoon and Butrint.

Looking at the CORINE Land Cover, **Serbia** includes 29 of the 44 level 3 headings registered in Europe. To date there were 345 bird species registers in Serbia representing 74% of European bird fauna. Around 1500 species are of international importance. Highly protected species include: 75 fungi and lichens, 600 plants, 25 algae, 1059 animals. There are 42 identified bird areas of international significance (IBA), 61 areas of international significance for plants (IPA) and 40 internationally significant areas for butterflies.

The nature conservation areas in Serbia have a total territory of 518,000 ha which corresponds to 5.86% of the country's total territory. It has 5 national parks, 16 nature parks, 16 scenic sites of extraordinary features, 71 nature reserves, and 313 nature monuments (of botanical, geological and hydrological character). 1st grade protection regime includes 3.89% of the country protected area, 19.77% is protected by 2nd grade and the rest by a 3rd level protection.

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<sup>11</sup> Nature Protected Web Portal of the Ministry of Environmental and Nature Protection. Available at: <http://www.zastita-prirode.hr/>.

More than 5,000 species and subspecies of vascular plants, over 100 species of fish and over 320 species of birds and other elements of biological diversity have been identified in **Bosnia & Herzegovina (B&H)**<sup>12</sup>. Fish fauna is relatively well researched and 199 fish species have been identified. The greatest reptile diversity can be identified in the Mediterranean region and supra-Mediterranean belt. The bird fauna includes 326 species. Eighty five mammal species have been identified of which the majority live in land habitats.

The territory of protected areas in B&H is relatively small, and the percentage share as compared to the total B&H territory is very low and significantly below the European average. In 2011, the percentage of protected areas in B&H was of 2%. Two out of three Ramsar sites in B&H are in Adriatic water shed: Hutovo Blato and Livanjskopolje. Hutovo Blato was declared a natural park in 1951. Due to its significance for migration of large number of wetland birds, it was enlisted in the Specially Protected Areas of Mediterranean Importance in accordance with the Barcelona Convention.

In **Montenegro** there are more than 3,200 plant species. The S/A index for vascular plants is 0.837 and is the highest recorded in all European countries. Montenegro is included within the Mediterranean biodiversity hotspot. Integral list including the potential Important Bird areas (IBA) includes 20 sites. Important plant areas include 22 sites. Out of a total 526 birds, 333 can be found regularly in Montenegro.

By national legislation, protected areas of nature in Montenegro include 124,946 ha or 9.047% of the state territory: five national parks, reserves of nature, monuments of nature, areas of special natural characteristic, areas protected by municipal decisions and internationally protected areas: Tara River Basin (UNESCO – World Biosphere Reserve); Durmitor with the Tara River Gorge (UNESCO, World Heritage Site); Kotor-Risan Bay (UNESCO – World Heritage Site) and Skadar Lake (Ramsar Wetland Site) cover 237,899 ha or 17.2% of the national territory.

**Neither Bosnia–Herzegovina nor Montenegro have so far established any marine protection areas or even plan to do so.**

#### 4.1.2 Assessment

The countries within the region of analysis have seen an increase in total area under national protection since the 1980s. Some of the non-EU countries have introduced national targets for protected areas. For example, Serbia intends to increase the protected surface to 12% of the country territory by 2021. The main challenges for biodiversity are described below.

#### Coastal zones

The coastlines of all the countries have been marred by sprawl, with the construction of holiday homes and small tourism developments which have damaged ecosystems in coastal lands. The impacts of **urban sprawl** are mainly the result of inadequately treated urban effluent but also the destruction or degradation of habitat as well as the fragmentation connected with the construction of traffic infrastructure and tourism. In addition, inert waste from construction has often been discarded in coastal waters, altering marine ecosystems<sup>13</sup>. The coastlines of all countries of the Western Balkans are also affected by inadequately treated urban effluent and other point sources of

<sup>12</sup> MFTER (2013): State of the Environment Report of Bosnia and Herzegovina 2012. Ministry of Foreign Trade and Economic Relations, Sarajevo.

<sup>13</sup> UNEP MED ECAP Assessment, 2010. Part 1, p. 36.

pollution such as untreated mining and industrial waste and wastewater. Additionally, eutrophication resulting from excessive nutrient discharge affects the biodiversity and natural ecosystems of the region especially through **agricultural practices**. These impacts are discussed in more detail in the sectors of water and soil.

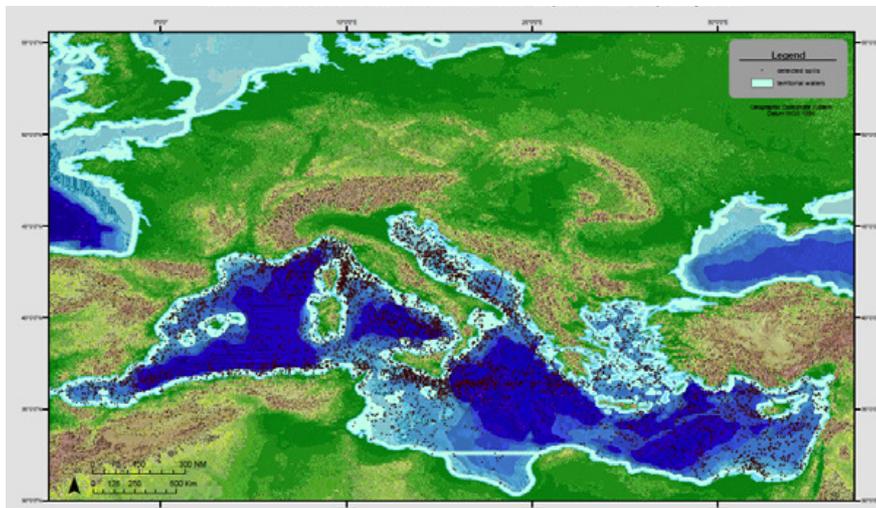
There are several large ports in the northern as well as the southern parts of the Adriatic and in the Ionian. **Intensive marine traffic and related port maintenance work** are expected to have significant impacts on the marine biodiversity, especially in the sensitive, shallow part of the Northern Adriatic. For example dredging of sediments for the accessibility of coastal ports, fishing harbours and navigable waterways and disposing dredged material are amongst the most important problems of coastal zone management<sup>14</sup>.

### Marine environment

The main pressures that threaten biodiversity and natural habitats in the marine environment of the region include marine transport of petroleum and natural gas, natural gas extraction in the Adriatic Sea, invasive species mainly from ports and maritime transport and overfishing<sup>15</sup>.

Additionally, the intensive **maritime transport of petroleum and natural gas** in the sea basin implies a significant risk of accidents. Most of the oil spills are often located along the major East-West maritime traffic lane along the Sicilian Channel, as well as on the Ionian stretch between Sicily and the Peloponnese peninsula. Considerable oil spills are also present along the Ionian waters off western Greece which most likely arise from the considerable maritime traffic leading into and away from the Adriatic<sup>16</sup>.

Figure 2: Oil spill locations 1999-2002



Source UNEP MED ECAP Assessment, 2010. Part 3, p.100

<sup>14</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.103.

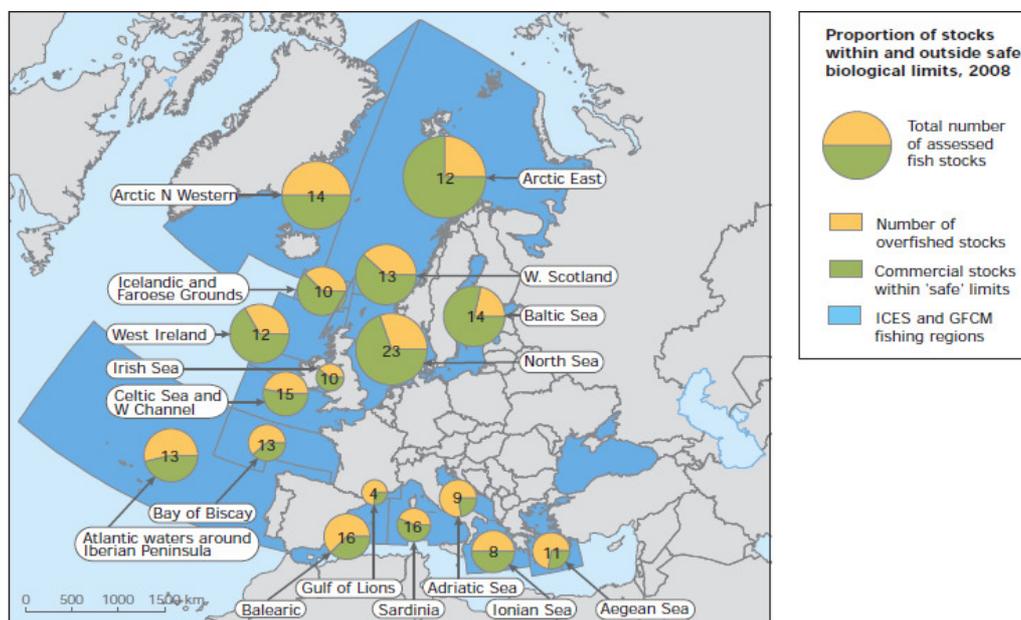
<sup>15</sup> UNEP MED ECAP Assessment, 2010. Part 3, pp. 35-36.

<sup>16</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.67.

Some Adriatic regions are suitable for the installation of **offshore Liquefied Natural Gas (LNG)** terminals. Offshore platforms however also involve a certain risk of strong pressure on the environment; if accidents happen, the effects on the marine environment can be high.

**Overfishing and several techniques of fishing and aquaculture techniques** contribute directly or indirectly to the disruption of ecosystems, habitats and species and threaten marine ecosystems throughout the Mediterranean, including the Adriatic and the Ionian<sup>17</sup>. Over-exploitation causes the loss of genetic diversity within species, and it also reduces the absolute number of species in an area. It can lead to degradation of natural ecosystems and ultimately to the species extinctions.<sup>18</sup>

**Figure 3: Proportion of fish stocks within and outside safe biological limits.**



Source: EEA, 2012. Protected areas in Europe — an overview, p.42

The **indirect effects of fishing** on biodiversity in the region include the impact on non-commercial species (discards), habitat structure and ecosystem functioning, including the decline of populations (either commercial or not), due to by-catch fish, discarding, ghost fishing, etc.; the decrease of populations of non-commercial endangered and protected species such as cartilaginous fish, sea turtles, sea birds; the disturbance or destruction of habitats such as *Posidonia oceanica* meadows, coral and maërlbeds, due to trawlers often illegally operating in shallow waters, but also due to practices such as illegal collection of date shells *Lithophagalithophaga*; the alteration of functioning and structure in other marine habitats such as sandy and muddy bottoms by trawling in particular because of sediment re-suspension which causes extensive damage to non-target species<sup>19</sup>.

<sup>17</sup> UNEP MED ECAP Assessment, 2010. Second part, p.74.

<sup>18</sup> EEA, Western Balkans Part 2 p.7.

<sup>19</sup> UNEP MED ECAP Assessment, 2010. Second part, p.74.

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The number of **introduced invasive species** in the Mediterranean has increased spectacularly since the start of the last century. Their distribution varies from country to country. They have been mainly introduced through two pathways: (i) by maritime transport and fish farming and (ii) through the Suez Canal. In the Hellenic Ionian Sea, 60 alien species have been recorded, belonging mostly to zoobenthos (24 species) and phytobenthos (18 species)<sup>20</sup>.

### General impacts

One of the significant indicators of **climate change** in the Mediterranean Sea is tropicalization. Its impacts are observed both in the marine environment and at the coastal zones. In the medium term, complex phenomena are expected in the biodiversity and habitats of the region because of climate change. Among others, changes are expected in the lifecycle of marine species, distributional range shifts of species and habitats, local extirpation of vulnerable species and, ultimately, decrease in the resilience (i.e. resistance and reversibility to disturbance) as well as profound changes in the functioning of marine ecosystems, which at present are difficult to forecast with the adequate level of accuracy<sup>21</sup>.

Corals like Gorgonians (Paramuricea, Eunicella and others) are threatened by the sea temperature rise. Loggerhead turtles and marine mammals like the bottlenose dolphin and the Mediterranean monk seal *Monachus monachus* are likely to be threatened by changes in their prey (plankton, fish and squid) distribution and abundance. Marine birds could be affected by climate change through availability of breeding sites and food resources because of the sea-level rise and possible changes in fish populations<sup>22</sup>.

**Fire** is the main threat for forest biodiversity in the region, especially in Italy and Greece. In Italy about 72% of fires occur for intentional reasons, 17% is for negligence, 14 of doubtful origin. In 2010, there have been 4884 arsons, most of them in south of Italy, and specifically in Sicily (1159), Calabria (652), and Puglia (473). However, compared to 2009, the trend has decreased (-40%).

## 4.2 Soil

### 4.2.1 Description

Organic carbon (OC) constitutes about 60% of organic matter in soils and plays an essential role in many soil properties: it favours the aggregation and stability of soil particles reducing erosions, and fostering compaction. It binds effectively with many substances, enhancing soil fertility and its buffer ability and it enhances microbial activity and the availability for plants of nutrient elements<sup>23</sup>. The following Figure shows the distribution of the percentage of the European organic carbon in the top 30 cm of soil.

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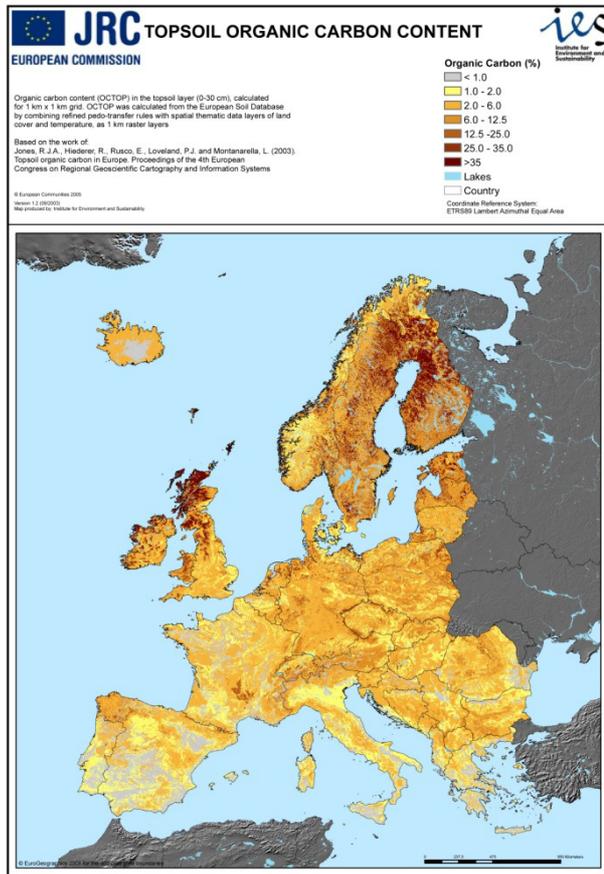
<sup>20</sup> UNEP MED ECAP Assessment, 2010. Second part, p.58.

<sup>21</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.111.

<sup>22</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.111.

<sup>23</sup> ISPRA, Annuario dati ambientali.

Figure 4: Topsoil Organic carbon content



Source: JRC, Institute for environment and sustainability  
[http://eusoiils.jrc.ec.europa.eu/ESDB\\_Archive/octop/Resources/OCTOP.pdf](http://eusoiils.jrc.ec.europa.eu/ESDB_Archive/octop/Resources/OCTOP.pdf)

Concerning the marine environment, the sea bottom in the North Adriatic consists mostly of sand and sand-detritic sediments due to the inflow from the Po River. The sea bottom along the eastern Adriatic coast is rocky while offshore it is mostly flat with sediments and corallogenic concretions along the islands. Large coral reefs beyond depths of 300m have also been registered.

In **Italy**, a big concentration of organic carbon is in the Alps, but also in some AIO Italian regions (Puglia, Calabria and Sicily mainly). Rather poorer values can be measured in the Po valley and along the Puglia coast mainly because of extensive agricultural practices that worsen the soil.

In Italy at least 30% of the territory is seriously threatened by soil erosion. Many of the Italian AIO regions are affected by soil erosion, namely all Adriatic regions southern Po plain (apart from Puglia) as well as Calabria and Sicilia.

There are several contaminated sites of national interests (SIN), spots in the Italian territory identified for the dangerousness of the characteristics, the quantity and hazardous nature of pollutants, the ecologic risk as well as possible threat to the cultural and environmental heritage. These sites in 2012 are 57 and are distributed all

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over the Italian territory. Some hotspots are in Lombardy region (6 sites), Puglia (4 sites) and Sicily (4 sites). Moreover, in addition to these sites, there are other 32,000 potentially contaminated sites all over the country.

Brownfields are another important aspect. In Italy, brownfields are often located within the urban texture and consequently have a high economic potential. The northern regions have the highest amount of brownfields, Lombardy and Veneto especially. The centre-south has few but quite extensive former industrial areas quite contaminated by low concentration of hazardous waste or pollution. Moreover, high concentration of heavy metals in soil is particularly evident along road infrastructure, vineyards and agricultural areas in general.

A survey has shown that salinisation is mostly affecting the lower Po valley, the long stretches of the Tyrrhenian Sea and the Adriatic, the coastal area of Puglia, Basilicata and Sardinia and large tracts of Sicily.

The loss of soil function affects large areas of the Italian territory. Accordingly, 10% of the Italian territory is very vulnerable, 49% has a medium vulnerability and 26% has a low vulnerability or is not vulnerable. The most vulnerable areas are those located in the AIO regions, namely Sicily (43%), Molise (25%), Puglia (15%), Basilicata (24%). Also between 5% and 15% of the Umbria, Marche, Abruzzo and Calabria territories are very vulnerable.

In general, in **Greece**, soils are characterised by low organic matter content. About two thirds of the cultivated soils contain only 1% of organic matter (very low content), whereas only less than 14% of the soils contain more than 3% of organic matter (medium content). The decrease of the organic matter content causes structural degradation and soil erosion as well as nitrogen deficits, which characterize the soil in 87% of the cultivated areas. Many soils in Greece, both in the uplands and the lowlands, originate from calcareous deposits and are rich in calcium carbonate (CaCO<sub>3</sub>). About 70% of the soils have an alkaline or very alkaline reaction, 12% have neutral reaction and 18% have acid reaction. Fixation of phosphorous as well as zinc, boron and other elements is common in alkaline soils.

Erosion and salinisation are the two most important threats to soil resources in Greece. The progressive degradation of the soil has led, among other consequences, to the reduction of the soil productive capacity and to more visible impacts on water resources (both in terms of quantity and quality). In the most severe cases, soil degradation has given way to desertification. According to the Greek National Committee to Combat Desertification, 34 % of the country is impacted to a high degree by desertification, 49 % is moderately affected, while 17 % is at low risk. The pressures are numerous, including inadequate protection of vegetative cover exacerbated by forest fires and inappropriate agricultural practices. Soil degradation accelerated as a result of bad management practices.

Soil contamination is not a major problem in Greece compared to other European countries. It mainly originates from local sources including waste disposal, industrial activities and mining operations. Contamination from diffuse sources occurs to a lesser extent. The problem is observed in the largest urban areas, due to the atmospheric deposition of pollutants from traffic and industry. Diffuse contamination is also observed around power stations, which use lignite combustion (Western Macedonia and Western Peloponnesus). Soil contamination, associated with agricultural practices, especially overuse of nitrogen fertilizers, mainly affects water quality. This process is primarily observed in the Thessaly plain.

Soil sealing is reported to be a threat, especially around major urban centres and along the coasts. The portion of urban areas is relatively low. Urban centres and economic activities are mainly localised along the coasts.

Greece is also characterised by the presence of zones of high seismic risk. In the past 40 years nine major earthquakes have occurred causing over 250 deaths, several hundreds of people injured and extensive damages to buildings and infrastructures.

The territory of **Slovenia** exhibits a variety of soil types in small area. According to the WRB classification, the most widespread soil types in Slovenia are Eutric Leptosols on limestone and dolomite, which cover almost 16% of the country. Eutric Leptosols prevail mostly in the mountains and in the hilly areas of the Alpine and pre-Alpine regions, and on limestones and dolomites of the Karst regions of the Dinaric Mountains, where they interweave with Eutric Cambisols. Forests with transitional woodland shrub cover 58% of the territory and constitute the prevailing land cover category in Slovenia, but they are not evenly distributed<sup>24</sup>.

194 degraded land areas with a total surface of 979 ha were identified in 2011, of which the majority fall under industrial types followed by transport, military and mining<sup>25</sup>.

In general, the soil in Slovenia is well supplied with organic matter. 86.2% of agricultural land contains more than 2% of organic matter, and 30.9% of land contains more than 4%. This relatively good condition of soil is due to the fact that grassland is the prevailing element in the composition of agricultural land and that arable land and permanent crops are relatively abundantly fertilized with livestock manure.

The coast is mostly of flysch. At the estuaries of rivers and creeks are characteristic floodplains that form a sandy and silty (muddy) sea-bed underwater.

**Croatia** has recorded 1,056 potentially polluted soil sites, of which pollution was confirmed at 69 sites. However, the number of potentially polluted sites is likely to be higher. There are no precise data for the Mediterranean part of Croatia. Acidification by acid rains and the intensive use of mineral and organic fertilizers are recorded in about 29% of all soils in the country. The trend of soil acidification by acid rains is slowing down, primarily due to the decrease in air emissions throughout Europe. Salinisation of soils in the Neretva Valley is growing sharply as a result of extensive land improvement and the construction of hydropower plants that have caused the changes in the hydrological regime of rivers. Large amounts of salt from deeper alluvial strata have penetrated into the surface layers of arable land. Increased salinisation was also recorded in the area of the Vransko Lake and in the lower Mirna and Raša Rivers in Istria. Approximately 48% of Croatia's agricultural land is exposed to erosion. However, there are no precise data for the Mediterranean part of Croatia. An important cause of soil erosion in coastal catchment areas is forest fires. Shortages of useful water in the agricultural soil are regularly recorded, indicating a pedological drought.

In **Albania** soil contamination from local sources, mainly waste disposal from urban sources and industrial activities is widespread. In 2012 the total amount of urban waste was of 1,136,802 ton and solid waste 332,199 ton. So, the average amount of waste resulted was 0.224 ton/capita. In total 14 priority hotspots that require emergency intervention to minimize risk on environment and human health are identified e.g. Mine in Bitincka; Mine in Bulqiza; Mine of Ferro-Nicelium in Përrenjas; Ferro chromium

<sup>24</sup> <http://nfp-si.eionet.europa.eu/publikacije/Datoteke/OND07en/EnvironmentInThePalm-min.pdf>.

<sup>25</sup> [http://kazalci.arso.gov.si/?data=indicator&ind\\_id=508&lang\\_id=94](http://kazalci.arso.gov.si/?data=indicator&ind_id=508&lang_id=94).

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smelter in Elbasan, Factory of Cooper Lac etc. Landfilling is still not the predominant waste treatment option in Albania. Only 2 landfills are operational: one in Sharrë (Tirana) and one in Bushat (Shkodra). Feasibility studies for establishing of 6 other landfills are ongoing or to be conducted. In Albania the potential risk of erosion is considered high. The official data for 2012 show that in about 75% of agricultural land the risk is very high and in 25% of it the risk is moderate. Erosion of river banks caused from uncontrolled (and sometimes illegal) removal of solid material from banks and bed of rivers is considered already problematic.

Soil in **Serbia** is diverse due to its heterogeneous geological surface, climate, vegetation and pedofauna. Soil quality is threatened by uncontrolled and inadequate disposal of wastes. Predominant soil types are: Dystric Cambisol (2.28 mio ha), Chernozem 1.2 mio ha, Smonitza (780,000ha). Agricultural land covers 66% of total area, forest areas represent 27%. Agricultural utilisation of soil is classified in 8 categories, of which 49.8% represent higher quality classes (1.4), while classes 5-8 are not fit for agriculture (50.2%). 86.4% of the country territory is subject to various types and intensity of land degradation.

The main characteristics of soils in **B&H** are: low content of humus and fertilizer nutrients, soils are generally shallow and approximately 14% of the territory contains excess water. Acid soils concern more than 1/3 of the land. As more than 80% of the country consists of terrain with slopes exceeding 13%, water induced erosion is an increasingly present problem. Erosions, landslides and deforestation are identified as serious land degradation processes. Opencast mining or opencast exploitation of mineral ores has resulted in approximately 15,000 ha of damaged land in B&H, while disposals of fly ash and slag occupy an area of approximately 250 ha. Waste is dumped on large areas of fertile agricultural land.

In **Montenegro**, due to the natural factors of climate, geological background, relief, vegetation and human beings, there are various types of soil, of which Calciferous-dolomite dark soil covering 660,000 ha and Brown acid soil (Districcambisole), covering the surface of 394,825 ha prevail. From the total surface of 13,812 km<sup>2</sup>, agricultural land covers 5160.7 km<sup>2</sup>, of which arable land is 1888.89 km<sup>2</sup>. The exploitation of mineral deposits and other raw materials in Montenegro amounts to 18,000 tons a year. With approximately the same volume of tailings, some 25,000 m<sup>3</sup> of soil is being devastated annually. Destruction of quality surface layer of the soil is taking place by sand and gravel extraction, exploitation of minerals (bauxite, coal, stone, zinc and lead), processing of minerals and other raw materials, production of brick and roof tiles and tiling disposal. Other significant factor of soil degradation includes erosion (water, wind) and in-situ damages of soil (physical, chemical, biological).

#### 4.2.2 Assessment

Soil **contamination** from diffused sources, mainly waste disposal from municipal and industrial sources and industrial activities, is widespread in the programming area. A wide range of pollutants, including excess nutrients, pesticides, microbes, industrial chemicals, metals, refining petroleum products, pharmaceutical products, mining products and waste end up in the soil. They also find their way into ground water and surface water<sup>26</sup>. Hot spots can be identified in the Po valley (Italy), the Black triangle (Slovakia) and at a great number of military sites that stem from past activities and

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<sup>26</sup> EEA Report, No 5/2012, Protected areas in Europe— an overview, p.41.

poor management practices in Eastern Europe. In B&H 25 % of the ploughed, arable land has been damaged due to warfare and land mining<sup>27</sup>.

The region of Western Balkans has many abandoned waste sites and uncontrolled landfills. The volume of mining and industrial waste in this region is most likely far greater than that of municipal waste, but data are not available. Accumulated mining and industrial waste is a further problem, including where factories and mines are concerned that have been closed<sup>28</sup>.

Landfilling is still the predominant waste treatment option in most countries throughout Central and Eastern Europe and the Western Balkans. Additionally, untreated urban and industrial waste water, including their marine discharge, is also a major concern. In Croatia, major pollution problems occur in Kastela Bay (Split), where metals and organohalogen compounds are accumulated in the sediment due to the discharge of untreated urban and industrial wastewater<sup>29</sup>.

Elevated level of contaminants in marine sediments, such as mercury, are more often found in the immediate vicinity of industrialized or heavily urbanized coasts. For example, mercury levels in the Gulf of Taranto range from 40 to 410 ng g<sup>-1</sup> dw in sediments near the coast and 70 ng g<sup>-1</sup> dw in sediments offshore, in the centre of the gulf. Similarly, sediments of the Strait of Otranto reached 78 ng g<sup>-1</sup> dw.<sup>30</sup>

The urban sprawl, industrial development, proliferation of infrastructures, the extraction of raw materials together with the modernisation and intensification of agriculture exert a significant pressure on soil. **Salinisation** problems exist in the region. The areas that are particularly vulnerable are those areas located in hot dry weather, especially in coastal areas where excessive agricultural, industrial or civil practices on the soil cause the lowering of the groundwater level and the possibility of saline water intrusion.

The soil is damaged from **sand and gravel extraction** from maritime and river bank activities. The Italian waters under Emilia-Romagna, Veneto and Friuli-Venezia Giulia jurisdiction are intensively used, among others, for sand extraction<sup>31</sup>. Fishing of mollusks has also an impact on the soil. Illegal clam fishing in the Venice lagoon for example has an impact on the sediment and the gathering of the species *Litophagalitophaga* is increasing in Albania and extraction has caused destruction of the rocky shoreline habitat<sup>32</sup>.

Soil erosion is an additional problem in the AIO region that has to be taken into consideration. The pressures include the impacts resulting from forest fires, especially in Italy and Greece, and inappropriate agricultural practices.

<sup>27</sup> SEA, SEES Environmental report.

<sup>28</sup> EEA, Western Balkans, Part 4, p.127.

<sup>29</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.99.

<sup>30</sup> UNEP MED ECAP Assessment, 2010. Part 2, p.64.

<sup>31</sup> Policy Research Cooperation, 2011. "The potential of Maritime Spatial Planning in the Mediterranean Sea" Case study report: The Adriatic Sea. P.22.

<sup>32</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.108.

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## 4.3 Water

### 4.3.1 Description

The Adriatic Sea receives large amounts of fresh water from numerous rivers. The largest is the river Po, which contributes to 46.5% of all the freshwater input. Most of the riverine input is in the north- west side (72%), while only 27% of fresh water comes from the Eastern side. The biggest river in the South-Eastern Adriatic area is the Drin, bringing 10% of annual freshwater input<sup>33</sup>.

In 2011, at the national level in **Italy** 70% of 4009 water monitoring stations had, according to the SCAS index<sup>34</sup>, positive values; the remaining 30% had rather poor values<sup>35</sup>. Looking at the Italian AIO regions, in Bolzano 100% of monitoring stations show good values; in Trento this value is of 92% and in Molise 88%. Lombardy and Sicily have rather low value with 37 and 36% respectively.

AIO Italian regions account for almost 62% of national water withdraw. Water holes are still the main source for water supply, accounting for 54%. They are followed by springs with 33%. However, regional differences in term of water supply are high. Irregularities in water supply, namely the interruption of public water services for the rationalisation of water during drought period, are also affecting the country. In Calabria, for instance, out of 100 families, 31 have experienced irregularities in water supply in 2013. High values are also recorded in Sicily, where out of 100 families, 25 experience such problems. Better values have been recorded in the north.

Italian AIO regions differ largely in terms of yearly rain quantity. Rather low yearly quantities of rain (500-700 mm) are characteristic of the Po region as well as the areas located alongside the Adriatic Italian coasts and Puglia. Higher quantities of rain are witnessed at the foot of the Alps, as well as in Calabria and the Ionic part of Sicily. Accordingly, moderate droughts in 2012 were noted only in the month of August in Emilia-Romagna, Veneto and the Adriatic coast of central Italy. Severe floodings affected the Italian territory over the last years. The majority of severe floods having occurred in Italy between 1998 and 2009 concerned the most urbanised areas of Lombardy, Lazio-Marche and Veneto.

With regards to nitrate pollution of groundwater in the period of 2008-2011, in some AIO regions (Emilia-Romagna, Lombardy, Trento & Bolzano, Abruzzo) the values have remained the same as in the previous four years. While in other regions the index has improved, namely in Friuli-Venezia Giulia, Umbria and Veneto, the value has worsened in Basilicata, Marche, Puglia and Sicily.

**Greece** has a land area of 131,944 km<sup>2</sup> and a population of 10.3 million (1991) of which about 90% live along the Mediterranean coastline. Greece consists of the northern peninsula and about 3,000 islands in the Aegean, Ionian and Cretan Seas. The major river systems of Greece are located in the northern part of the country and generally run from north to south. The largest rivers are the Axios, the Aliakmonas, the Acheloos, the Pinios, the Evros, and the Strymonas. The major lake areas are located in the western part of Greece, 14 lakes having a surface area exceeding 8 km<sup>2</sup>.

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<sup>33</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.86.

<sup>34</sup> Chemical status of groundwater.

<sup>35</sup> The "positive value class" include all sampled groundwater without evidence of human impact and those without contaminants. The other class includes all groundwater which cannot be classified in the other type, and where therefore an anthropic impact is evident because of the high concentration level of contaminants.

Greece is surrounded by the Ionian Sea to the west and the Aegean Sea to the east, both having a jagged coastline and many gulfs. The coastline of Greece is 15,000 km, which is one third of the total Mediterranean coast.

Almost all the coastal bathing sites in Greece complied with the more stringent guide values. The arid or semi-arid conditions necessitate the use of irrigation. In these areas, nearly 80% of water used in agriculture currently goes to irrigation. Across Greece, it is estimated that the total surface area of aquifers impacted by seawater intrusion is about 1 500 km<sup>2</sup>. The WEI calculated based on long-term average availability of water describes Greece as a non-stressed country with a Water Exploitation Index (WEI) of 13 %. However, water consumers are affected by serious water shortage problems, particularly interruptions, during irrigation season, when about 87 % of total freshwater abstraction is used for agriculture.

**Slovenia** abounds with watercourses (26,600 km) and standing waters, which divide between the Black Sea (83.2%) i.e. the Danube river catchment including the Sava, Drava and Mura river basin; and Adriatic Sea (16.8%) drainage systems, of which the major part consists of the Soča river basin and its inflows, the Idrijca, Vipava, Reka, and the Dragonja and Rižana river basins. Slovenia's watercourses receive 85% of all water runoff from hills and mountains; for this reason, most of them are torrents. Underground water bodies are numerous but are unevenly distributed. The Slovenian sea (40 km<sup>2</sup>) with 47 km of coast is part of the relatively shallow Northern Adriatic, which rarely exceeds 30 m in depth.

Slovenia has around 1,300 permanent and seasonal/intermittent lakes with a total surface amounting to 68.93 km<sup>2</sup> or 0.3% of Slovenia's surface. The prevailing types are artificial lakes and water reservoirs. Our biggest natural lakes are Lake Bohinj and Lake Bled. Slovenia's largest water surface consists of karstic intermittent lakes when they are filled.

According to the conservation-status assessment of nine freshwater habitat types protected under the Habitats Directive, only 20% of these were considered to have favourable conservation status, while 35% of aquatic and riverine habitat types were assessed as having poor conservation status. Included in the latter category are the standing freshwater vegetation habitats (2.4) and alpine rivers with riparian vegetation habitat types. Assessment of inland water and wetland habitat types has shown that these are among Slovenia's most threatened habitat types. Moreover, the trend for these habitat types was assessed as unfavourable.

The main source of surface and ground waters pollution is agriculture with excessive and inappropriate use of fertilisers and pesticides. Another important source of water pollution in Slovenia is untreated domestic and industrial sewage from urban areas. Numerous settlements and industrial plants are still not connected to sewage-treatment plants, and consequently waste waters are often released directly into groundwater or karstic aquifers. In addition, periodic releases of dangerous substances (mostly oils) from industrial plants are an important source of pollution.

Because of the increased need for renewable energy sources, the burden on groundwater is constantly increasing through the construction of hydroelectric power plants of various sizes.

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**Croatia** is naturally endowed with reserves of water sufficient for its development. But, there is a problem in the geographic and time-related unevenness in accessibility. There is a marked shortage of water on the islands and in the coastal area during the summer, when water demand becomes several times higher due to the arrival of a large number of tourists. Groundwater is especially important because it is the main source of the potable water supply – some 90 per cent of potable water originates from groundwater.

The quality of inland surface water in the period 2006–2010 was categorized in one of five classes (from class I – the highest quality to class V – the lowest quality). The median of annual average concentration values of BOD5 in the watercourse of the Adriatic River Basin District corresponded to values of class I water. A mild decline in BOD5 recorded in the Adriatic River Basin District may be attributable to the construction of public sewage systems and the operation of new urban wastewater treatment plants. Since 2007, the systematic monitoring of groundwater quality has been conducted at about 250 monitoring stations throughout the country. Nearly all values of the annual mean concentrations of nitrates in groundwater in the Adriatic River Basin are lower than the maximum allowable concentration. Nevertheless, elevated nitrate values are recorded at few locations of the Adriatic River Basin. These are designated as Nitrate Vulnerable Zones.

Seventy-six percent of the population has a public water supply. The rest of the population uses uncontrolled drinking water (individual wells etc.). About 44% of the population is connected to sewage systems. In 2009 108 urban wastewater treatment plants were in operation (33 pre-treatment, 20 primary, 49 secondary and 6 tertiary treatment level). At the urban wastewater treatment plants 62% of wastewater collected by the sewage system was treated. However, there are no precise data for the Mediterranean part of Croatia.

The large, craggy coastal and maritime areas are extremely important to Croatia. The quality of the Croatian part of the Adriatic Sea ranges from high (Class 1) to satisfactory. An elevated degree of eutrophication caused by an excess of nutrients has been recorded in the bays of Šibenik, Kaštela and Bakar only, where seawater quality in Category 2 and sometimes in Category 3 has been recorded. The lowest quality Category 4 was not found at all. The sanitary quality of seawater on beaches and sea water quality in fish farms is satisfactory. The load of hazardous and harmful substances in the sea ranges from values characteristic of low to those characteristic of moderately polluted areas. Harmful and hazardous algal blooms periodically occur in certain areas, but to a much lesser extent than in the past twenty years. Other pressures on seawater quality such as the discharge of unpurified or insufficiently purified municipal and industrial wastewaters are on the increase. The load of nitrogen compounds is slightly increasing, but that of phosphates is decreasing. The intensity of marine transport and trans-shipment of hazardous and harmful substances through Croatian ports is maintaining an upward trend (25%). Despite the increased volume of transport, the incidence of accidental marine pollution is not particularly high.

**Albania** shares three main lakes with its neighbouring countries: Lake of Shkodra, Lake Ohrid and Prespa Lake (Micro and Macro). In the country there are also about 247 natural lakes of different types and sizes as well as a considerable number of artificial lakes. The main rivers are the Drini, Buna, Mati, Shkumbini, Semani, Vjosa, Erzeni, Ishmi, Bistrice and Pavlo grouped in 6 main River Basins. Their courses have an important effect on the country's coastal biodiversity.

Water quality in general is affected by organic and inorganic pollutants from households, industry and agriculture. The fertiliser industry, metal industry and wastewater treatment plants, energy sector and the chemical industry are causing groundwater quality problems in Albania. An official test of 2012 shows that the following heavy metals are found in the groundwater: Ni, Mn, Zn, Pb, Cu, Co, Cr t. Still, their level is below the European Standards. Water shortages also continue to occur in some (mainly rural) parts of Albania, where there is a combination of low water availability during droughts or periods of low river flow and high demand (mainly from agriculture) and poor water management systems.

The most important rivers in **Serbia** are: the Danube, the Sava, the Drina, the Morava and the Tisa. Around 92 % of water resources are external. The average per capita availability of own surface waters is 1500m<sup>3</sup> annually which makes the country one of the poorest areas of Europe in terms of water. The territory is characteristic for numerous low mineral, mineral, thermal and thermal-mineral waters. There are over 1200 sources registered. The most important potential sources of underground waters are in the alluvial and neogen basins and the carst basins.

Water quality is monitored at 160 locations and shows overall poor quality as only 15 out of 160 profiles correspond to the prescribed classes. The quality of surface water is unsatisfactory. Clean waters of class I and I/II ranking are rare and located in mountainous parts. The most polluted watercourses are StariBegej, Vrba-Bečej channel, Tolpica, Veliki Lug, Lugomir, CrniTimok, and Borskariver. Begej is the most polluted water entering Serbia at class IV. The quality of the Danube water remains in the class II-III.

Water supply for the population is issued from surface and underground water. Of the total number of inspected water supply systems in the Republic of Serbia in 2012, 33 or 21.43% of the water supply systems were non-compliant both in terms of physio-chemical and microbiological safety, while 81 or 52.60% water supply systems were compliant, that is, they had less than 5% microbiologically and less than 20% physically and chemically contaminated samples of water.

The Adriatic Sea basin covers 33.3 per cent of the total area of **B&H**. The total internal renewable water resources per capita in B&H are 9,279 m<sup>3</sup>/capita per year. An unbalanced spatial and temporal availability of water presents a problem. In the water supply system for households, the percentage of uncharged water ranges from 25% to 75% for different public water utility companies. Due to the old infrastructure, physical losses of water in the central systems for public water supply are estimated at between 30% and 50%. Water losses have been higher in the post-war period and they have a trend of slow growth, which is affected by the percentage of uncharged water. However, during the period 2003 to 2009, a trend of increase in household water supply from the public water supply system was noted. Central municipal water supply systems which are managed by municipal utility companies cover 58% of the population in B&H. The population not covered by central municipal water supply system relies on the water supply system in their local communities or on individual wells.

The total annual water abstraction for public water supply amounts to around 1% of the annual renewable water resources. Water supply is mainly based on the use of ground waters and springs (89%), while 10.2% of water comes from rivers and 0.8% from lakes and artificial accumulations. Between 2003 and 2010, the average annual abstraction of ground and surfaces waters for the needs of public water supply in B&H

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was between 320 and 330 million m<sup>3</sup>, while the quantity of water delivered to households, the agricultural sector, the industrial sector and for the needs of other activities and water supply systems, amounted to between 157 and 165 million m<sup>3</sup>, while the rest is statistically recognized under 'water losses'.

The available data show only few cases of occasional groundwater contamination. During the period 2000-2009, no major changes in the concentration of organic substances in rivers were recorded, as indicated by BOD<sub>5</sub> and ammonium (NH<sub>4</sub>) levels. These values show that the state of rivers in B&H is generally good, considering the content of oxygen in water and saturation of water with oxygen. The content of nitrogen and phosphorus in B&H surface water is low and eutrophication cannot be noticed, although the trends cannot be determined due to a short series of data. Flooding of karst areas forms temporary lakes/wetlands in the Adriatic Sea Basin, storing about 2.5 billion m<sup>3</sup> of water. The state of bathing water in the Adriatic is 'satisfactory'.

Waste waters from households account for the highest percentage of total waste waters. The number of people connected to the sewage system is higher in urban areas. The percentage of population living in agglomerations (>2000 PE) that are connected to the sewage system is estimated to be 46%.

The main rivers in **Montenegro** are the Tara, Lim, Cehotina and Moraca. Of the lakes, Skadarskolake is the largest with 369.7 km<sup>2</sup>. The quality of ground water in natural conditions, with the exception of coastal aquifers influenced by the sea, is of class I for the biggest part of the year. In the mainland, natural quality of waters in aquifers of inter-granular structure is jeopardized only at a few locations, downstream from larger settlements and industry. 82% of the population is supplied with underground-waters through water supply systems. Only water supply systems in Herceg Novi and in Pljevlja use surface-waters from Bilecko Lake and Otilovici Lake. The remaining 18% of the population is supplied with drinking water from their own water supply systems, directly from springs or from cisterns. Around 40% of village population does not have regular or good quality drinking water.

The exception in this generally good state of waters are found in the rivers Cehotina and Vezisnica as well as the Moraca and Ibar downstream from Podgorica and Rozaje during the low-water period. The ground waters of the Zeta plain are dominantly full of nitrate and phosphate while the waters at the location of Vranj are of the worst quality.

Approximately 60% of urban population discharges waste water in public sewage networks, or 37% of the total population of Montenegro. Wastewater treatment is in extremely bad condition, they are treated properly only in settlement Virpazar and partially in Podgorica. Prevailing pollutants are waste waters from concentrated sources – settlements and industry. In comparison to the quality classes envisaged by the Regulation on Water Categorization and Classification, water quality (of watercourses, lakes, sea and ground waters) is satisfactory.

#### 4.3.2 Assessment

Problems in water quality persist in the region. The pollution tends to be localised in hot spots downstream of cities, industrialised and agricultural areas and mining regions.

Eutrophication resulting from **excessive nutrient discharge** is one of the most significant threats to the Adriatic Sea<sup>36</sup>. In the northern Adriatic, the most extensive nutrients come mostly from the extensive freshwater inflow of nutrient rich waters from Po River. In the early 1990s the estimated average contribution of agriculture to the total nutrient load (phosphorus) was of 22-25 % for the Po River. The reduction of the fertilizer consumption and the increase of crop yields resulted in a slight reduction of the agricultural surplus of N and (especially) P between 1985 and 1995. Nutrient concentrations have decreased in the last decade, as new sewage networks and freshwater treatment plants have been constructed.<sup>37</sup>

Agricultural run-off is a problem in many parts of the Western Balkans. Agriculture is the largest contributor of nitrogen pollution to groundwater and many surface water bodies, as nitrogen fertilisers and manure are used on arable crops to increase yields and productivity. Since 2000, water pollution levels have been largely steady. This is the case for concentrations of oxygen consuming substances and ammonium measured at over 200 river monitoring stations in the region. The average level of BOD5 recorded in 2006 in the region, is slightly higher than the average value for EU rivers. On the other hand average ammonium concentrations in the Western Balkans are much lower. The average concentrations of two other pollutants, NO<sub>3</sub> and phosphorus in regional rivers have generally remained stable since 2000.<sup>38</sup>

For the Greek Ionian waters, eutrophic conditions have been reported in the semi enclosed Amvrakikos Gulf, mainly due to agricultural runoff and effluents. Furthermore high levels of nutrients and phosphate levels in excess of background levels were often recorded in the Gulf of Patras. On the other hand, the Greek Ionian coastal waters are generally oligotrophic, except in the immediate vicinity of river discharges (which carry mainly agricultural runoff)<sup>39</sup>.

**Wastewater treatment** in the western Balkan region is often poor or non-existent. In Serbia, for example, many large industrial facilities are located at the outskirts of urban areas and discharge their waste water directly into rivers with little treatment, though total discharges have decreased in recent years. Wastewater treatment plants served only 16 % of the country's population in the middle of this decade. Albania has one working wastewater treatment plant. In B&H, 90 % of wastewater is reportedly released without treatment.<sup>40</sup>

<sup>36</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.108

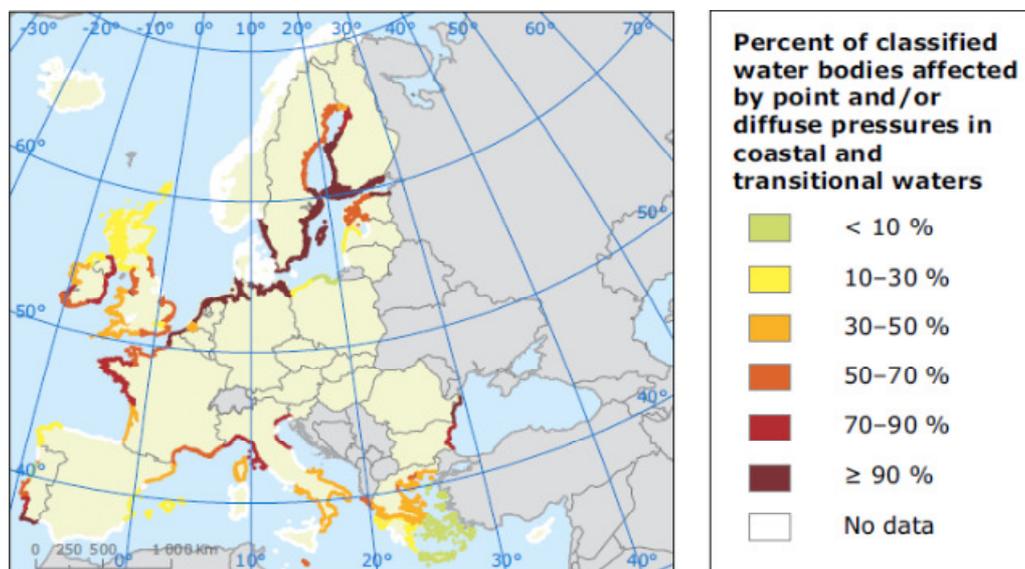
<sup>37</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.86

<sup>38</sup> EEA 2010, Western Balkans, Part 1, p.24-25

<sup>39</sup> UNEP MED ECAP Assessment, 2010. Part 2, p.70

<sup>40</sup> EEA 2010. Western Balkans, Part 1, p.25

Figure 5: EEA 2013



Source: Environmental Indicator Report 2013, p. 64

Also **water overdraft** could affect the quality of water resources. Highly populated areas constitute a critical point for the high demand of water for domestic, industrial, agricultural and recreational uses.

## 4.4 Air, Climate

### 4.4.1 Description

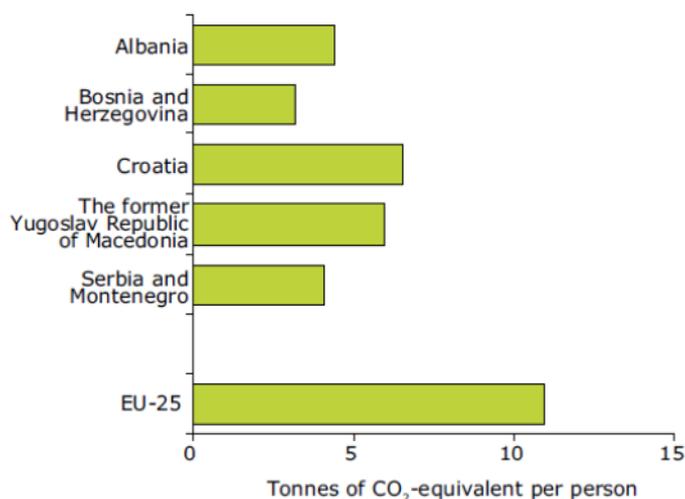
Greenhouse gases (GHG) emission show a reduction in the Member States of the Atlantic-Ionian region, except for Italy, according to the EEA Greenhouse gas emission trends and projections in Europe in 2012. **Greece** showed the largest emission reductions within the EU (-5.1%) in 2010 compared to 2009. Average 2008–2011 emissions in Greece were 15.2 % higher than the base-year level, well below the burden-sharing target of 25% for the period 2008–2012. Average 2008–2010 emissions in **Croatia** were 5.6 % lower than the base-year level, below the Kyoto target of -5 % for the period 2008–2012. In 2010 emissions in **Slovenia** were almost at the level of the previous year (+0.3%). Average 2008–2011 emissions in Slovenia were 1.8 % lower than the base-year level, significantly above the Kyoto target of -8 % for the period 2008–2012. **Italy**, however, showed increasing emissions between 2009 and 2010 (+2.0%). Average 2008–2011 emissions in Italy were 1.9 % lower than the base-year level, above the burden-sharing target of -6.5 % for the period 2008–2012. In the sectors not covered by the EU ETS, emissions were significantly higher than their respective target, by an amount equivalent to 6.3 % of base-year emissions.

Only limited information on GHG emissions trends and projections is available from the countries belonging to the Western Balkans. A review of data from 1990 to 2004 show that emissions from south-east Europe, an area that includes the Western Balkans as well as Bulgaria, Romania and Turkey, increased from 1999 to 2004, following major

declines in the first half of the 1990s. On a per capita basis, greenhouse gas emissions in the region remain below those in the EU-25<sup>41</sup>.

Due to relatively low total energy generation and consumption, as well as low energy generation and consumption per capita, B&H remains a small emitter of GHGs with a total of 24.14 Mt CO<sub>2</sub> equivalents in 2005.

**Figure 6: GHG emissions per capita, 2004**



Source: western Balkans, part 1, p.31.

A significant part of the population in **Italy**, especially the one living in large urban areas, is exposed to high levels of air pollutants, which are greatly exceeding the limits set by legislation (Directives 2008/50/EC and 2004/107/EC, D.Lgs. 155/2010). The daily limit value of PM<sub>10</sub> for instance is often exceeded in Italy. Most critical areas are in Po valley, but also few hotspots are identified in Basilicata, Umbria and alongside some coastal areas in Marche. Positively, is that apart from Friuli-Venezia Giulia, where Pm<sub>10</sub> trend of 2002-2011 has increased, all other hotspots in the countries have significantly decreased PM<sub>10</sub> concentration from 2002 to 2011. From 2002 to 2011, 54% of Italian monitoring stations observed a weak decrease in terms of PM<sub>10</sub> concentration (-1 ug/m<sup>3</sup>)<sup>42</sup>.

Concerning Pm<sub>2,5</sub> Italy is the European Country, together with Bulgaria and Czech Republic, where the target value of 25ug/m<sup>3</sup> is most frequently exceeded<sup>43</sup>. 27% of monitoring stations in 2011 have exceeded the limit value of 25ug/m. The hotspots in this respect are mainly in the north of Italy, and particularly in Veneto (Venice and Padua areas specifically) and Lombardy (Milan area).

With regards to ozone, in the summer of 2012, 74% of the Italian monitoring stations registered exceeding values. The most critical regions are once more the northern Italian regions.

<sup>41</sup> EEA 2010. Western Balkans, Part 1, p.30

<sup>42</sup> EEA Report N.4/2012, Air quality in Europe-2012 report

<sup>43</sup> ISPRA, Annuario dati ambientali

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With respect to climate, temperate temperature with regional differences characterised the country. In the summer, the northern regions are hot and occasionally rainy, while the central regions are rather more humid. Southern regions suffer scorching heat. In winter, northern cities are rather cold, damp and foggy while southern cities' temperatures are warmer (10-20 degrees).

**Greece** has a Mediterranean climate with mild and rainy winters, relatively warm and dry summers and many hours of sunshine almost all year long. Precipitation is concentrated in the cold period, with almost no precipitation in the warmest months. The amount of rainfall is approximately halved in the eastern part compared to the western part of the country.

Air emissions show a decrease from 1990 to 2010. NO<sub>x</sub> emissions decreased by 2.36%, NMVOC emissions decreased by 31.48%, SO<sub>2</sub> emissions decreased by 44.28%, CO emissions from transport decreased by 62.84% from 1990 to 2010 and as a result total CO emissions in 2010 decreased by 53.35%. The mean annual contributions of natural sources to PM<sub>10</sub> levels ranged from 1–3 µg/m<sup>3</sup>.

In 2013, the atmospheric concentrations of PM<sub>2,5</sub>, SO<sub>2</sub>, CO, C<sub>6</sub>H<sub>6</sub> were below the threshold values. PM<sub>10</sub>, O<sub>3</sub> and NO<sub>2</sub> have exceeded in some cases the limit values. In general all monitored atmospheric concentrations show decreasing or stabilization trends over recent years.

**Slovenia** has Mediterranean climate on the coast, continental climate with mild to hot summers and cold winters in the plateaus and in the valleys to the east. Precipitation is high away from the coast, with the spring being particularly prone to rainfall. Slovenia's Alps have frequent snowfalls during the winter. Temperature in Slovenia increases faster than the global average. Increase in the annual average temperature is most evident in the last three decades. From the year 1982 onwards the shrinking of the glacier was more intense. Due to intensive thinning the extent of outcropping rocks increased so much that the glacier disintegrated into several parts. In the first decade of the 21st century we can observe a stagnation of the glacier<sup>44</sup>.

Greenhouse gas emissions in 2011 (compared to 2010) in most European countries decreased by 3.3% and by 4.2% in the EU-15, while in Slovenia they were 0.1% higher. The main reason for lower emissions in the EU is lower fuel consumption for electricity and heat production due to the modernization of boilers and milder winters. The increase in emissions in Slovenia was mainly due to transport emissions have increased by as much as 8.2% compared to 2010.

Concentrations of sulphur dioxide in ambient air do not represent a danger for human health in urban areas any longer. Also a critical annual value for the protection of vegetation is not exceeded any more. The improvement of the situation in the last decade is a result of the use of high quality fuels in industry (better quality coal, oil, gas), the operation of desulphurisation facilities in the thermal power plants (Šoštanj, Trbovlje), the treatment plants in the cement factory Lafarge (Trbovlje), and the use of cleaner fuels in individual heating systems. The level of air pollution by ozone in recent years is above the target value on the majority of locations, including in rural areas and at higher altitudes, while the action value of less sunny and hot summers exceeded only in the Littoral and in some places in the higher altitudes. The most polluted area is

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<sup>44</sup> [http://kazalci.arso.gov.si/?data=group&group\\_id=8&lang\\_id=94](http://kazalci.arso.gov.si/?data=group&group_id=8&lang_id=94)

Primorska of favourable weather for ozone formation and transport of ozone and its precursors from northern Italy.<sup>45</sup>

In **Croatia**, the total SO<sub>2</sub> emissions in 2010 amounted to 41.5 kt, which is 76% lower compared to the base year of 1990. Total SO<sub>2</sub> emissions in 2010 were noticeably lower than 70 kt, which is the target set by the Multi-Pollutant, Multi-Effect Protocol (MPME) ratified by the Republic of Croatia in 2008.

Accounting for more than 80% of total ammonia (NH<sub>3</sub>) emissions, agriculture is the predominant source of ammonia (NH<sub>3</sub>) emissions. In the Mediterranean part of Croatia, ammonia concentrations in the air have been systematically measured only in the city of Rijeka (since 1990), which in the first half of the 90s recorded high mean annual ammonia concentrations. However, since years the mean annual ammonia concentrations in Rijeka are below the limit value.

The total PM<sub>2.5</sub> emissions in 2009 amounted to 9.98 Gg, which is 17% lower compared to the base year of 1990. The introduction of natural gas and the decline in fuel oil consumption in the period of 1990–2010 resulted in a drop of Cd emissions by 55.6%. In the same period Hg emissions were 48.4% lower, which is mainly the result of using mercury removal units in natural gas production. Nevertheless, total Cd emissions in 2010 were 28.2% higher compared to the previous year, which is a consequence of burning solid fuels and biomass in the fuel burning sectors, i.e. industry, building construction and general consumption.

Monitoring studies for 2012 in **Albania** show these data on the main air pollutants: SO<sub>2</sub> 60 µg/m<sup>3</sup> (20 µg/m<sup>3</sup> European Standard), NO<sub>2</sub> 60 µg/m<sup>3</sup> (40 µg/m<sup>3</sup> European Standard), LNP 140 µg/m<sup>3</sup>, PM<sub>10</sub> 60 µg/m<sup>3</sup> (40 µg/m<sup>3</sup> European Standard), PM<sub>2.5</sub> 15 µg/m<sup>3</sup>, O<sub>3</sub> 65 µg/m<sup>3</sup>. Despite declining emissions of ozone precursors in Albania annual ozone concentrations have slightly increased. The country is facing the appearance of summer ozone.

On the basis of the degree of industrial activities, **Serbia** may be classed as a significant emitter of CO<sub>2</sub>. The quality of ambient air in urban areas is caused by emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, soot, solid, organic and inorganic substances originating from energy generating and industrial plants, transport, combustion in individual heating plants, etc. The settlements most polluted with sulphur-dioxide in 2012 were Bor and Zrenjanin. The settlements that were most polluted with soot in 2012 were Čuprijanad Zajecčar. The measure average annual values of lead in ambient air in Belgrade and Niš are two to nine times higher than the allowed average annual emissions for settlements (1,0 µg/m<sup>3</sup>). In Bor and Belgrade over the past ten years the annual limit of ambient air concentrations of SO<sub>2</sub> was permanently above the allowed limit.

Significant progress was achieved in decrease and prohibition of ozone depleting substance (ODS) use in **B&H**. Ozone depleting potential in B&H has decreased by over 90% between 2002 and 2008 due to implementation of the Montreal Protocol. There is a trend of decrease of ozone precursor emission – a 63% from 1990 to 2004, and the emissions are indexed to 1990 values (1990 = 100). The decrease is the result of the war and very slow recovery of all industrial facilities after the war.

<sup>45</sup> [http://kazalci.arso.gov.si/?data=group&group\\_id=16&lang\\_id=94](http://kazalci.arso.gov.si/?data=group&group_id=16&lang_id=94)

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The Adriatic Sea and mountain massifs predominantly influence climate conditions in Montenegro. Average annual concentrations of polluting substances in the majority of settlements in Montenegro are under the legally permitted pollution limits. The exception is the concentration of fluorides in Podgorica, Nikšić and Pljevlja, which are significantly exceeding the legally stipulated limits during the whole year, for even 3 times and more. Other parameters which occasionally go beyond the allowed concentrations are SO<sub>2</sub>, resulting from exhaust gases of motor vehicles – maximal concentrations of nitrogen monoxide, nitrogen dioxide and overall nitrogen oxides which exceed instant allowed limits even up to 5 times. Also, the maximum of daily concentrations of ground ozone are higher than legally allowed norms in several towns– Berane, Budva, Herceg Novi, Kotor, Pljevlja, Podgorica, Tivat and Žabljak.

#### 4.4.2 Assessment

The major cause of **air pollution** problems in the region are industrial activities (including power plants, oil refineries, chemical industry and metallurgical complexes), the construction sector, uncontrolled combustion of the waste at the landfills and transport mainly through increased traffic (including the existing large number of vehicles and its annual growth, the bad quality of fuel used, their production year). However, the overall emissions trend in Europe has decreased from 1990 to 2011.

In the Ionian sea, the effects of **climate change** on the physical environment are already being detected, especially related with rising the risk of forest fires in coastal lands, increase of the surface sea temperature, hydrological and hydrodynamic changes, sea level rise and the expected repercussions on the integrity of the coastline, wetlands generally and more particularly lagoons, salty lakes (sebkhas), and estuaries, supra- and midiolittoral zones and the ecological and economic values thereof – with particular emphasis on the threats to islands, and changes in the nutrient supply and dynamics of coastal and high-sea waters and increased frequency of extreme events –winds and storms.<sup>46</sup>

The hydrographic regime of the Northern Adriatic influences, during certain seasons, the hydrographic, chemical and biological characteristics of the rest of the Adriatic, because it is highly influenced by freshwater inputs from the entire catchment of the Northern drainage basin. Climate change-mediated changes to precipitation or to level of ice melt in that area could potentially alter the oceanographic conditions over the entire Adriatic Sea. Changes in the precipitation quantity over the catchment feeding rivers and the coastal aquifers would influence also the availability of fresh water resources and inputs of freshwater to the marine environment. Increased air temperatures are expected to influence the process of stratification in enclosed areas such as Kastela Bay. In the case of water temperature changes it is expected that species currently found in warmer, more southern latitudes might shift northwards and by that influence the abundance of species and the composition of animal and plant communities.<sup>47</sup>

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<sup>46</sup> UNEP MED ECAP Assessment, 2010. Part 2, p.76

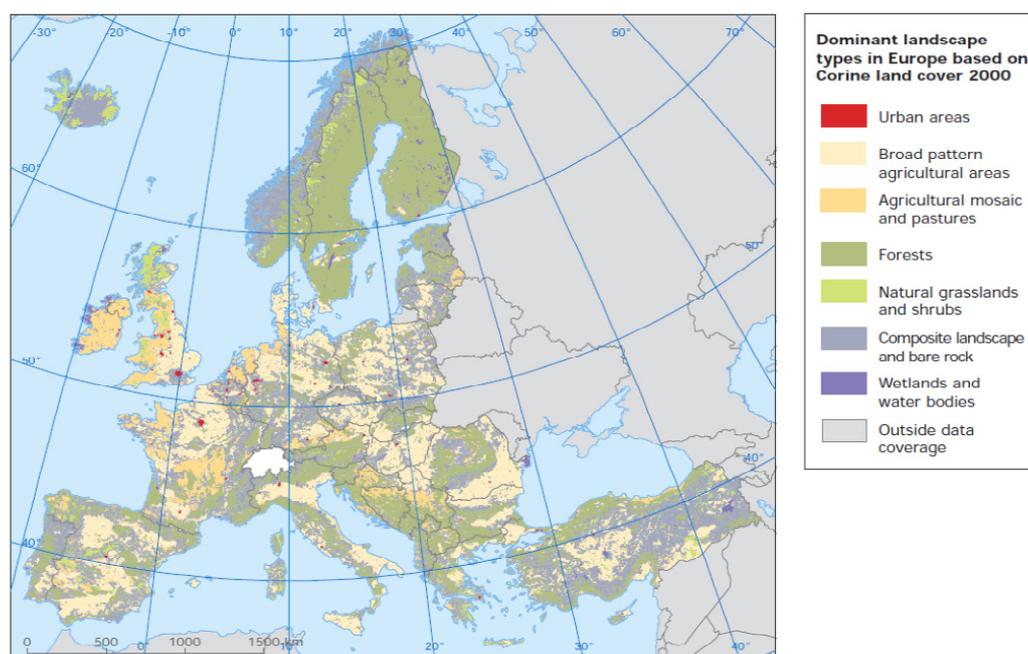
<sup>47</sup> UNEP MED ECAP Assessment, 2010. Part 3, p.112

## 4.5 Landscape, cultural heritage

### 4.5.1 Description

The dominant landscape types of the programme region include mountains, major river valleys and wetlands, farmland and forests, and urban and industrial zones. An overview of the dominant landscapes is presented in the following Figure.

**Figure 7: Dominant landscape types in Europe**



Source: EEA, No 5/2012. Protected areas in Europe.

**Italy** is a peninsula located in southern Europe, in the middle of the Mediterranean Sea. The territory includes the mountain range of the Alps and the Apennines; few large rivers, the longest is the Po river and many lakes (the large being the Garda lake); numerous islands, including big ones like Sicily and Sardinia, and 70 other smaller ones. The Italian land area amounts to 301,336 Km<sup>2</sup>. The maximum length is 1200 Km. The area is mainly characterised by hilly and mountainous regions, with respectively 41.6% and 35%. The extension of the coast is quite long with 8300 Km. All of these spatial features ensure a wide variety of landscapes.

The forest distribution on the Italian territory is mainly on the Alps and Apennines. However, a great quantity of arable and permanent crops is also found especially in Po valley, Puglia and Sicily. The latest Corine land cover inventory in 2006 shows a continued expansion of artificial surfaces, such as urban sprawl and infrastructure development, at the expenses of agricultural land, grassland and wetlands.

In addition, due to its specific location in the Mediterranean geodynamic setting, Italy is one of the countries bearing the greatest risks for seismic and volcanic activity in the Mediterranean area. The areas with high seismic risk are in Friuli-Venezia Giulia, along the central-southern Apennines, and along the Tyrrhenian margin of Calabria and Sicily in the south-east. The greatest volcanic risks are related to the presence of

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active volcanoes; consequently the Vesuvius and Phlegraean area, the island of Ischia, the Etna area, the Aeolian Islands and the Alban hills.

Mining activities, both in the underground or in open air, are also particularly invasive activities for landscapes. In Italy, quarries are distributed all over the territory. The hotspots are in Abruzzo (270 quarries), Veneto (205 quarries) Lombardy (187) and Sicily (176).

Looking at land use, comparing the Corine land cover of the years 1990, 2000 and 2006, a widespread increase of urban areas at the expenses of agricultural and to a less extent forest and semi natural areas can be noticed. In the period 2000-2006 a progressive decrease of agricultural areas has been noted (143,000 hectares less between 1990 and 2000, 40,000 between 2000 and 2006) quite homogeneously over the country.

**Greece** consists of a very large number of small islands and a hilly or mountainous terrain with steep slopes. More than 40% of the land is over 500 metres in altitude, with several peaks reaching an elevation of more than 2,000 metres. Greece's extensive coastline -the longest in Europe with nearly 14,000 km length is equally distributed between the mainland and some 3,000 islands which cover approximately 20% of the territory. The Pindus mountain range lies across the centre of the country in a northwest-to-southeast direction, with a maximum elevation of 2,637 m. Extensions of the same mountain range stretch across the Peloponnese and underwater across the Aegean, forming many of the Aegean Islands.

Greece's natural hazards include severe earthquakes, droughts and wildfires. Forest fires occur almost every year but the most recent destructive fires took place during 2007 and 2009. The 2007 and 2009 Greek forest fires were a series of massive forest fires that broke out in several areas across the country throughout the summer period. Some of these firestorms are believed to be the result of arson while others were merely the result of negligence.

In the period 1990-2000, the increase in artificial surfaces (+13.8 %) was the most significant land cover change in Greece. This corresponds to the increase in urban areas. However, in 2000, dense urban areas still occupied a small portion of the whole territory (just over 2 %). The largest land-cover category taken by urban and other artificial land development was agriculture (34 37% arable land or permanent crops). Pastures and mixed farmland was the next category (32.52 % of the total uptake). Greece's land is highly fragmented due to its mountainous terrain and hundreds of inhabited islands, which affects land use.

**Slovenia** is touching the Alps and bordering the Mediterranean. The Alps dominate Northern Slovenia along its long border to Austria. Slovenia's Adriatic coastline stretches approximately by 43 km. The part located south of Sava river belongs to the Balkan peninsula. On the Pannonian plain to the East and Northeast, toward the Croatian and Hungarian borders, the landscape is essentially flat. However, the majority of Slovenian terrain is hilly or mountainous, with around 90% of the surface 200 meters or more above sea level.

More than half of Slovenia's land surface is covered with forest, 56 % and 58 % when taking into account transitional woodland-scrub; other mainly natural areas, natural grassland, wetlands, water bodies, open spaces with little or no vegetation take up 4 %; 35 % of the surface is intended mainly for farming, while just under 3 % has artificial surfaces. An analysis of the course of changes between individual types of land cover

and use has shown that the biggest changes took place in the forest areas. Around 60 % of newly sealed surfaces were previously forests, and the remaining third was farmland, of which 210 ha were complete field areas. Almost all of it was developed after 2000.

As far as high-quality landscape is concerned, within the framework of natural features there is a mosaic-like interweaving of forest and farmland. These categories of land represent 23 % of Slovenia. While the fragmentation of farmland is not desirable from the aspect of the economics of farm production, in terms of cultural landscape the diversity and landscape patterns and the interweaving of uses encourage greater biodiversity and represent the natural and cultural heritage and identity of the Slovenian landscape.

The geographic characteristics of **Croatia** are governed by the sea, Karst relief and hydrography, a Mediterranean climate and vegetation. Geological and geomorphological heritage in the Mediterranean part of Croatia are valuable geosites, not only of local or European, but also of global importance. The most notable ones are the quarry Fantasia, Lukinajama-Trojama pit system and Crvenojezero (Red Lake). The most densely inhabited and the largest settlements are along the coast. Many coastal cities date back to antiquity and have the oldest urban tradition in Croatia.

Topographically, the Mediterranean part of Croatia is characterised by the barren, rocky mountains of the Dinaric Alps stretching along the Adriatic coastline and extending through the centre of Croatia. An important landscape type in Croatia is the Adriatic coast with subtypes such as the insular landscape and high plains of Dalmatinskazagora and Konavle regions and the Istrian peninsula. Dry stone walls are traditional landscape features in the Mediterranean part of Croatia. They are part of Croatia's natural and cultural heritage and important landscape elements contributing to the mosaic landscape.

A rich landscape diversity can be found into the **Albanian** territory, consequence of the nature characteristics and the long peopling history and the human been activities in it. The traditional human activities in this terrain, in accordance with the nature conditions, had been the major factors that defined the Albanian landscape physiognomy, in which we found the particular autochthon elements.

The Northwestern regions of Shkodër and Lezhë suffer very often higher floods as a result of increased rainfall and rising of Drini river flow. Forest fires, mostly caused by man, destroy yearly considerable surfaces of forest and pastures.

The landscape of **Serbia** is diverse; Vojvodina and valleys along major rivers are dominated by lowland areas with predominantly arable agricultural land. The remaining parts include hilly and mountainous areas covered with forests. There are two specific landscapes: the relatively homogenous Vojvodina-Panonian-Danube macroregion and the central Serbian-Balkan macroregion with a more complex landscape structure. The areas of protected natural and cultural values include spatial cultural and historical entities (Fruškagora with monasteries, Stari Ras with Sopoćani), archaeological sites (Gamizgrad, Viminacium), monuments of culture (historical cities and fortresses – Globac, Smederevo, Maglič), monasteries, areas of integrated natural and cultural values (Golija-Studenica).

Predominant landscapes in the Adriatic water shed of **B&H** are: (i) Mediterranean landscapes; (ii) Supra-Mediterranean landscapes and (iii) Mediterranean-mountainous landscapes. The Dinarides mountain system stretches from Posavina in the north with

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slightly hilly landscapes to the Adriatic Basin in the south, and its direction is from northwest to southeast. Apart from orogenic wedges, the Dinarides are dominated by high plateaus. Tectonic movements formed valleys and karst fields. The landscape of B&H is made of underground karst forms in carbonate rocks, which classify it as one of the richest holokarst regions in the world. B&H is rich in many discovered and undiscovered caves and pits.

**Montenegro** has diverse landscape. The northern part of the country is mountainous with 37 peaks above 2,000 m and the deepest European canyon of the Tara river (1300 m). The central part consists of carst areas with larger depressions/plains. Its lowest part is the Zestko-bjelopavliča plain with Skadarskolake, the largest lake in the Balkans. The coastal plain stretches from a few 100 m to several kilometres. The following typical landscapes in Montenegro have been recorded: E-Mediterranean, lower sub-Mediterranean, Mediterranean-flysh, flat land-swampy, higher sub-Mediterranean, hilly-silicate, mezophile, mountainous, high- mountainous and anthropogenic landscape type. Internationally protected cultural areas are the Tara River Basin (UNESCO – World Biosphere Reserve), Durmitor with the Tara River Gorge (UNESCO, World Heritage Site) and Kotor-Risan Bay (UNESCO – World Heritage Site).

#### 4.5.2 Assessment

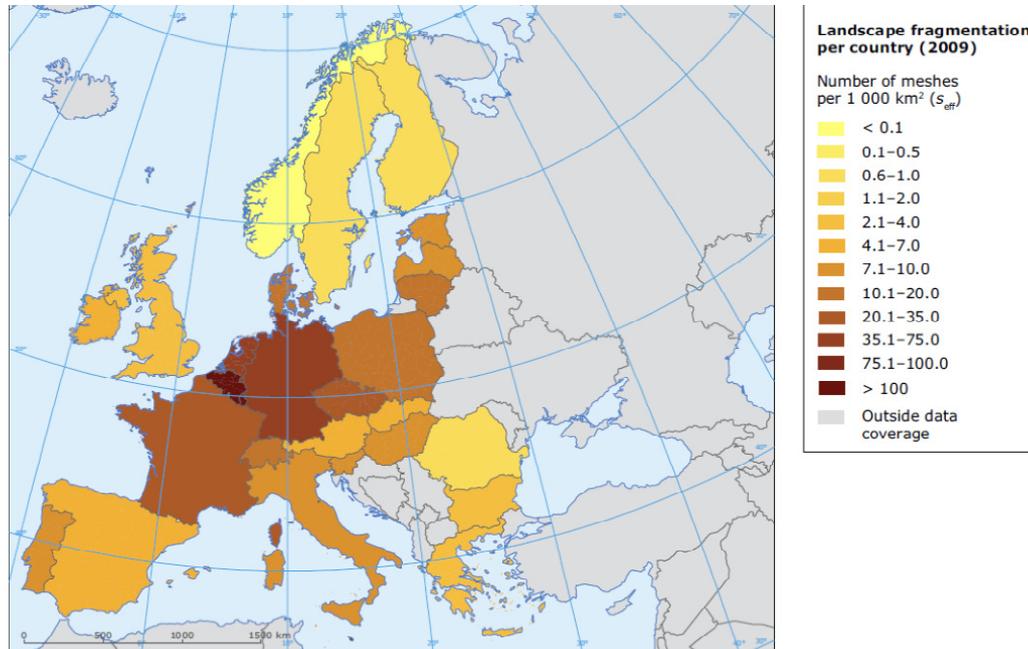
The EU has seen the expansion of urban sprawl in recent decades and this has also happened in many parts of the Western Balkans in recent years. The abandonment of agricultural land is another problem, particularly in mountain areas<sup>48</sup>. Europe's landscapes are highly fragmented as a result of urbanisation, transport infrastructure and intensive agriculture.

**Land use** is one the principal drivers for environmental change and changes in the landscape. Moreover, the human demands for food, forest products and renewable energy has also a strong impact on the landscape. These land use changes have implications on soil carbon storage and greenhouse gas emissions. They also effect biodiversity conservation and water management – including effects of droughts and floods as well as water quality. Moreover, as the coastal population grows and urbanises, natural coastal habitats and landscapes get further fragmented, the land use changes towards more anthropogenic with the corresponding change in the landscapes leading to decreasing integrity of coastal landscapes and ecosystems. Landscape fragmentation in the EU Member States is presented in the following figure.

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<sup>48</sup> EEA, 2010. Western Balkans, part 1, p. 32

Figure 8: Landscape fragmentation per country (2009)



Source: EEA (Landscape fragmentation in Europe, 2011)

**Mining activities**, both in the underground or in open air, are also particularly invasive activities for landscapes and might cause environmental problems. These practices can produce profound and permanent landscape changes, irreparable soil losses, and possible groundwater pollution.

## 4.6 Human health/population

### 4.6.1 Description

In the European context, **Italy** is one of the most densely populated countries. The density average in Italy is about 200 inhabitants per square kilometres (EU average is 114). Population growth presents differences in the national territory, and is as a result of opposing trends: the migratory flows mainly towards northern regions and central Italy, and the natural growth of population mainly in the South<sup>49</sup>.

A multi-scope survey<sup>50</sup> highlighted that one of the most pressing issue for families in the place they live is, after traffic (38,1 %) and parking difficulties (37,2 %), air pollution (36,7%). Air pollution is a problem indicated to a greater extent by families in the North of Italy (39.8 %, compared with 35.4 % of households in the Centre and 33.1 per cent of those in the South). Hotspots are in Lombardy (50.1%), Veneto (36.5%) and Emilia Romagna (33.2%); but also in some southern regions as Puglia (41.9%) and Sicily (35.1%).

According to the official 2011 census, the population of **Greece** amounted to 10,816,286 inhabitants. The Greek population shows a rapid increase of the

<sup>49</sup>SPRA, Annuario dati ambientali

<sup>50</sup> <http://www.istat.it/it/archivio/107568>

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percentage of the elderly people. In terms of health, life expectancy at birth in Greece is of almost 81 years, one year higher than the OECD average of 80 years. Life expectancy for women is of almost 83 years, compared with 79 for men.<sup>51</sup> Since the beginning of the 1990s, diseases of the circulatory system have been the leading causes of death. In 2008, 43.5% of total deaths in Greece were due to cardiovascular diseases. Among the OECD countries, Greece has the fifth highest standardized mortality ratio for diseases of the circulatory system. The second major cause of death is cancer. Deaths from accidents have also been decreasing steadily although they remain the primary source of premature mortality.<sup>52</sup>

Human health in relation to environmental impacts is related mainly to atmospheric pollution. PM10, NO2 and O3 levels exceed the threshold values. The level of atmospheric PM10 for example is 27.3 micrograms per cubic meter, considerably higher than the OECD average of 20.1 micrograms per cubic meter. Greece also performs below the OECD average in terms of water quality, as 66% of people say they are satisfied with the quality of their water, below the OECD average of 84%.<sup>53</sup>

**Slovenia** belongs in the group of EU countries, which are more polluted with PM10. The average exposure to particulate matters (PM10) is above limit value proposed by WHO (20 µg PM10/m<sup>3</sup>). Very young children, including unborn babies and elderly are particularly sensitive to air pollutants. Analyses show that in Slovenia 2/5 of children are exposed to negative consequences because of the elevated PM10 concentrations. Recent data suggest that in Slovenia, 15 % of hospitalized children are due to respiratory diseases.

In Slovenia 0-3 waterborne outbreaks were notified annually in the period 1997-2012. There were from 34 to 263 reported cases in each outbreak. In most of the outbreaks the microbiological agent was unknown. Some outbreaks were caused by *Cryptosporidium Parvum*, *Escherichia coli*, *Shigellasonnei*, *Lambliaintestinalis*, rotavirus, adenovirus, astrovirus, kalicivirus, norovirus and hepatitis A virus.

In 2011, 89% of the population was supplied with drinking water from drinking water supply systems, which were monitoring regarding the quality of drinking water at the point of use, which is the tap of the user. The quality of drinking water is unknown for about 11% of the Slovenian population; they are supplied from its own resources of water (individual drinking water systems) or from systems supplying less than 50 persons, or from systems not included into the monitoring for any other reason. In cities, all residents are supplied with monitored drinking water.

Results of monitoring of lead and cadmium in selected food categories in the period 2006-2010 show that the permitted maximum levels were not exceeded. However, on the basis of experience of other EU countries, it is necessary to remain committed to their regular monitoring, because the presence of metals in food, even in small concentrations, can cause adverse health effects in people.<sup>54</sup>

The Mediterranean region makes up 31.6% of the **Croatian** territory and 30.6% of its inhabitants. Available data do not suggest that any particular link between environment and its negative impact on health. The average life expectancy is of 74.4 years. The percentage of the population that is connected to the public water supply system is

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<sup>51</sup> <http://www.oecdbetterlifeindex.org/countries/greece/>

<sup>52</sup> European Observatory on Health Systems and Policies, 2010. Health Systems in Transition Vol. 12 No. 7 2010 – Greece: Health System Review 2010, p.9.

<sup>53</sup> <http://www.oecdbetterlifeindex.org/countries/greece/>

<sup>54</sup> [http://kazalci.arso.gov.si/?data=group&group\\_id=25&lang\\_id=94](http://kazalci.arso.gov.si/?data=group&group_id=25&lang_id=94)

high and the percentage of substandard drinking water samples is decreasing – constantly below 10% since 1997. Recreational water of the highest quality is found on beaches (about two percent of samples do not meet the standards) and of the lowest quality water in swimming pools (21 % of samples do not meet the standards).

Air quality in urban areas has generally improved compared to 1990. Noise is more often present in the working than in the living environment. Ultraviolet radiation is constantly increasing at a rate of eight percent annually, which may correlate with the increased incidence of malignant skin cancer of some 8.7% yearly. Food safety in production and in transportation in Croatia is continuously monitored. Bacterial infections caused by Salmonella, E-coli or Trichinella occur only occasionally.

Occupational diseases are monitored, but the impact of the working environment on human health may only be monitored when the hazardousness of a workplace is the basic cause of a disability. The majority of the diseases registered may be attributed to the harmful effects of vibration and noise. Many others are caused by mineral dust, e.g. asbestosis and skin diseases. However, no systematic research into the reach and impact of such pollution on human health has been carried out. Allergies, mostly the so-called pollen allergies, represent a large segment of the impact of nature on human health. With respect to microbiological and chemical parameters, there is a downward tendency of the share of drinking water samples found to be unsafe taken from public water supply facilities. Since 1997 their individual share in the total number of samples tested has been lower than 10%.

In **Albania** human health is connected to the state of environment. Environmental factors that negatively impact the human health are transport, chemicals in the environment caused by inappropriate waste management and industry, climate change etc. Transport continues to be a significant contributor to health effects in Albania from accidents, air pollution and noise. Road traffic is the predominant source of human exposure to SO<sub>2</sub> and NO<sub>2</sub> and noise, especially in Tirana. Around 1 million people living in Tirana are exposed to high level of noise e.g. in 2013 this level was 70 dBA (55 dBA European Standards). Due to air pollution the number of cancer and other respiratory diseases (e.g. allergies and asthma) is increasing rapidly. Long-term exposure to air pollution is estimated to cause an increase number of deaths per year.

The estimated population of the Republic of **Serbia** in 2012 was of 7,199,077 and declined by 4% compared to the 2002 census. The overall life expectancy in 2011 was of 74.74 years. A decline in the rate of live births per 1000 population from 9.4 (2008) to 9.3 per thousand (2012) was noted. The most common causes of death in 2012 were: Diseases of the circulatory system (53.7%), Neoplasms (21.2%), diseases of the respiratory system (4.9%). In 2006 in Serbia 33.6% of the population were smokers (regular or occasional), suggesting a reduction of the smoking rate by 6.9% in comparison with 2000. In 2006 two thirds of the population of Serbia (67.7%) spent their free time mainly in a sedentary way. There is no complete information providing insight in the state of public health in Serbia with respect to the impact of the environmental factors.

The percentage of population covered by public water supply is high (88.8% of households in **B&H** have in-house access to potable water) and the percentage of non-compliant potable water samples in terms of physical-chemical aspect varied from 10 to 18% in the period from 2009 to 2011, and from 8 to 12% in terms of microbiological conformity. Diseases transmitted via potable water are limited and occur mainly in smaller water supply systems which are not monitored regularly by

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public health institutes. Almost the entire population in B&H (99.6% in the FB&H, 99.5% in the RS and 99.4% in the BD) use improved potable water sources, with nearly equal percentages in urban and rural areas. Food safety in production and trade in B&H is continually monitored and there are sporadic occurrences of limited cases of infection.

From the aspect of environmental and human safety, landslides, wildfires and floods represent a significant issue in B&H. Aside from this, it is estimated that 1,443 km<sup>2</sup> remain covered by landmines as a consequence of warfare, which is 2.8% of the total territory of B&H. Post conflict political and economic issues still largely affect recovery which directly affects the environment sector.

Public health from the environmental aspect is still an insufficiently explored area in B&H. Public health institutes report on epidemiological data, but no data directly linking environmental factors and human health (air pollution, summer heat waves, etc.) exist. A lack of targeted research regarding specific environmental pollution and its consequences on human health is evident. Even though there is still no systematic reporting on toxic chemicals and substances in all segments of the environment, there are information sources which clearly state that water, soil and food in B&H contain certain concentrations of harmful substances. The main sources of eco-toxic substances are inadequate disposal of municipal, medical and industrial waste, quarrying waste and a lack of wastewater treatment plants as well as sewage directly discharged into open receiving water bodies.

From 1961 to 2011, number of the population of **Montenegro** has increased from 473404 to estimated 620029 in 2011. It presents overall increasing of population for 30.97%. During indicated period the number of live born children dropped by 55.5%. General mortality rate in that period increased from 7.7‰ in 1961 to 9.43‰ in 2011 with decreasing tendency in the meantime. The rate of natural increase decreased from 20.4‰ in 1960 to 2.21‰ in 2011. The most frequent groups of diseases, conditions and injuries registered in primary health care for adults were: diseases of the respiratory system (31.5%), diseases of circulatory system 15.15% and diseases of musculoskeletal system and connective tissue 10.11%.

#### 4.6.2 Assessment

Transport continues to be a significant contributor to health effects in Europe from accidents, air pollution and noise. Road traffic is the predominant source of human exposure to noise, especially for people living near airports and railway lines.

Currently, **PM** (particulate matter), **NO<sub>2</sub>** and **O<sub>3</sub>** are Europe's most problematic pollutants in terms of harm to human health. European anthropogenic emissions are the most important contributors to O<sub>3</sub> and PM concentrations levels over Europe, but intercontinental transport of pollution also contributes.

## 4.7 Material assets, cultural heritage including architectural and archaeological heritage

### 4.7.1 Description

**Italy** hosts approximately 40% of the world's artistic heritage. Currently, Italy is the nation with the largest amount of sites included in the list of World heritage sites (47 cities and cultural sites are included in the UNESCO list of world heritage sites). Most museums in the AIO territory are located in Emilia Romagna (32) and Lombardy (25). The museums revenues in these two regions are also amongst the highest, Veneto follows. The other regions are lagging behind.

In **Greece** 17 sites are included in the UNESCO World Heritage List<sup>55</sup>. Of these, 15 are inscribed based on 'cultural' criteria. Five of the sites are located on islands; one is distributed between the islands and the mainland, and the other 11 exclusively on the mainland. The two remaining sites are inscribed for meeting both 'cultural' and 'natural' criteria and have been declared as World Heritage Monuments, the Antihasia Mountains – Meteora (area of 387 hectares) and Mount Athos with a total area that represents 0.26% of the total land area of the country. There are an additional 15 sites on the Tentative List. Additionally, according two areas have been categorized as Biosphere Reserves, the National Woodland Park of Olympus (with a core of 3,988 hectares) and the National Woodland Park of Samaria (with a core of 4,850 hectares). Finally, 51 natural monuments have been established (areas that may include single trees or groups of trees with special botanical, ecological, aesthetical or historical and cultural value) with a total area of 16.840 hectares.

There are three properties inscribed on the World Heritage List in **Slovenia**. The cultural sites include the Heritage of Mercury (Almadén and Idrija) and the Prehistoric Pile dwellings around the Alps. The natural site listed is the Škocjan Caves. The Biosphere Reserves are the Julian Alps, Kozjansko & Obsotelje and the Karst.

**Croatia** is stretched over a range of different climatic, relief and geological environments. It has also been surrounded and influenced by several great cultures and civilisations which have mixed here. For centuries, the country has been at the cultural crossroads influenced by the three Europe's largest ethnic groups: Slavs, Romans and Germans. Its Eastern borders were for century demarcation line between Western Christianity and the Ottoman Empire. Croatia today is a melting pot featuring Central European, Mediterranean and Western Balkans influences.

Croatia is characterised by exceptional diversity of cultural heritage on a small surface and the presence of monuments from all periods of civilization, from Ancient History to recent times. Thus, in Croatia, there are monuments from ancient Greece, ancient Rome, early medieval monuments, Mediterranean Renaissance, Middle European Baroque and Modern secessionist heritage. There are also unique testimonies from pre-Roman Illyrian ruins and many more. The tangible cultural heritage of the Mediterranean Croatia includes architecture (stone is mainly used as building material), landscape design, roads, trails/paths, bridges, crafts, etc. The intangible rural heritage comprises legends, history, art, beliefs and customs, dances, songs, gastronomy, etc.

<sup>55</sup>Greece: Properties inscribed on the World Heritage List ( <http://whc.unesco.org/en/statesparties/gr>)

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**Albania** is located in a very important section of the Balkan Peninsula, facing 'ancient Rome' and en route to Byzantium and the 'capital of the world' at that time, Istanbul. As such, many conquerors have passed through the region, leaving traces of their cultures. The treasures and remains of the region's great civilizations are still visible today, including the Hellenes, Romans, Byzantines, Ottomans, Venetians and modern Italians.

At 8 archaeological parks (Bylis, Amantia, Orikum, Shkodra, Antigonea, Lissus, Apollonia, Phoenice, Butrint) the ruins of some of these mighty civilizations can be touched. They contain an assortment of Byzantine and post-Byzantine churches, mosques, monasteries with valuable frescoes and icons, old bridges and other monuments are present. And crowning the heights of many of the country's rugged mountains are castles dating back to the time of the Illyrians and into the Middle Ages. Three cultural heritages are included in the actual UNESCO World Heritage List, the National Park of Butrint, declared 'Monument in Protection' by the Albanian State in 1948, Gjirokastra, stated as a 'Museum City' by the Albanian state in 1961 and Berat, registered as a world heritage in 2005 and ratified in 2008 by UNESCO. In 1961 the city was put under the protection of the Albanian state and was declared a 'Museum City'.

**Serbia's** diverse topology and a complex history resulted in rich and valuable cultural heritage. Along the sites under the World heritage protection, the following are regarded to be of specific importance: areas around Fruška Gora, SremskiKarlovci, Petrovardinska fortress, Ovčar-Kolubara, river bank of the Danube from Belgrade fortress to Kladovo, Viminacium, Caričin grad, Niš, Golija, and others. The central register of immovable cultural property includes 2,462 entries: 2,023 cultural monuments, 72 cultural-historical areas, 151 archaeological sites and 72 sights of significance. 782 are officially categorised. From 200 cultural monuments with the highest level of protection in the country 10 are registered to the UNESCO World heritage list: 8 medieval monasteries and churches, medieval town Ras, archaeological site Feliks Romuliana near Zaječar.

At the crossroads between the East and the West, **B&H** has always been the meeting place of different cultures, nations and civilizations. Starting from unique medieval standing tombstones – the so-called 'stećci', Roman buildings and mosaics, to Ottoman and Austro-Hungarian architecture, and ancient Catholic and Orthodox ornaments, the cultural heritage of this country is characterized by richness and diversity. B&H has a rich architectural and archaeological heritage, inherited from various empires ever since the Palaeolithic period.

According to the current legislation, the cultural heritage in **Montenegro** is composed of 357 archaeological, historical, artistic, building, ethnological and technical monuments of culture. The first category (monuments of exceptional significance, there are 35 of these) includes monuments of culture of exceptional significance, monuments registered in the List of World Cultural Heritage etc. In the Second category (monuments of great importance) there are 135, and in the Third category (monuments of local significance) there are 187 monuments.

A particular danger and incoming problem for immovable cultural heritage, and especially for the protected area of Kotor, is the increasingly uncontrolled urbanization which can endanger the values which is why Kotor has been included in the List of World Cultural Heritage (UNESCO).

#### 4.7.2 Assessment

A good estimate about the challenges in this section could be given by the **tourism sector**. In Italy for example, 2011 confirms the increase of tourism, which was already registered in 2010 (+4.6%). Europe as a whole witnessed an increase of 6.1%. In 2011, the arrivals and overnight stays of tourists in hotels and other type of touristic accommodations increased by 5% and 3% respectively. The average length of a stay (3.7 days) decreased slightly compared to the previous year, confirming the trend registered over the past years of rather short time stays. Climate is the main driver for tourists, as it defines the length and quality and place of touristic trips. In 2011, the biggest touristic flow (50%) was recorded in the third quarter.

Generally, the high number of visitors during seasonal picks and their use of most polluting transport means have a strong impact on the environment. Moreover, tourist waves radically change the population density in some of the most popular touristic destinations.



## 5 Assessment of the environmental impact

### 5.1 Introduction

#### 5.1.1 Assessment Methodology

This stage of the SEA process involves the identification and evaluation of the likely significant effects on the environment of implementing the AIO programme and its possible reasonable alternatives. This follows a matrix approach and has been carried out in several stages to include relevance and detailed matrix assessments, and when possible to descriptive cumulative effects assessment.

The assessment of the potential impact of the programme encloses a great deal of uncertainty, as the draft version of the AIO programme only defines the framework and type of actions and/or projects to be supported. Its implementation and the nature and the scope of the projects that will be supported are not yet described. This SEA only can estimate potential and non-quantifiable impacts. The effectiveness of these potential impacts will depend on the orientations followed by the projects, but also from external factors.

In addition, the effects of the Specific Objectives (SO) of the AIO programme assessed in this report are most of the time indirect effects induced by expected changes (which are then more difficult to assess. To remind that, as a transnational cooperation programme, the AIO programme will neither support heavy investments, development of large infrastructures nor scientific and technology research as such. Investments in small scales facilities or infrastructures might be supported in the case of pilot projects and territorial experiences. The AIO programme supports in particular intangible or 'soft' actions which could potentially have a long term effect and which provide visibility to the programme (studies and research, networking, dissemination of knowledge and data, etc.).

The first step of the assessment process, the relevance assessment, is used to identify the likely adverse, beneficial, neutral and uncertain effects of the AIO programme on the environment. Presented in matrix format, the assessment ascertains how well each of the SO and thematic objectives meet each of the SEA objectives.

This matrix assessment (Table 1) is not a conclusive tool or model; its purpose is to identify those SOs for which uncertainties or potential impacts may arise. These particular SOs are the ones that had further scrutiny at the detailed matrix assessment further ahead in this section.

**Table 1: Relevance matrix of AIO programme specific objectives with likely adverse, beneficial, neutral and uncertain effects on environmental issues**

Environmental issues	Is the AIO programme specific objective (SO) relevant on addressing environmental issues?					
	Thematic Objective 1	Thematic Objective 4	Thematic Objective 6	Thematic Objective 6	Thematic Objective 7	Thematic Objective 11
	SO 1.1	SO 2.1	SO 3.1	SO 3.2	SO 4.1	SO 5.1
<b>Biodiversity</b>	YES	NO	YES	YES	YES	NO
<b>Soil (and Subsoil)</b>	NO	NO	YES	YES	YES	NO
<b>Ground and surface water</b>	NO	NO	YES	YES	YES	NO
<b>Air and Climate Change</b>	YES	YES	YES	NO	YES	NO
<b>Landscape, Cultural Heritage (including Functional utilizations)</b>	NO	NO	YES	YES	YES	NO
<b>Population, Human Health</b>	NO	YES	YES	YES	YES	NO
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>	YES	YES	NO	NO	YES	NO

From the matrix assessment that can be seen in Table 1. Some uncertainty was identified over whether impacts would be beneficial or adverse across the sustainability topics, particularly for biodiversity, but also for soil, water, air, climate, cultural heritage, landscape, and ecosystem services. However, most of the proposed priorities and objectives are predicted to have either neutral or beneficial effects, and in some cases these may be strongly beneficial, e.g. socio-economics. The likely beneficial and potentially adverse effects are summarised by sustainability topic below. This is followed by a discussion on uncertain and potentially adverse effects; the Priorities and activities to which these uncertain/adverse effects relate are then explored further through the detailed matrix assessment. This is followed by a discussion on the reasons for the uncertainties.

The analysis of the impacts on the environment is based on a list of guided questions (see Table 2); the grid was then used for each SO impact can turn out to be positive or negative or uncertain for the environment. The list of questions (see table 2) is not exhaustive. Many topics, even environmental relevant at global level, are not addressed: e.g. hazardous substances. By contrast, the main environmental issues according to SEA Directive are addressed: biodiversity, water, air, soil, climate as well as issues related to energy and human health.

Table 2: Guiding questions

Environmental Issues	Guiding questions
Biodiversity	Does the OP support the EU 2020 objective to stop the loss of biodiversity? Will the OP improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?
Soil (and Subsoil)	Will the OP help to protect soil attributes and soil sealing? Will the OP have effects on the state of contaminated sites? Will the OP promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?
Ground and surface water	Will the OP influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')? Will the OP affect the hydro-morphology of river basin systems? Will the OP create impact on the sustainable use of water resources? Will the OP strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?
Air, Climate	Will the OP lead to reduction of air pollutants? Will the OP lead to reduction of GHG? Will the OP increase energy efficiency? Will the OP change the role of renewable energy sources? Will the OP lead to reduction of transport related emissions? Will the OP lead to improve climate change adaptation?
Landscape, Cultural Heritage including Functional utilizations,	Will the OP facilitate protection of cultural heritage? Will the OP support conservation or reconstruction of valuable cultural landscape? Will the OP support sustainable urban and regional development? Will the OP influence the demand of land take for urban development? Will the OP enhance protection against natural hazards?
Population, Human Health	Will the OP support endeavours to reduce environmental related health risks? Will the OP catalyse the reduction of the share of population exposed to noise?
Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources	Will the OP support the resource efficiency concepts and innovation in the region? Will the OP promote environmentally friendly transport? Will the OP promote the use of the locally available renewable energy sources? Will the OP promote the combination of Energy systems in the region?

Answers to these questions allow us to describe the likely impacts of actions, regarding their **nature**.

Moreover, this estimate is completed by assumptions on each potential impact in terms of:

- **probability** of the impact to occur
- **frequency** throughout space and/or time of the impact to happen
- **duration** of the impact (long-term or short-term)
- impact **reversibility**
- **transborder** impact effects (outside the Adriatic area)

The following table shows the qualitative rating scale used in the evaluation of AIO possible impacts.

<b>Nature of the impact</b>	+	Possible occurrence of environmental positive effects
	+/-	Possible occurrence of both environmental positive and negative effects
	-	Possible occurrence of environmental negative effects
	o	Likely non-significant (or non applicable) environmental effects
	=	Assessment not possible (No rating, due to lacking or insufficient data) Intermediate ratings are also possible : <b>o/+ or o/-</b>
<b>Probability of the impact</b>	VP (Very probable), P (Probable), U (Uncertain)	
<b>Frequency</b>	C (constant) F (Frequent) O (Occasional)	
<b>Duration</b>	LT (long term) ST (short term)	
<b>Reversibility</b>	I (irreversible) R (reversible)	
<b>Transborder effect</b>	NTE (No Transborder Effect) PTE (Possible Transborder Effect)	

## 5.2 Zero alternative

Reasons for the choice of the alternatives need to be examined: The investigation of all alternatives (examination reasonable alternatives according to the SEA Directive, Art.5) comprises the gradually elaborated draft of the programme) and the zero alternative (non-implementation of the programme). The assumption is that the final version of the programme is the best alternative as it has been improved in an iterative way through the cooperation among programming, ex-ante evaluation and SEA. The elaboration and assessment of further alternatives would only be reasonable, if they can be actually implemented and, thus, are a relevant basis for decisions.

### 5.3 Environmental impact - Priority Axis 1 ‘Innovative region’

#### Priority Axis 1: ‘Innovative Region’

**Thematic Objective 1:** Strengthening research, technological development and innovation through:

**IP 1b:** Promoting business investment in innovation and research, and developing links and synergies between enterprises, R&D centres and higher education, in particular product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in Key Enabling Technologies and diffusion of general purpose technologies

**SO 1.1:** Support the development of innovation networks and clusters among regions, academia and enterprises in the AIO region

The impacts foreseen from the implementation of the SO 1.1 can be found on the below detailed table:

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	+/-	U	O	LT	=	PTE
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	o					
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	o					
Will the SO have effects on the state of contaminated sites?	o					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	o/+	U	O	LT	=	PTE
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	o					
Will the SO affect the hydro-morphology of river basin systems?	o					
Will the SO create impact on the sustainable use of water resources?	o/+	U	O	LT	=	PTE
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	o					
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	o/+	U	O	LT	=	PTE
Will the SO lead to reduction of GHG?	o/+	U	O	LT	=	PTE
Will the SO increase energy efficiency?	o/+	U	O	LT	=	PTE
Will the SO change the role of renewable energy sources?	o/+	U	O	LT	=	PTE
Will the SO lead to reduction of transport related emissions?	o					
Will the SO lead to improve climate change adaptation?	o					
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	o					
Will the SO support conservation or reconstruction of valuable cultural landscape?	o					
Will the SO support sustainable urban and regional development?	o					

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
Will the SO influence the demand of land take for urban development?	o					
Will the SO enhance protection against natural hazards?	o					
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	o					
Will the SO catalyse the reduction of the share of population exposed to noise?	o					
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	+	P	F	LT	R	PTE
Will the SO promote environmentally friendly transport?	o/+	P	F	LT	R	PTE
Will the SO promote the use of the locally available renewable energy sources?	o/+	P	F	LT	R	PTE
Will the SO promote the combination of Energy systems in the region?	o/+	P	F	LT	R	PTE

The AIO programme expects to increase new innovation approaches, research, and establishment of platforms and transfer knowledge to and between business, users, academia and administration actors. The programme will support transnational frameworks, platforms and networks, training and development of transnational designed products, services, investment models and funding support instruments.

These activities supported by the AIO can have an indirect positive environmental impact (+) in particular in the descriptor 'Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources' where SO 1.1 will have a major potential impact improving resource efficiency concepts and innovation in the region.

The SO can have a minor to non significant impact (o/+) in other descriptors:

- Soil (and Subsoil)
- Ground and surface water
- Air, Climate

These impacts can result from the outcomes of all the actions (transnational frameworks, platforms and networks, training and development of transnational designed products, services, investment models and funding support instruments) that can lead to better energy efficiency, less GHG emissions better resource uses and establishing of new eco-innovation pilots that have lower resources requirements.

A mixed impact (+/-) is foreseen for the biodiversity descriptor in particular on the objective of preventing loss of biodiversity. The actions related with Blue growth can have a positive and/ negative impact over marine and costal biodiversity. The establishment of actions supported by the AIO programme can be for example linked to fisheries or aquaculture that depending on the cases can have a positive impact if is related to establishment of sharing of information and management of marine resources, or have a negative impact if for example the plan or framework puts too much pressure on marine Adriatic areas that area already under heavy pressure (North Adriatic).

## 5.4 Environmental impact - Priority Axis 2 ‘Resourceful Region’

**Thematic Objective 4:** Supporting the shift toward a low-carbon economy in all sectors

**IP 4e:** Promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multi-modal urban mobility and mitigation relevant adaptation measures

- **SO 2.1:** Enhance the potential for the integration of renewable energy sources in integrated transnational and regional low carbon policies, strategies and action plans in the AIO region

The impacts foreseen from the implementation of the SO 2.1 can be found on the below detailed table:

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	o/-	U	O	LT	I	NTB
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	0					
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	0					
Will the SO have effects on the state of contaminated sites?	0					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	0					
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	0					
Will the SO affect the hydro-morphology of river basin systems?	0					
Will the SO create impact on the sustainable use of water resources?	0					
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	0					
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	+	P	O	LT	R	PTE
Will the SO lead to reduction of GHG?	+	VP	F	LT	R	PTE
Will the SO increase energy efficiency?	+	VP	F	LT	R	PTE
Will the SO change the role of renewable energy sources?	+	VP	F	LT	R	PTE
Will the SO lead to reduction of transport related emissions?	0					
Will the SO lead to improve climate change adaptation?	0					
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	0					
Will the SO support conservation or reconstruction of valuable cultural landscape?	0					
Will the SO support sustainable urban and regional development?	0					
Will the SO influence the demand of land take for urban development?	0					
Will the SO enhance protection against natural hazards?	0					

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	0					
Will the SO catalyse the reduction of the share of population exposed to noise?	0					
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	o/+	P	O	LT	R	PTE
Will the SO promote environmentally friendly transport?	0					
Will the SO promote the use of the locally available renewable energy sources?	+	VP	F	LT	R	PTE
Will the SO promote the combination of Energy systems in the region?	+	VP	F	LT	R	PTE

The AIO programme aims to facilitate the integration of RES and low carbon policy instruments in the area with practical responses to the specific needs and challenges, spatial development policies, strategies and processes through the combination of available or potential technological and operational innovations and tools in low carbon systems. These will be implemented by supporting actions to set up transnational frameworks, platforms, strategies policies cooperation structures. The significance of the environmental impact of the implementation of these actions at programme level is quite low. However, indirectly the impact can be assessed as positive (+) for:

- Air quality
- Climate change
- Energy and renewable resources

A negative impact (o/-) is foreseen for the biodiversity descriptor in particular on the objective of preventing loss of biodiversity. The SO 2.1 can in certain cases establish plans/strategies for establishment of renewable energy infrastructures that can result in a following step to impact biodiversity. The impacts of these renewable energy infrastructures (windmills, wave energy, geothermal, solar panels..) have to be subject to an environmental impact assessment (EIA) at project level according to the established in the EIA Directive.

## 5.5 Environmental impact - Priority Axis 3 'Endowed Region' SO 3.1

**Thematic Objective 6:** Protecting the environment and promotion resource efficiency

**IP 6c:** Conserving, protecting, promoting and developing natural and cultural heritage

**SO 3.1:** Promote the sustainable valorisation of natural and cultural assets as growth assets in the AIO Region

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	+/-	VP	F	LT	=	PTE
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	+/-	VP	F	LT	=	PTE
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	o					
Will the SO have effects on the state of contaminated sites?	o					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	o					
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	o					
Will the SO affect the hydro-morphology of river basin systems?	o					
Will the SO create impact on the sustainable use of water resources?	o					
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	o					
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	o/-	U	O	LT	R	PTE
Will the SO lead to reduction of GHG?	o/-	U	O	LT	R	PTE
Will the SO increase energy efficiency?	o/-	U	O	LT	R	PTE
Will the SO change the role of renewable energy sources?	o/-	U	O	LT	R	PTE
Will the SO lead to reduction of transport related emissions?	o/-	U	O	LT	R	PTE
Will the SO lead to improve climate change adaptation?	o					
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	+	VP	F	LT	R	PTE
Will the SO support conservation or reconstruction of valuable cultural landscape?	+	VP	F	LT	R	PTE
Will the SO support sustainable urban and regional development?	+	VP	F	LT	R	PTE
Will the SO influence the demand of land take for urban development?	o					
Will the SO enhance protection against natural hazards?	o					
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	o					
Will the SO catalyse the reduction of the share of population exposed to noise?	o					

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	o					
Will the SO promote environmentally friendly transport?	o					
Will the SO promote the use of the locally available renewable energy sources?	o					
Will the SO promote the combination of Energy systems in the region?	o					

The AIO Programme SO 3.1 is to provide a framework for the exchange and interaction of organisations involved in the protection of **natural and cultural heritage**. It embraces the overall goal of strengthening a transnational identity and supports cooperation structures by developing adapted strategies, tools and models to this end. These include the development of transnational strategies, models, training, test methodologies and can also take shape in small scale investments.

The assessed impact of the SO 3.1 is positive (+) for the landscape and culture heritage descriptors due to the nature and objectives of the SO 3.1 itself. However, there were assessed some negative impacts (o/-) especially at air and climate level due to the expectable increase of number of visitants and traffic. This negative impact is considered not significant and it is uncertain that might occur for all the projects funded under this SO.

Positive and negative impacts (+/-) were assessed for biodiversity. The objectives of the SO have an obvious impact on raising awareness and better managed of natural areas (in particular NATURA 2000 network sites) and thus biodiversity in general will have a positive impact from this SO. But, at the same time the increase access to touristic natural areas might put a pressure on biodiversity and thus result in a negative impact on biodiversity. This impact, in general, is not significant and is uncertain and it will be localized in space depending on the project to be funded by the SO.

## 5.6 Environmental impact Priority Axis 3 ‘Endowed Region’ SO 3.2

**Thematic Objective 6:** Protecting the environment and promotion resource efficiency

**IP 6d:** Protecting and restoring biodiversity, soil protection and restoration and promoting ecosystem services including NATURA 2000 and green infrastructures;

**SO 3.2:** Enhance the capacity in transnationally tackling environmental vulnerability, fragmentation and the safeguarding of ecosystem services in the AIO Region

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	+	VP	F	LT	R	PTE
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	+	VP	F	LT	R	PTE
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	o/+	U	O	LT	R	NTE
Will the SO have effects on the state of contaminated sites?	O					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	O					
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	+	VP	F	LT	R	PTE
Will the SO affect the hydro-morphology of river basin systems?	+	VP	F	LT	R	PTE
Will the SO create impact on the sustainable use of water resources?	+	VP	F	LT	R	PTE
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	+	VP	F	LT	R	PTE
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	O					
Will the SO lead to reduction of GHG?	O					
Will the SO increase energy efficiency?	O					
Will the SO change the role of renewable energy sources?	O					
Will the SO lead to reduction of transport related emissions?	O					
Will the SO lead to improve climate change adaptation?	+	VP	F	LT	R	PTE
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	O					
Will the SO support conservation or reconstruction of valuable cultural landscape?	O					
Will the SO support sustainable urban and regional development?	+	VP	F	LT	R	PTE
Will the SO influence the demand of land take for urban development?	o/+	P	F	LT	R	NTE
Will the SO enhance protection against natural hazards?	+	P	F	LT	R	PTE
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	o/+	P	F	LT	R	NTE
Will the SO catalyse the reduction of the share of population exposed to noise?	o					
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	O					
Will the SO promote environmentally friendly transport?	O					
Will the SO promote the use of the locally available renewable energy sources?	O					
Will the SO promote the combination of Energy systems in the region?	O					

This SO aims to harmonise management approaches, facilitate knowledge transfer and share responsibilities with the goal of integrating environmental interests and ecosystems functions and needs formulated as Blue and Green Growth principles in regional development planning. These will take form through This can be achieved through the provision of a framework for the joint development of tools and methodologies, combination of knowledge bases, but also for common responses in form of strategies, (green) infrastructures, management structures and hazard/risk response mechanisms e.g. via a harmonised transnational operating environment, interoperable information base (databases, platforms, monitoring systems surveillance mechanisms etc.) (output: implementation elements) and a harmonised and coordinated management system (risk assessments, management strategies and plans, sustainability and adaptation assessments etc.).

The environmental impact of this SO is considered positive (+) for almost all the descriptors as the main objective of the SO is precisely to improve and integrate environmental issues in Blue and Green Growth. Therefore the expected indirect impact of the possible funded actions will have a relevant positive impact on the environment. There were not assessed any possible negative impacts from the implementation of this SO.

## 5.7 Environmental impact - Priority Axis 4 SO 4.1

**Thematic Objective 7:** Promoting sustainable transport and removing bottlenecks in key network infrastructures

**IP 7c:** Developing and improving environment-friendly and low-carbon transport systems including [...] inland waterways and maritime transport, ports [...] multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility

**SO 4.1:** Enhance capacity for integrated transport and mobility services and multimodality in the AIO Region

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	+/-	P	F	LT	□	PTE
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	+/-	P	F	LT	□	PTE
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	O					
Will the SO have effects on the state of contaminated sites?	O					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	O					
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	+/-	P	F	LT	□	PTE
Will the SO affect the hydro-morphology of river basin systems?	+/-	P	F	LT	□	PTE
Will the SO create impact on the sustainable use of water resources?	+/-	P	F	LT	□	PTE

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	+/-	P	F	LT	□	PTE
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	+	VP	C	LT	R	PTE
Will the SO lead to reduction of GHG?	+	VP	C	LT	R	PTE
Will the SO increase energy efficiency?	+	VP	F	LT	R	PTE
Will the SO change the role of renewable energy sources?	O					
Will the SO lead to reduction of transport related emissions?	+	VP	C	LT	R	PTE
Will the SO lead to improve climate change adaptation?	O					
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	O					
Will the SO support conservation or reconstruction of valuable cultural landscape?	O					
Will the SO support sustainable urban and regional development?	o/+	U	O	LT	□	NTE
Will the SO influence the demand of land take for urban development?	O					
Will the SO enhance protection against natural hazards?	O					
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	O					
Will the SO catalyse the reduction of the share of population exposed to noise?	o/+	P	F	LT	R	NTE
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	o/+	VP	F	LT	R	PTE
Will the SO promote environmentally friendly transport?	+	VP	F	LT	R	PTE
Will the SO promote the use of the locally available renewable energy sources?	O					
Will the SO promote the combination of Energy systems in the region?	O/+	VP	F	LT	R	PTE

The aim of this SO is to improve transnational coordination among existing services, provided by different modes of transport, creating intermodal systems of existing transport facilities, overcoming discontinuity across borders and the lack of infrastructure. These will be implemented by funding coordinated strategies, concepts and management tools that shall contribute to improving the multimodality of environmentally-friendly freight transport (e.g. rail and river transport). Mobility centres, bus terminals and multi-modal platforms shall be promoted and developed as a potential for consolidating and optimising transport flows for people and goods in order to enhance the efficiency, reliability and quality of greener transport modes and services.

The majority of the likely impacts are indirect and positive (+) these results from the type of actions that will be funded, mostly 'soft' actions aiming at increasing multimodality in **existing** transport systems in the region and thus promote greener transports. These will have a positive impact (G) on air and climate by potentially

reducing CHG emissions, pollutants, noise and indirectly human health related issues. In addition optimised, interconnected and sustainable transport networks would improve the energy efficiency of the domestic ways of life and of productive sectors. In urban areas, this transport optimisation is a major asset for a sustainable development.

A mix of positive and negative potential indirect impacts (+/-) may arise from the implementation of this SO, especially on the descriptors Biodiversity and Water. The possible positive impact results from the optimization and better interconnection of transport, specially road and railway, and reduction of pressure in certain natural areas (e.g. coastal areas). These would result in a positive impact by improving the ecological coherence of the territory by optimizing existing transport infrastructures and non development of new roads or rail-roads, which could have induce natural habitats fragmentation. On the other hand, possible indirect negative impacts might occur on biodiversity and water/marine resources, if the traffic increases in certain marine routes and coastal areas, and new logistic and multimodal infrastructures plans are developed. Biodiversity might be under further pressure from increased marine and coastal traffic, in particular species sensitive to noise, such as cetaceans, and water quality might further deteriorate due to the intensification of traffic.

## 5.8 Environmental impact - Priority Axis 5 SO 5.1

**Thematic objective 11:** Enhancing institutional capacity and an efficient public administration by strengthening of institutional capacity and the efficiency of public administrations and public services related to implementation of the EUSAIR

**IP 11:** JAP (Joint action Plan)

**SO 5.1:** Support the implementation and the governance of the EUSAIR Action Plan

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	=					
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	=					
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	=					
Will the SO have effects on the state of contaminated sites?	=					
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	=					
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	=					
Will the SO affect the hydro-morphology of river basin systems?	=					
Will the SO create impact on the sustainable use of water resources?	=					
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	=					
<b>Air, Climate</b>						

Guiding questions	Nature of the impact	Probability of the impact	Frequency	Duration	Reversibility	Transborder effect
Will the SO lead to reduction of air pollutants?	=					
Will the SO lead to reduction of GHG?	=					
Will the SO increase energy efficiency?	=					
Will the SO change the role of renewable energy sources?	=					
Will the SO lead to reduction of transport related emissions?	=					
Will the SO lead to improve climate change adaptation?	=					
<b>Landscape, Cultural Heritage including Functional utilizations</b>						
Will the SO facilitate protection of cultural heritage?	=					
Will the SO support conservation or reconstruction of valuable cultural landscape?	=					
Will the SO support sustainable urban and regional development?	=					
Will the SO influence the demand of land take for urban development?	=					
Will the SO enhance protection against natural hazards?	=					
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	=					
Will the SO catalyse the reduction of the share of population exposed to noise?	=					
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	=					
Will the SO promote environmentally friendly transport?	=					
Will the SO promote the use of the locally available renewable energy sources?	=					
Will the SO promote the combination of Energy systems in the region?	=					

The objective of this SO is to support the implementation of the EUSAIR Action plan. It is not possible to assess the possible impact of this SO due to its nature and wide objective.

## 5.9 Synergies and cumulative impact

It is possible to assess indirect cumulative negative effects could be caused by the AIO actions that support tourism (SO 3.2) and SO .41– negative impacts could arise by an increase in the volume of traffic and increased tourism pressure. These could induce negative impacts on air quality, noise, GHG emission and primary energy consumption. At the current time it is, however, unclear and uncertain if the AIO will cause such effects. Nevertheless, it is of special importance to promote sustainable mobility solutions (SO 3.2 and SO 4.1) and to implement the recommendations of the SEA process.

## 5.10 Summary of the assessment of environmental impact

The AIO main focus are strategies and capacity building by developing common tools and innovative approach and ensure that results are disseminated and used beyond projects partners and that they reach large number of end-users.

The programme will especially support the constitution of multilevel and intersectoral partnership to overcome administrative and sectoral bottlenecks, with the involvement of the main stakeholders and target groups (local, regional, national and international bodies, public and private) in the area of the smarts and sustainable growth (clustering for the R&D in the blue growth, in promotion of renewable energy, protection of natural and cultural heritage, fighting against loss of biodiversity, multimodal system, etc.).

As a transnational cooperation programme, the AIO **programme will neither support heavy investments**, development of large infrastructures nor scientific and technology research as such. Investments in small scales facilities or infrastructures might be supported in the case of pilot projects and territorial experiences. The AIO programme supports in particular **intangible or 'soft' actions** which could potentially have a long term effect and which provide visibility to the programme (studies and research, networking, dissemination of knowledge and data, etc.).

As such, the impacts will all be of indirect nature due to the objectives of the AIO programme and its support on 'soft' actions and plans. As seen in the table below the general environmental impact of the AIO programme is neutral to positive with no SO having an overall negative impact. To highlight that 39 of the assessments the impact of the AIO programme is positive to the environment.

Priority axes and objectives		Positive impact (+)	Negative impact (-)	Neutral impact (o)	Mixed impact (+/-)	No rating (=)
PA 1	TO1 - SO 1.1	10	0	15	1	0
PA 2	TO4 - SO 2.1	7	1	18	0	0
PA 3	TO6 - SO 3.1	3	5	16	2	0
PA 3	TO6 - SO 3.2	10	0	16	0	0
PA 4	TO7 - SO 4.1	9	0	11	6	0
PA 5	TO11 - SO 5.1	0	0	0	0	26
<b>Total</b>		<b>39</b>	<b>6</b>	<b>76</b>	<b>9</b>	<b>26</b>

The following table shows the impacts by descriptor and AIO programme's Specific Objective (SO):

Guiding questions	SO 1.1	SO 2.1	SO 3.1	SO 3.2	SO 4.1	SO 5.1
<b>Biodiversity</b>						
Does the SO support the EU 2020 objective to stop the loss of biodiversity?	+/-	o/-	+/-	+	+/-	=
Will the SO improve the quality and/or quantity of protected areas, especially the NATURA 2000 network?	o	o	+/-	+	+/-	=
<b>Soil (and Subsoil)</b>						
Will the SO help to protect soil attributes and soil sealing?	o	o	o	o/+	o	=
Will the SO have effects on the state of contaminated sites?	o	o	o	o	o	=
Will the SO promote sustainable waste management with focus on avoiding waste dumping and reducing land filling?	o/+	o	o	o	o	=
<b>Ground and surface water</b>						
Will the SO influence the surface and/or ground water quality in the sense of the Water Framework Directive ('good ecological and chemical status')?	o	o	o	+	+/-	=
Will the SO affect the hydro-morphology of river basin systems?	o	o	o	+	+/-	=
Will the SO create impact on the sustainable use of water resources?	o/+	o	o	+	+/-	=
Will the SO strengthen the coordination among international water basins for the management of water resources and the achievement of environmental objectives, including the management and prevention of risks, and the implementation of corrective actions?	o	o	o	+	+/-	+
<b>Air, Climate</b>						
Will the SO lead to reduction of air pollutants?	o/+	'+'	o/-	o	'+'	=
Will the SO lead to reduction of GHG?	o/+	'+'	o/-	o	'+'	=
Will the SO increase energy efficiency?	o/+	'+'	o/-	o	'+'	=
Will the SO change the role of renewable energy sources?	o/+	'+'	o/-	o	o	=
Will the SO lead to reduction of transport related emissions?	o	o	o/-	o	'+'	=
Will the SO lead to improve climate change adaptation?	o	o	o	'+'	o	=
<b>Landscape, Cultural Heritage including Functional utilizations,</b>						
Will the SO facilitate protection of cultural heritage?	o	o	+	o	o	=
Will the SO support conservation or reconstruction of valuable cultural landscape?	o	o	+	o	o	=
Will the SO support sustainable urban and regional development?	o	o	+	'+'	o/+	=
Will the SO influence the demand of land take for urban development?	o	o	o	o	o	=
Will the SO enhance protection against natural hazards?	o	o	o	+	o	=
<b>Population, Human Health</b>						
Will the SO support endeavours to reduce environmental related health risks?	o	o	o	o/+	o	=
Will the SO catalyse the reduction of the share of population exposed to noise?	o	o	o	o	o/+	=
<b>Resource efficiency and conservation/sustainable resource management including environmentally friendly transport/sustainable mobility systems and Energy efficiency and renewable energy sources</b>						
Will the SO support the resource efficiency concepts and innovation in the region?	+	o/+	o	o	o/+	=
Will the SO promote environmentally friendly transport?	o/+	o	o	o	'+'	=
Will the SO promote the use of the locally available renewable energy sources?	o/+	'+'	o	o	o	=
Will the SO promote the combination of energy systems in the region?	o/+	'+'	o	o	o/+	=

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## 6 Description of measures to minimize significant impacts of the Programme on the environment

Annex 1 of the SEA Directive requires the Environmental Report to set out 'the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme'. This chapter therefore sets out mitigation measures appropriate to minimising the adverse effects identified in Chapter 6.

It must be noted that responsibility for carrying out these mitigation measures does not necessarily lay with the AIO programme Managing Authority. Responsibility may lie with other public departments and agencies, or may be addressed through the planning system e.g. through compliance with legislation and planning policy, developer contributions and Environmental Impact Assessments (EIA) as appropriate.

The programme could underline the importance of environmental issues regarding sustainable growth in **the project selection process**. For example, with a dedicated application form that could make it possible to have a **prior environmental assessment of projects**.

The AIO programme could indicate the project proposals can give output indicators on environmental issues (where applicable according to the objectives of the project).

The programme could also foresee that the project applications integrate **environmental impact indicator(s)**, defined in respect to the environmental objectives of the Programme. These indicators would then be common to all projects.

Furthermore, in case of **pilot demonstration activities launchings/deployments**, each project should present a prior study of environmental impacts. This impact assessment shall study, in particular, how the project localisation is related to protection areas classified in respect to environmental regulations, in particular to NATURA 2000 and Emerald networks.

## 7 Monitoring

SEA Directive requires the treatment of the following topic within the Environmental Report: 'a description of the measures envisaged concerning monitoring in accordance with Article 10'

The monitoring of possible negative environmental impacts can be implemented on two levels:

- in the framework of the project selection process;
- within the programme monitoring process.

A system can be used to assess the environmental impacts of the projects within the project selection process – based on a self-assessment of the project proposal which is verified during application process. As such projects with significant negative environmental impact can be excluded. In this context, the SEA team recommends to integrate core questions on the environmental output of the project into the project application:

- Contribution to efficiency in the use of resources (e.g. energy efficiency, renewable energy use, reduction of greenhouse gas (GHG) emissions, efficient water supply, waste-water treatment and water reuse, sustainable land use, waste management and recycling etc.);
- Contribution to the development of Green and Blue infrastructures;
- Contribution to sustainable integrated urban and regional development;
- Contribution to better awareness for the adaptation to climate change and risk prevention;
- Promotion of employment opportunities, education, training and support services in the context of environment protection and sustainable development.

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- Directive 2006/7/EC
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## 9 Annex – consultation documentation