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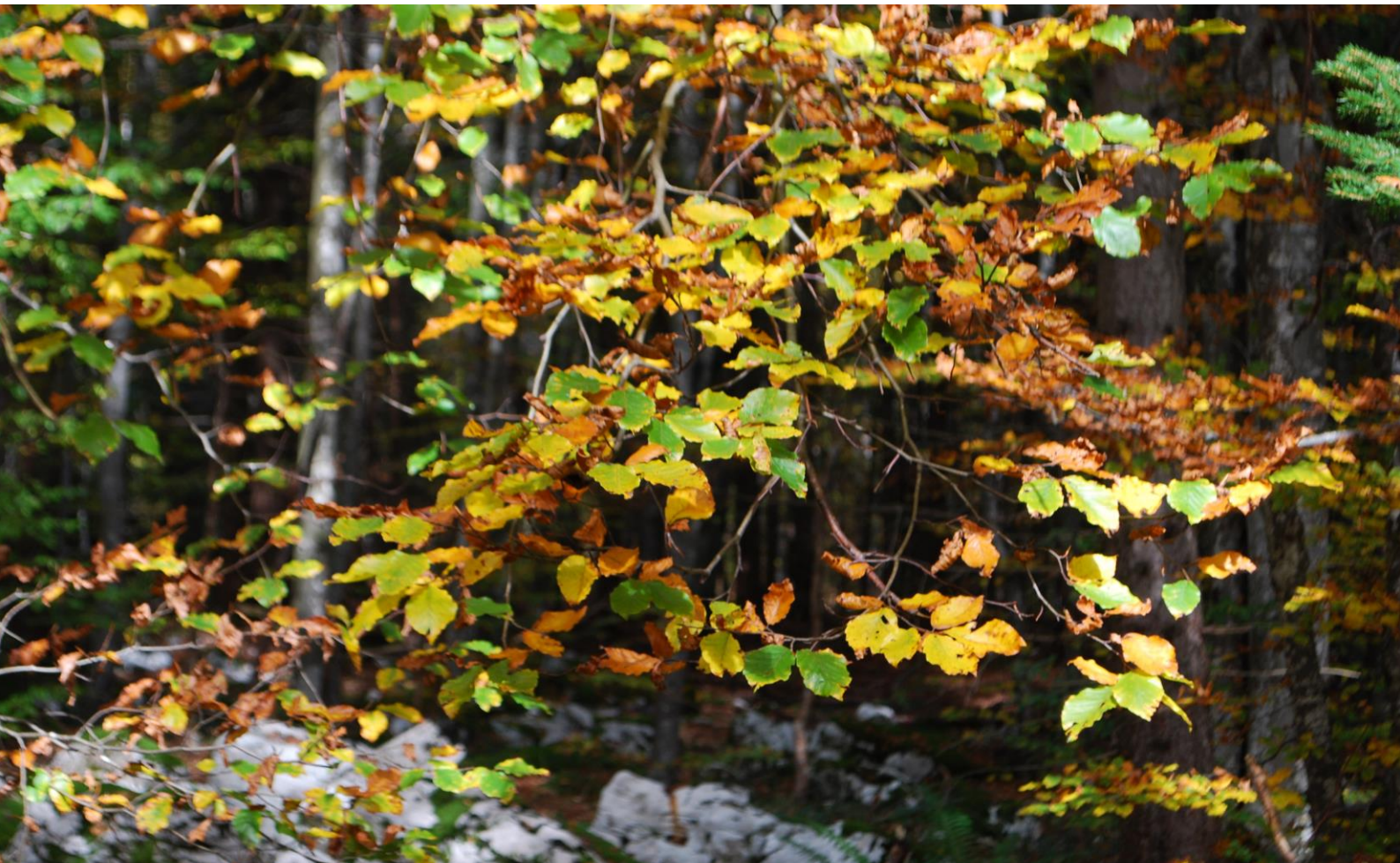
ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

Interreg IPA Cross-border Cooperation Programme
Croatia-Bosnia and Herzegovina-Montenegro
2014-2020

# STRATEGIC ENVIRONMENTAL IMPACT STUDY

Final revised versions that incorporates inputs from consultations with the public and relevant authorities

Zagreb, May 2015



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# TERMS AND ACCRONYMS

| | |
|---|---|
| BiH | Bosnia and Herzegovina |
| CBC | Cross Border Cooperation |
| CP | Cooperation Programme |
| HR | Republic of Croatia |
| EC | European Commission |
| EU | European Union |
| EUSAIR | European Union Strategy for the Adriatic and Ionian Region |
| IPA | Instrument for Pre-Accession Assistance |
| MNE | Montenegro |
| MENP | Ministry of Environmental and Nature Protection |
| MRDEUF | Ministry of Regional Development and EU Funds |
| Programme area | Area targeted by interventions proposed in this cooperation programme |
| SEA | Strategic Environmental Assessment |
| SEA Directive | Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. |
| SO | Specific objective |

# NON-TECHNICAL SUMMARY

## Introduction

This SEA study is prepared for the proposed Interreg IPA Cross-border Cooperation Programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020 (hereafter cooperation programme) that aims to strengthen the social, economic and territorial development of the cross-border area between Croatia, Bosnia and Herzegovina and Montenegro.

The programme has been prepared for an area covering 12 counties on the Croatian side, 109 municipalities on the side of Bosnia and Herzegovina and District Brčko and 10 municipalities on the Montenegrin side. This amounts to total of 87.453.95 $km^2$ of programme area with 5.587.836 inhabitants.

The programme has a total indicative EU budget of EUR 57.155.316 million for the 2014-2020 period. With this budget and territorial focus, the cooperation programme focuses on four priority axes:

- **Priority Axis 1: Improving the quality of the services in public health and social care sector (8.573.297 €)** with one Specific Objective
  - *1.1 ´To improve services in the area of public health and social sector across the borders´*

- **Priority Axis 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency (14.288.830 €)** with two Specific Objectives:
  - *2.1. ´To promote and improve environment and nature protection and management systems for risk prevention´ and*
  - *2.2. ´To promote utilization of renewable energy resources and energy efficiency´*

- **Priority Axis 3: Contributing to the development of tourism and preserving cultural and natural heritage (17.146.595 €)** with one Specific Objective:
  - *3.1. ´To strengthen and diversify the tourism offer through cross border approaches and to enable a better management and sustainable use of cultural and natural heritage*

- **Priority Axis 4: Enhancing competitiveness and developing business environment in the programme area (11.431.063 €)** with one Specific Objective
  - *4.1 ´To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area´*

The programme will be implemented through various calls for proposals. Support to projects and ad-hoc application procedures and templates will be developed for each call for proposals. Calls for proposals might have different characteristics, i.e. they might be open to all programme priorities or thematically targeted in response to changed framework conditions in the area and/or taking into consideration the progress of the programme implementation. All these documents will be widely circulated and available from the programme and national websites.

### Relationship of the proposed cooperation programme with other relevant plans and programmes

The main aim of EU-funded cross border cooperation programmes is to reduce the negative effects of borders as administrative, legal and physical barriers, tackle common problems and exploit untapped potential.

The main added value of cross-border cooperation is that it helps to better address similar threats and to promote more balanced development. In this regard, Interreg IPA Cross-border Cooperation Programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020 has important relationship to especially European Union Strategy for the Adriatic and Ionian Region (EUSAIR).

EUSAIR has indicative Environmental Quality targets that basically address threats to coastal and marine biodiversity, pollution of the sea and transnational terrestrial habitats and biodiversity. Our assessment concluded that the proposed Interreg IPA Cross-border Cooperation Programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020 directly addresses all the relevant EUSAIR environmental quality targets and there is no need for adjustments.

## State of the environment and the existing environmental problems in the proposed programme

### Seismic risks

The Natural Disaster Risks and Risk Assessment in South East Europe indicate that area addressed within the Cooperation Programme is highly exposed to seismic hazards. On average at least one earthquake strikes the Western Balkans at VII intensity (MSK scale) every three years, at VIII intensity every 15 years, and at XI intensity or higher every 60 years.

### Climate change, floods and risks

In South East Europe meteorological data so far show only a small temperature rise for the region during the 20th century, and small decline in precipitation, although neither of these is significant enough to identify a clear trend separate from normal climate variability. However, major changes are predicted for the region during the next century. Climate models agree that South East Europe will experience significant rises in temperature, diminishing precipitation, and potentially damaging sea-level rise.

The average temperature is expected to rise across all three countries, within outside bounds of 1.0 to 5.5˚C by the end of the century. Most models agree that precipitation will decrease throughout the eastern Mediterranean. Surface runoff (a measure of water availability) will decline by up to 36 % by the end of the century, and peak flows of rivers during the summer will also decreases. While precipitation will decrease overall, most models agree that it will fall in fewer, more intense events, with longer dry periods between events. The risk of flash-flooding is likely to increase in the short term at least, as the rise in rainfall intensity makes this hazard more frequent, also raising the risk of associated hazards such as soil erosion and landslides. Towards the end of the century, flooding is likely to decrease in overall frequency, with extreme floods becoming more common.

Global sea levels are predicted to rise between 0.09 and 0.88 m by 2100, and sea-level rise in the Mediterranean is potentially a significant risk for Croatia and Montenegro. However, it is difficult to predict the exact effects of sea level rise along the Adriatic coast due to the fact that the area is tectonically highly active, and local uplift or subsidence could have a greater influence on coastal dynamics than sea level rise.

Meanwhile, rising sea temperatures in the Adriatic are likely to lead to higher wind speeds along the coast, and stronger storms in general, raising the risk of coastal flooding from storm surges, and increasing the likelihood of inundation of vulnerable and ecologically delicate habitats such as wetlands

and river deltas in Croatia and Montenegro. More violent storms may threaten coastal areas of Croatia and Montenegro, and cause flash-flooding in inland parts of the programme area.

UNDP, WMO and World Bank and UN/ISDR secretariat[1] indicate that there is a considerable lack of capacities in the region and that applications and utilization of risk information remain a challenge. While the implementation of risk assessments is slowly increasing in the region, most of the efforts end up in data, technical reports and/or maps that are not necessarily utilized by end users (decision makers, communities, sectors) to support their decision processes or development planning.

**Biodiversity, fauna, flora**

The programme area has a rich biodiversity in comparison to the average European region, with many endemic species. Several eco-regions stretch across borders. These eco-regions include the Illyrian deciduous forests, the Dinaric Mountains and the Pannonian mixed forests. The Region also contains a number of unique ecosystems, including karstic regions and tectonic lakes. It also host habitats and landscape elements of central importance for large carnivores such as the wolf, Eurasian lynx and brown bear which require large habitats to sustain viable populations.

Of specific trans-boundary interest in the programme area is the presence of *Adriatic Flyway* which is one of the main routes for millions of migratory birds crossing the Mediterranean, with birds making a resting stop along the eastern Adriatic. Another trans-boundary interest is also the presence of *large carnivores* – brown bear, lynx and wolf -because of their wide distribution and migration among the countries in the programme area.

Other trans-boundary interest in the programme area concerns the Sava River Basin system which features outstanding biological and landscape diversity. It hosts the largest complex of alluvial wetlands such as Posavina in the Central Sava Basin and large lowland forest complexes. The Sava River and some of its tributaries offer a unique example of a river with some of the floodplains still intact, thus supporting the flood alleviation and biodiversity. It hosts the largest complex of alluvial floodplain wetlands in the Danube basin and the largest lowland forests. The Sava is a unique example of a river where the floodplains are still intact, supporting both floods alleviation and biodiversity. It has been selected as a focal area in the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

Lastly, the major part of the programme area belongs to the Dinaric karst area where *karst fields* (or 'krška polja') have great ecological, hydrological, cultural and economic value. In terms of biodiversity, karst fields are important as wetlands and grasslands of high conservation value as well as important bird areas and should be carefully protected.

**Hazardous waste and pollution hotspots**

Croatian part of the programme area features the following hotspot that are largely associated with the chemical, petrochemical, machinery manufacture, metallurgical, food and oil industries:

- Factory Salonit d.d. (asbestos cement waste), Mravinačka kava
- Red mud pool and the waste lye of the former alumina plant next to Obrovac
- Unarranged depository with location large quantities of hazardous waste Lemić Brdo next to Karlovac
- Site with slag and ashes-depository of slag in Kaštela Bay.

[1] World Bank and UN/ISDR: South Eastern Europe Disaster Risk Mitigation and Adaptation Initiative Risk Assessment for South Eastern Europe Desk Study Review

Furthermore, the Waste Management Plan identified four more "hot-spot" created by long-term inappropriate management of industrial (technological) waste:

- Factory Borovo in Vukovar (remediation of first phase finished in 2010);
- Fuel oil in the screw factory (former TVIK factory) in Knin (remediation plan prepared through Phare 2006 project);
- Area of the closed factory of electrodes and ferroalloys in Šibenik (EPEEF provided loan for remediation);
- Island of Biševo - tar on the Salbunara beach (remediation finished in 2008).

In Bosnia and Herzegovina, there are 6 hotspots in the programme area:

- Mostar Refinery & Smelter
- Jajce smelter
- Jalovište Srebrenica
- Modriča – gudronska jama
- Brod – gudronska jama
- Biračka regija – crveni mulj.

Opinions received from Bosnia and Herzegovina during the consultations on this SEA study also suggest that polluting facilities in Zenica and Maglaj should be added to the above six priority as well as the Pljevlje mine and the hydropower electricity plant on the river Piva in Montenegro that are sources of transboundary environmental risks that should be addressed accordingly.

In Montenegro, four industrial plants) were listed as potential hotspots (both national and/or transboundary), out of which 2 are in the programme area:

- Niksic steel plant;
- Podgorica Alumina plant, Aluminum smelter and rolling mill(s)

Considering the above facts, it was recommended to add decreasing of air pollution should be among the priorities of the proposed Cooperation Programme – and this proposal was fully accepted.

## Overview of key expected impacts of the proposed programme

The design of the programme - reflecting its focus on cross-border cooperation, nature of eligible activities and a rather limited budget - allows to support activities that address some of the most urgent trans-boundary environmental problems. In addition to these positive impacts, the programme includes some proposals that - like any other development activities - pose some risks of adverse impacts on the environment. The expected impacts of the programme are shortly summarized in the matrix below:

| **Matrix of interactions between proposed Specific Objectives for each of the Priority Axes and their environmental implications** | | **Climate change mitigation** | **Climate change adaptation** | **Air quality** | **Soil and agriculture** | **Water quality** | **Forests** | **Biodiversity** | **Ecological network** | **Cultural heritage** | **Public health** | **Waste and resource mgmt.** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Priority Axis 1: Improving the quality of the services in public health and social care sector (8.573.297 €)** | | | | | | | | | | | | |
| 1.1 | To improve services in the area of public health and social sector across the borders | | | | | | | | | | | |

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| **Priority Axis 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency (14.288.830 €)** | | | | | | | | | | | | |
| 2.1 | To promote and improve environment and nature protection and management systems for risk prevention | | | | | | | | | | | |
| 2.2 | To promote utilization of renewable energy resources and energy efficiency | | | | | | | | | | | |
| **Priority Axis 3: Contributing to the development of tourism and preserving cultural and natural heritage (17.146.595 €)** | | | | | | | | | | | | |
| 3.1 | To strengthen and diversify the tourism offer and to enable a better management and sustainable use of the cultural and natural heritage | | | | | | | | | | | |
| **Priority Axis 4: Enhancing competitiveness and developing business environment in the programme area (11.431.063 €)** | | | | | | | | | | | | |
| 4.1 | To enhance institutional infrastructure and services in order to accelerate the competitiveness of business environment in the programme area | | | | | | | | | | | |

Key:

| | |
|---|---|
| | Likely significant impacts expected, impacts can be either positive or negative |
| | Potential impacts expected, impacts can be either positive or negative |
| | No significant impact expected |
| | Likely significant adverse impacts expected |
| | Potential adverse impacts expected |
| | Likely significant positive impacts expected |
| | Potential positive impacts expected |

The following text summarizes the nature of the proposed interventions, their possible impacts and recommendations formulated within this SEA study.

## Findings regarding Specific Objective 1.1.

The programme´s proposed Specific Objective 1.1. ´**To improve services in the area of public health and social sector across the borders**´ envisages that support will be provided to improving accessibility, quality and effectiveness of public health and social care institutions, developing ICT solutions and joint lifelong learning and training programmes addressing skills and needs in the area of health and social care, joint strengthening of health care for vulnerable groups, networking of organisations in order to create joint activities for enhancing accessibility to health and social services and implementing exchange of experience concerning the transfer of good practices.

These interventions are expected to have minor positive impacts on public health. No adverse impacts are expected.

This SEA recommends that the following measures can be taken in order to enhance positive environmental impacts of the proposed interventions:

a. Supported facilities for health and social services should be located in flood-safe areas and should be easily accessible in emergency situations (e.g. not be cut-off by floods).
b. Development or modernization of buildings must meet all applicable environmental requirements and should ideally demonstrate good environmental building practices - e.g. easy accessibility for

public transport, accessibility for people with disabilities, energy efficiency, sound waste collection, etc.

### Findings regarding Specific Objective 2.1.

The programme´s proposed Specific Objective 2.1. ´**To promote and improve environment and nature protection and management systems for risk prevention**´ aim to support developing and implementing joint initiatives for biodiversity protection and environmental management, improving emergency preparedness and risk prevention systems for key cross-border hazards such as (fire, floods, draughts and other disasters) and implementing projects for reducing or mitigating environmental problems and risks including small-scale infrastructure.

The proposed interventions under Specific Objective 2.1 include actions related to environmental protection which are expected to have positive impacts without any risks of adverse impacts. Our recommended measures for actions related to joint environmental management initiatives are:

a. Consider adding ´monitoring and management of large carnivore populations and their habitats´, ´protection and restoration of coastal wetland areas and karst fields´ and ´joint initiatives on trans-boundary marine protected areas´ amongst examples of eligible joint environmental management initiatives;
b. If suitable applications arrive, prioritize trans-boundary cooperation related to protection of Sava River Basin floodplains and especially those in Central Posavina; and cooperation for connecting National Park Sutjeska in Bosnia and Herzegovina with National Park Durmitor and the planned Regional Park Maglic, Bioc and Volujak in Montenegro, and cooperation on improving forest ecosystems with the goal to protect them from floods, prevention of erosion and reducing climate changes. Transboundary cooperation on forest protection against fires, plant deceases and pests-
c. Eligible activities may also include those related to trans-boundary air pollution, especially air pollution in Slavonski Brod and Brod-Posavina County which is caused by industry “Rafinerija nafte Brod” from the Bosnia and Herzegovina, as well as pollution from other potential sources that could be significant in trans boundary terms.

On the other hand, the Specific Objective 2.1 include actions related to disaster risk reduction and management which may have both positive or adverse impacts on flooding, water quality and possibly also biodiversity - depending on the exact choice of measures to be supported. Our recommendations for actions related to emergency preparedness and risk prevention systems and small/scale investments for reducing or mitigating environmental problems and risks are as follows:

d. Consider also adding mapping of various water pollution hazards in the flood zones in accordance with the EU Floods Directive as part of single disaster risk prevention and management system as part of emergency preparedness and risk prevention systems.
e. If suitable applications arrive, prioritize trans-boundary cooperation for emergency preparedness and measures to address water pollution hazards in Neretva river and Mali Ston Bay, Una river, Krka river, Cetina river and Drina river
f. All supported activities on flood protection should promote a long-term flood protection and retention approach and aim to expand natural retention by e.g. promoting the ´room for river´ approach that allows flooding during periods of high discharge. Supported measures must not restrict natural retention of flood plains.
g. Flood prevention and drought protection projects should not be planned on locations where they will not have a negative impact on the Ecological Network target features or integrity, and cannot worsen ecological status of water bodies.

h. Supported infrastructural projects must be subject to applicable environmental standards and be subject - as and when needed - to applicable environmental impacts assessments, assessments of impacts on Natura 2000 network and must include consultations on trans-boundary impacts (if such impacts are expected).

## Findings regarding Specific Objective 2.2.

The programme´s proposed Specific Objective 2.2. ´**To promote utilization of renewable energy resources and energy efficiency**´ plans to promote utilization of renewable energy production and energy efficiency in the programme area through exchange of experience; elaboration of joint studies and capacity building; implementing joint pilot projects, joint investments in public infrastructure and joint incentives in order to improve planning and regulatory framework.

Although these interventions will have positive impacts on both climate change mitigation concerns (reductions in $CO_2$ emissions) and also adaptation concerns (adaptation to changing climatic conditions), there are several risks associated with their implementation. Renewable energy development may have - depending on the types of supported renewable energy options and their locations - adverse impacts especially on biodiversity, Natura 2000 network, water quality, landscape and cultural heritage.

In order to reduce these risks and enhance positive impacts of proposed activities, this SEA recommends that priority support within this Specific Objective should be given to:

a. energy efficiency measures in public buildings (such as hospitals, schools - where possible synergies with interventions under Thematic Priority 1 Health and Social services exist)
b. use of agricultural waste for energy production,
c. demonstration projects for solar power on roofs or build surfaces as long as they do not have adverse visual impacts on the landscape amenity.

We also recommend that:

d. Supported projects must be subject to applicable environmental and health protection standards and be subject (when needed) to: environmental impacts assessments, assessments of impacts on Natura 2000 network and consultations on trans-boundary impacts (if such impacts would be expected).
e. Wind turbines and large solar parks should not be planned within areas important for bird preservation (Special Protection Areas, SPA).
f. Large solar parks and hydropower plants should not be planned within areas important for preservation of species and habitat types (Special Areas of Conservation, SAC)
g. Wind turbines and solar parks should not be located on very valuable agricultural soil (P1) and valuable agricultural soil (P2).
h. It is recommended to finance smaller-scale solar power projects (use of several panels, rather than large parks). Solar parks should be limited to already built urban areas.
i. Any larger-scale promotion of biomass farming should be permitted only if it can be proved that it will not lead to the deterioration of already achieved state of any water body surface and groundwater. Biomass farming should not be supported on vulnerable areas under Nitrate Directive, unless such project applications prove that the choice of crops and farming practice will not increase fertilizers and pesticides loads.
j. Targeted support can be provided to elaboration of renewable energy plans on local/regional level in the study area and their optimizing through SEA processes. Such plans may be helpful for guiding preparations of specific investment projects and they can simplify environmental permitting processes (if SEA it done well). Such plans, can also consider any possible trans-boundary impacts.

## Findings regarding Specific Objective 3.1.

The programme´s proposed Specific Objective 3.1.´ **To strengthen and diversify the tourism offer and to enable better management and sustainable use of cultural and natural heritage'** envisages that support will be provided especially to cross-border networking of institutions in tourism sector; developing, promoting and branding of joint tourism niches and products for diversification of tourism offer; developing complementary services in tourist offer that utilize natural and cultural potentials of the programme area; promoting and introducing (international) certifications and standards; supporting destination management; and developing innovative offers and services using ICT and other technologies (e.g. GPS routes, booking systems); valuating, preserving, restoring and reviving cultural, historical and natural heritage, including improving access to them, joint cultural events such as cultural festivals, cultural exchange; training programs in quality assurance systems and different types of standardisation (e.g. ISO certification, etc.) on cultural and natural heritage and small scale infrastructure related to cultural and natural heritage

The cooperation programme also include a **strategic project ´Adriatic Hinterland´** which will support the first phase of a planned 10-year programme that aims to provide incentives for the development of rural tourism and related infrastructure in hinterland areas of HR, BA, and ME. The project will include - among other - creation of "Adriatic hinterland" touristic product visual identity, active promotion of the destination through available information channels, identification of priority investments and technical assistance and capacity building for local stakeholders interested in the programme. These interventions may have some local impacts on biodiversity and Natura 2000 network with possible minor local impacts on water quality, landscape and cultural heritage. These interventions are also expected to bring positive impacts on cultural heritage and also possibly on natural heritage sites. However, inappropriate implementation of these activities poses risks of unintended adverse impacts on tangible and intangible attributes of heritage sites and on nature heritage sites. Our recommended measures for reducing risks of adverse impacts and enhancing positive environmental impacts of these interventions are:

a. Consider prioritizing eco/agro-tourism activities that contribute to sustainable development in protected areas.
b. Ensure, in the project preparatory phase, that no important and protected habitats and species (target features) are endangered by the planned infrastructure and activities and that the proposed projects do not worsen existing status of surface water and groundwater bodies.
c. Consider needs related to waste management and also waste-water treatment (using e.g. cheap decentralized options that can well cope with short-term pollution peaks during summer periods) as part of preparation of projects in the destination that will be prioritized for targeted promotion.
d. The supported projects must meet all applicable national rules for cultural heritage protection.
e. It is also recommended to inform prospective applicants about the following principles that should guide their planning of interventions for sustainable use of cultural and natural heritage:
    - Conservation plans must contribute to the authenticity and integrity of the sites and monuments and their tangible and intangible elements.
    - Conservation plans must address all relevant factors necessary for adequate long-term safeguarding and sustainable use of the heritage site or monument.
    - The principal objectives of the conservation plans should be clearly stated. The proposals in the conservation plan must be articulated in a realistic fashion, from the legislative, financial and economic point of view, as well as with regard to the required standards and restrictions.
    - The conservation plans should aim at ensuring a harmonious relationship between the heritage sites and monuments and the surrounding environment as a whole. Wherever necessary for the proper protection of the property, an adequate buffer zone should be provided.

- New functions and activities should be compatible with the character of the heritage sites and monuments. Proponents must ensure that such changes do not impact adversely on the outstanding value of the heritage site or monument.
- Before any intervention, existing conditions in the area should be thoroughly documented.
- Conservation planning should therefore encourage the active participation of the communities and stakeholders concerned with the property as necessary conditions to its sustainable protection, conservation, management and presentation.

## Findings regarding Specific Objective 4.1.

The programme´s proposed Specific Objective 4.1 ´**To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area**´ aims to support - among others - the business-support institutions and networks in order to enhance standardisation, certification, product protection, research, marketing, e-commerce and development of cross-border markets; competitiveness and education and training in entrepreneurship skills; actions directly linked to attracting direct investments in the programme area; and research and development activities in order to increase competitiveness.

These interventions are not expected to have any significant impacts on the environment. In order to enhance their potential positive environmental impacts, we recommend considering potential support to business clusters that address opportunities arising from:

- organic agriculture products,
- sustainable farming and collection of organic aromatic herbs and their promotion on international markets.

## Alternatives considered, uncertainties and the need for environmental monitoring

This SEA study has focused on the two alternatives - ´do nothing´ and ´proposed programme´. Information provided within Chapters 5 and 6 of this study outline the expected impacts of proposed programme as compared with ´do nothing´ option. The SEA was conducted in ex-ante manner during final 4 months of the programme elaboration. Within this context, the assessment aimed to identify possible problems and measures during the formulation of the programme itself- and indeed, several recommendations, especially those related to Priority Axis 2 were directly incorporated into the proposed version of the cooperation programme. In this regard, the Managing Authority and the programming team strived to optimize the cooperation programme so that it does not pose - on the level of the programme itself - any risks to environment and maximizes opportunities for achieving positive impacts on the environment. The recommendations provided within this SEA study should be treated as additional detailed safeguards to ensure that this happens.

The assessment itself has not been constrained by any difficulties, except facing the usual challenge of having no information about the exact features and locations of future activities that will be actually supported during the implementation of the cooperation programme. The assessment therefore considered the likely possible scenarios of possible implementation without being speculative (by e.g. considering extreme hypothetical options). Other than these usual challenges, there were no constrains in the SEA process and the conclusions made are not bound by any significant uncertainties.

Due to the absence of significant risks and uncertainties on the programme-wide level, the SEA study concluded that there is no need for dedicated environmental monitoring system for the proposed Interreg IPA CBC programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020.

However, joint environmental management initiatives under the programme Specific Objective 2.1 may provide useful data on biodiversity protection, water quality, flood risks and related hazards. Any proposals for monitoring systems should be therefore consulted with the relevant national authorities in order to maximise potential synergies with higher-level monitoring systems.

# 1 INTRODUCTION TO PROPOSED PROGRAMME

This SEA study is prepared for the Interreg IPA Cross-Border Cooperation Programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020. This chapter presents the main objectives of the proposed cooperation programme, its implementation modality and envisaged activities, and its relationship with the relevant macro-regional strategy.

## 1.1 Outline of the programme

The overall objective of the cooperation programme is to strengthen the social, economic and territorial development of the cross-border area between Croatia, Bosnia and Herzegovina and Montenegro.

The programme area covers 12 counties on the Croatian side, District Brčko and 109 municipalities on the side of Bosnia and Herzegovina and 10 municipalities on the Montenegrin side. This amounts to total of 87.453.95 $km^2$ of programme area with 5.587.836 inhabitants.

On the Croatian side the programme territory covers 38.405.00 km2 and includes following counties: Zagreb County, Sisak-Moslavina County, Karlovac County, Bjelovar-Bilogora County, Lika-Senj County, Požega-Slavonia County, Brod-Posavina County, Zadar County, Šibenik-Knin County, Vukovar-Srijem County, Split-Dalmatia County, Dubrovnik-Neretva County..

On the side of Bosnia and Herzegovina, the programme territory covers 42.540.95 km2 and includes Brčko District and following municipalities: Bijeljina, Teočak, Ugljevik, Lopare, Tuzla, Lukavac, Čelić, Srebrenik, Petrovo, Gračanica, Doboj Istok, Gradačac, Pelagićevo, Donji Žabar, Orašje, Domaljevac-Šamac, Šamac, Modriča, Vukosavlje, Odžak, Bosanski Brod, Srebrenica, Bratunac, Milići, Han-Pijesak, Vlasenica, Kladanj, Šekovići, Kalesija, Osmaci, Zvornik, Banovići, Živinice, Sapna, Prnjavor, Srbac, Laktaši, Čelinac, Kotor Varoš, Kneževo, Dobretići, Šipovo, Jajce, Jezero, Mrkonjić Grad, Banja Luka, Gradiška, Kozarska Dubica, Prijedor, Oštra Luka, Sanski Most, Ključ, Ribnik, Glamoč, Bosansko Grahovo, Drvar, Istočni Drvar, Petrovac, Bosanski Petrovac, Bosanska Krupa, Krupa na Uni, Novi Grad, Kostajnica, Bužim, Velika Kladuša, Cazin, Bihać, Doboj, Derventa, Prozor/Rama, Konjic, Nevesinje, Gacko, Bileća, Trebinje, Ravno, Ljubinje, Berkovići, Mostar, Jablanica, Kupres, Kupres (RS), Tomislavgrad, Posušje, Široki Brijeg, Čitluk, Stolac, Neum, Čapljina, Ljubuški, Grude, Livno, Istočni Mostar, Doboj Jug, Kakanj, Maglaj, Tešanj, Usora, Zavidovići, Zenica, Žepče, Bugojno, Busovača, Donji Vakuf, Gornji Vakuf-Uskoplje, Novi Travnik, Travnik, Vitez i Teslić.

On the Montenegrin side the programme territory covers 13.812.00 km2 and includes municipalities as follows: Herceg Novi, Kotor, Tivat, Budva, Bar, Ulcinj, Cetinje, Nikšić, Podgorica, Danilovgrad.

Within this area, the cooperation programme focuses on four thematic priorities:

1. Public health and social care sector
2. Environment, biodiversity, risk prevention, sustainable energy and energy efficiency
3. Tourism and cultural and natural heritage
4. Competitiveness and business environment development

The programme has a total indicative budget of EUR 57.155.316 million ERDF/IPA for the 2014-2020 period. The programme is expected to reach the following objectives and results within each of its Priority Axes.

**Table 1: The Priority Axes and Specific Objectives of the Interreg IPA Cross-Border Cooperation Programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020**

| Priority Axes of the Cooperation programme | Specific Objectives of Priority Axes |
|---|---|
| Priority Axis 1: Enhancing public health and social care (8.500.000 €) | 1.1 To improve services in the area of public health and social sector across the borders |
| Priority Axis 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency (14.200.000€) | 2.1. To promote and improve environment and nature protection and management systems for risk prevention |
| | 2.2. To promote utilization of renewable energy resources and energy efficiency |
| Priority Axis 3: Contributing to the development of tourism and preserving cultural and natural heritage (17.100.000 €) | 3.1. To strengthen and diversify the tourism offer and to enable a better management and sustainable use of the cultural and natural heritage |
| Priority Axis 4: Enhancing competitiveness and developing business environment in the programme area (11.400.000 €) | 4.1 To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area |

The cooperation programme will be implemented through selection of applications for projects support made in various calls. Calls for proposals might have different characteristics, i.e. they might be open to all programme priorities or thematically targeted in response to changed framework conditions in the area and/or taking into consideration the progress of the programme implementation (also as follow-up of the independent programme evaluation).

## 1.2 Types of actions to be supported within the programme

The managing authority for the programme will prepare information about the application and selection process and will make it available to potential applicants in call-specific application documents. The programme envisages that ad-hoc application procedures and templates will be developed according to the specific characteristics of each call for proposals. The information and application package will include the necessary guidance to assist partnerships in the preparation of their application. All these documents will be widely circulated and available from the programme and national websites.

The programme foresees that the following types of actions will be supported under its various specific objectives.

Specific Objective 1.1. ´**To improve services in the area of public health and social sector across the borders**´ envisages that support will be provided to the following types of actions:

- Providing support to public health and social care institutions in improving accessibility and effectiveness (e.g. small infrastructure and equipment), including related pilot projects.

- Implementing ICT solutions in order to improve public health and social care services.
- Developing and implementing joint lifelong learning and training programmes addressing skills and needs in the area of health and social care.
- Developing and implementing joint activities on enhancing the quality of health care and social care (e.g. joint health services delivery, promoting healthy lifestyles and active and healthy aging, disease prevention implementation plan, etc.)
- Joint strengthening of health care for vulnerable groups with focus on elderly, palliative care and persons with disabilities.
- Networking of organisations (e.g. health care and social care institutions, family centres, education institutions, etc.) in order to create joint activities for enhancing accessibility to health and social services.
- Implementing exchange of experience concerning the identification, transfer and dissemination of good practices and innovative approaches and support to the implementation of the Cross-border Healthcare Directive (2011/24)
- Awareness rising activities in promotion of different types of services available for vulnerable groups.

Specific Objective 2.1. ´**To promote and improve environment and nature protection and management systems for risk prevention**´ plans to support the following types of actions:

- Developing and implementing joint environmental management initiatives in the area of environment and nature protection (e.g. monitoring and exchange of data, biodiversity and geo-diversity maps, i management plans for nature protected areas of cross-border interest, maritime spatial planning and integrated coastal management for cross-border areas, etc.)
- Awareness raising activities, information campaigns and education and training concerning environmental and nature protection.
- Improving emergency preparedness and risk prevention systems that addresses existing as well as expected cross-border hazards (fire, flood, draughts, hazardous pollution events including trans boundary air and water pollution and other natural disasters) through, for example: adopting comprehensive multi-hazard framework to risk management and communication, harmonizing information about risks using internationally accepted definitions and guidelines, addressing priority gaps and needs for exchanging available data, developing and/or implementing plans that specify standard operating procedures on local level (who, what, when, how and with whom) based on higher level initiatives for disaster management)
- Cross-border measures and tools for reducing or mitigating environmental problems and risks, including small-scale infrastructure and equipment,
- Implementing joint interventions in case of accidents and natural disasters and establishment of strong cooperation between the emergency centres, including small-scale infrastructure and equipment.

Specific Objective 2.2. ´**To promote utilization of renewable energy resources and energy efficiency**´ crates a funding framework for the following types of actions with cross-border elements:

- Transfer of knowledge (awareness rising), exchange of experience and capacity building on the utilization of renewable energy resources and energy efficiency.
- Elaboration of joint studies and documentation on (the utilization of) renewable energy resources and energy efficiency.
- Developing and implementing joint pilot and demonstration projects on innovative technologies and solutions in the field of energy efficiency and renewable energy resources.
- Joint investing in public infrastructure on sustainable energy production and energy efficiency.
- Joint incentives in order to improve planning and regulatory framework in the area of renewable energy resources and energy efficiency (e.g. analyses, comparisons, recommendation, local/regional action plans etc.).

Specific Objective 3.1.´ **To strengthen and diversify the tourism offer and to enable a better management and sustainable use of the cultural and natural heritage**´ envisages that support will be provided to the following types of actions:

- Developing, promoting and branding of joint tourism niches and products including development of joint tourism activities and diversification and sustainable of tourism offer (inclusion of other sectors e.g. agriculture, organic food supply, handcrafts and other local products, culture, sustainable transport, etc. in order to develop projects in ecotourism, hunting, rural, mountain, excursion, cultural, adventure, religious**,** nautical, conference, health and wellness and spa tourism.
- Joint incentives of integrating culture, nature and leisure activities into sustainable tourism offer taking care of preservation of nature and cultural protected areas (e.g. marine and coastal environment, historical and cultural sites etc.).
- Developing complementary services in tourist offer valorising natural and cultural potentials of the programme area.
- Promoting and introducing (international) certifications and standards, in order to improve the quality of tourism providers and their services.
- Support to development and improvement in destination management capacity building in tourism sector (e.g. by developing destination management skills and focusing on quality (e.g. standardisation) and integration of offers, tourist destination development, management, marketing and promotion).
- Cross-border networking of institutions in tourism sector, including establishment of clusters.
- Developing innovative offers and services using ICT and other technologies (e.g. GPS routes, booking systems)
- Valuating, preserving, restoring and reviving (e.g. animation of site) cultural, historical and natural heritage e.g. UNESCO and other historical and cultural sites and landscapes, including enabling or improving access to them.
- Enabling joint cultural cooperation initiatives including creation of joint cultural events such as cultural festivals, cultural exchanges, joint theatre performances or joint/traveling exhibitions.
- Training programs in quality assurance systems and different types of standardisation (e.g. ISO certification, etc.) on cultural and natural heritage.
- Investments in certification including training, equipment supply but also small scale infrastructure on cultural and natural heritage.

Specific Objective 4.1 ´**To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area**´ will offer funding for the following types of actions:

- Support to business support institutions and establishment of and support to existing and new business related sectorial networks and organisations in order to enhance standardisation, product protection, marketing and development of cross-border markets.
- Developing and supporting existing business clusters and networks of SMEs in applying ICT, innovation and new technologies in order to develop and promote common products for local cross-border and international markets.
- Improving communication and cooperation between SMEs and business support institutions at national, regional and local level in the programme area.
- Supporting business support institutions in improving the capacity of entrepreneurs including micro entrepreneurs such as family farms/households regarding marketing, branding, market research, e-business, competitiveness and education and training in entrepreneurship skills.
- Support to actions directly linked to attracting direct investments in the programme area.

- Increasing cooperation between research institutions, clusters, businesses, public sector & development organisations to stimulate innovation and entrepreneurship to improve business innovativeness and technology based on smart specialization approach.
- Support to actions related to development of innovative products and services (e.g. patents, industrial design, trademark and innovation etc.)
- Promoting and introducing (international) certifications and standards of existing and new products and services.
- Joint research and development activities involving the research and educational centres in the programme area in order to increase competitiveness.
- Cross-border development, adaptation and exchange of best practices in application of ICT, new technologies, processes, products or services to be directly used by the enterprises between the clusters or groups of business, R&D and education institutions.
  Establishing and supporting development agencies, technological and competence centres, laboratories and local ICT infrastructure for common use of the enterprises in the programme area in order to upgrade the existing and develop new products, services, processes or prototypes.

Strategic project ´**Adriatic Hinterland**´

In addition to the above types of actions, the cooperation programme also includes a **strategic project ´The Development of Rural Tourism in the Adriatic Hinterland of Croatia, Bosnia and Herzegovina and Montenegro – 1st phase**´ (hereafter abbreviated as **Adriatic Hinterland**). This project is conceived as the first phase of a planned 10-year programme initiated by the Ministry of Foreign and European Affairs of the Republic Croatia with the next two phase to be implemented in the period 2018 – 2023.

The overall objective of this project is to create conditions for sustainable development of hinterland areas and its demographic reconstruction (HR, BA, ME) through the incentives for the development of rural tourism and related infrastructure.

The project will be managed by Zadar County and will be jointly implemented by the following institutions in **Croatia** (Touristic board of Split-Dalmatia County, Natura Jadera Public Institution for management of protected areas in Zadarska county; City of Šibenik; City of Dubrovnik, Dubrovnik-Neretva County, Lika-Ssenj County), **Bosnia and Hezegovina** (Hercegbosanski Kanton, Ministry of Economy; Zapadno Hercegovački Kanton, Ministry of Economy; Tourist Organization of the City of Trebinje, Tourist Organisation of Republic Srpska, Tourist Board HNK/Ž, Mostar) and **Montenegro** (Old Royal Capital Cetinje, Municipality of Tivat, Municipality of Ulcinj , Ministry of Sustainable Development and Tourism).

The project aims to achieve the following outputs:

- Creation of “Adriatic hinterland” touristic product visual identity
- Sale systems developed (i.e. develop partnerships with touristic agencies) for existing offer with its extension for future ones.
- Smartphone applications and other promotional tools developed and in use
- Active promotion of the destination through available national channels for touristic promotion and free and easy accessible sources (web, social networks), with promotion directly on seaside of Croatia, Bosnia and Herzegovina (Neum) and Montenegro.
- Analysis of the Adriatic hinterland in compliance with previously established initiatives / project outcome
- Establishing roles and responsibilities of Stakeholders Working Group, in order to implement ETIS Toolkit.
- Development of capacity building programme by the Stakeholders Working Group.
- Design of Target areas/clusters and thematic tours (possible itineraries).
- Identification of priority investments and technical assistance.

- Implementation of capacity building programme for stakeholders

The aspiration is that project will increase tourist visits by 15% by the end of the project implementation (whole area of proposed Adriatic hinterland) and increase of overnight stays by 10% by the end of project implementation in project implementation area. Also, clear priorities and needs for defined target areas and clusters will be established within the Adriatic hinterland for medium and long-term period. Lastly, a number of prioritised projects will have their technical and other documentation prepared for further investments, some projects will be put into investment process during the 1st phase of programme implementation.

## 1.3 Relationship of the proposed cooperation programme with other relevant plans and programmes

The main aim of EU-funded cross-border cooperation programmes is to reduce the negative effects of borders as administrative, legal and physical barriers, tackle common problems and exploit untapped potential. CBC programmes are cooperation mechanisms which do not directly influence any lower level plans - such regional or local spatial plans in the respective programme area. Through joint management of programmes and projects, mutual trust and understanding are strengthened and the cooperation between participating countries is enhanced.

Cross-border cooperation aims to address similar threats and promote more balanced development. In this regard, Interreg IPA CBC Programme HR-BA-ME 2014-2020 has an important relationship to the European Union Strategy for the Adriatic and Ionian Region which has been devised by the European Union. This strategy offers an endorsed and integrated framework for addressing common challenges faced by the countries of the programme area and suggests actions of common interest that may be supported, among others, by the European Structural and Investment Funds. The key features of this strategy are shortly summarized below.

**European Union Strategy for the Adriatic and Ionian Region**

In June 2014, the European Commission adopted communication concerning the European Union Strategy for the Adriatic and Ionian Region[2] (EUSAIR) provides a framework for a coherent macro-regional strategy and Action Plan that addresses the needs and potential for smart, sustainable and inclusive growth in the Adriatic and Ionian Region through cooperation between the participating countries. The general objective of the Strategy is to promote sustainable economic and social prosperity in the Region through growth and jobs creation, and by improving its attractiveness, competitiveness and connectivity, while preserving the environment and ensuring healthy and balanced marine and coastal ecosystems. The strategy is based on the following four pillars:

1. Blue Growth aimed to drive innovative maritime and marine growth in the Region by promoting sustainable economic development and jobs and business opportunities in the Blue economy, including fisheries and aquaculture.
2. Connecting the Region aimed to improve transport and energy connectivity in the Region and with the rest of Europe through Inter-linked and sustainable transport and energy networks.
3. Environmental Quality aimed to address environmental quality through cooperation at the level of the Region.
4. Sustainable Tourism aimed to develop the full potential of the Region in terms of innovative, sustainable, responsible quality tourism.

[2] COM(2014) 357 final

The EUSAIR recognizes climate change mitigation and adaptation as well as disaster risk management as two horizontal issues of concern that should be addressed in all four pillars. Furthermore, it also identifies two cross-cutting aspects: capacity-building, including communication, for efficient implementation and for raising public awareness and support; and research and innovation to boost high-skilled employment, growth and competitiveness as important tools for addressing aims of the Strategy.

# 2 SCOPE OF THIS STRATEGIC ENVIRONMENTAL ASSESSMENT STUDY

This chapter presents scope of the SEA study. It outlines key environmental issues of interest which are relevant to the proposed programme, comments obtained during scoping, assessment approach, alternatives considered and uncertainties and limitations that constrained this study.

## 2.1 Key environmental issues of interest relevant to the proposed programme

As noted earlier in section 1.1 of this SEA study, the proposed programme is primarily designed to implement a range of smaller activities that facilitate cross-border cooperation. The cooperation programme will be implemented through series of calls for proposals that address development interventions and desired outcomes outline above. While the cooperation programme specifies the nature of proposed interventions by outlining the eligible activities, it does not specify the location and exact nature of projects that will be supported. Budget for the proposed activities makes it clear that the programme will not allow implementation of larger infrastructural projects.

While the cooperation programme specifies the nature of proposed interventions by outlining the eligible activities, it does not specify the location and exact nature of projects that will be supported. The nature of the programme hence does not allow to address local and specific environmental impacts of future interventions that will be supported within the programme implementation. It does allow to analyse consistency of proposed interventions with the relevant environmental protection objectives established at higher-level strategies which are relevant for the programme area and also the general environmental risks associated with proposed interventions.

The table below offers an overview of possible substantive linkages between proposed interventions, typical EU environmental policy targets that are relevant for the proposed interventions and possible environmental risks.

**Table 2: Interactions between the proposed cooperation programme and environmental protection policy concerns**

| Environmental issues | Environmental protection policy concerns | Priority Axis 1 | Priority Axis 2 | | Priority Axis 3 | Priority Axis 4 |
|---|---|---|---|---|---|---|
| | | SO 1.1 | SO 2.1 | SO 2.2 | SO 3.1 | SO 4.1 |
| **Biodiversity** | Conditions, functions and connectivity of ecosystems | - | | | | - |
| | Natural diversity of fauna, flora | - | | | | - |
| **Climate change** | Decrease emissions causing climate change | - | - | | - | - |
| | Facilitate adaptation to the climate change | - | | | - - | - |
| **Water** | Water | - | | | - | - |

| Environmental issues | Environmental protection policy concerns | Priority Axis 1 | Priority Axis 2 | | Priority Axis 3 | Priority Axis 4 |
|---|---|---|---|---|---|---|
| | | SO 1.1 | SO 2.1 | SO 2.2 | SO 3.1 | SO 4.1 |
| | pollution from point and diffuse sources and accidents | | | | | |
| | Floods and droughts | - | | - | - | - |
| **Soil** | Limit point and diffused sources of soil pollution | - | | | - | - |
| **Air** | Quality of ambient air | - | - | | - | - |
| **Public health** | Determinants of health | | - | - | - | - |
| | Environment-related health risks | - | | - | - | - |
| **Sustainable resource mgmt** | Use of depleting natural resources | - | - | - | - | |
| | Waste generation, recovery and recycling | - | - | | - | |
| **Cultural heritage and landscape** | Natural and cultural landscape | - | - | | - | - |
| | Cultural heritage | - | - | - | | - |

Key:

Potentially significant impacts expected, impacts can be either positive or negative
Potential impacts expected, impacts can be either positive or negative
No significant impact expected
Potentially significant adverse impacts expected
Potential adverse impacts expected

| | |
|---|---|
| | Potentially significant positive impacts expected |
| | Potential positive impacts expected |

As evident above, of specific interest within the interventions proposed is the Thematic Priority 2 with its specific objective2.1. ´To promote and improve environment and nature protection and management systems for risk prevention´ which is likely to achieve many positive effects but it may pose risks of adverse impacts on biodiversity and natural flood passage capacity. This intervention will receive increased attention.

The specific objective 2.2 ´To promote utilization of renewable energy resources and energy efficiency´ is likely to achieve overall positive environmental effects but it may also pose potential environmental risks, especially those related to biodiversity, landscape, and possibly air quality and waste management.

The Specific Objectives 3.1.´To strengthen and diversify the tourism offer and to enable a better management and sustainable use of the cultural and natural heritage´ may have impacts on biodiversity, cultural heritage and natural and cultural landscape.

The Specific Objective 4.1. 'To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area' may very theoretically have some impacts on the natural resources use and waste generation, recycling and recovery.

The Specific Objective 1.1 ´To improve services in the area of public health and social welfare sector´ is designed to achieve positive impacts on public health and will not expected to have any significant adverse impacts on the environment.

## 2.2 Inputs obtained through consultations on the scoping report

Based on the initial review of the proposed cooperation programme, a question arose as to whether the proposed interventions may lead to significant impacts that could not be managed through more detailed studies on project-level (such as EIA, or standard types of permits related to environmental matters that are already in place in Croatia and Bosnia and Herzegovina and Montenegro) and whether SEA is actually needed. In this regard, it was proposed to undertake a simplified form of SEA and focus it on providing suggestions for detailed planning of each of the intervention in order to reduce possible risks and maximize their environmental benefits.

The proposed interventions were described in the scoping report which was sent to relevant authorities in Croatia and Bosnia and Herzegovina and Montenegro on 21 August 2014 and made available for 30 days of public commenting through the website of the Managing Authority for the cooperation programme[3]. The Managing Authority also held a scoping meeting on 12 September 2014 in Zagreb at the premises of Ministry of Regional Development and EU Funds of the Republic of Croatia.

The period of scoping consultations finished on 22 September 2014. The table below presents inputs obtained during this consultation and the way the recommendations and requests obtained have been taken into account within this SEA.

**Table 3: Inputs obtained during scoping consultations and response by the SEA team**

[3] http://www.mrrfeu.hr/default.aspx?id=4243

| Institution and response regarding the scope of the SEA | Response by the SEA team |
|---|---|
| **Republic of Croatia, Ministry of Culture**<br><br>Requires to address relationship to the cultural heritage. The contents of the study related to the cultural heritage should be:<br>• starting points and methodological approach with regard to cultural heritage<br>• analysis of conditions of cultural heritage on which the implementation of the programme could have a significant effect<br>• verification of implementation of the cultural heritage protection objectives which arise from international conventions and charters signed by the Republic of Croatia<br>• analysis and presentation of likely significant impacts of the programme on cultural heritage<br>• measures to protect cultural heritage, including measures to prevent, reduce mitigate or compensate potential impacts on cultural heritage and proposal for a solution most convenient for cultural heritage<br>• description of envisaged measures for monitoring the status of cultural heritage<br><br>It was recommended that the SEA includes appropriate cartogram representations of cultural heritage in relation to the planned programme. | With regard to assessment methodology, the SEA faced the generic nature of the proposed cooperation programme and lack of details of future activities that will be implemented within its framework (what, where and how). These features of the proposed programme did not permit us to assess impacts of development interventions on specific cultural heritage sites through project-level (EIA-based) approaches that are e.g. promoted within ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011) which advocates for a holistic assessment of cumulative effects of various impacts on key attributes of cultural heritage properties.<br><br>Our methodology was guided by conclusions of session on Cultural Heritage held within the 2008 Annual Conference of International Association for Impact assessment that formulated the following recommendations related to treatment of cultural heritage concerns within SEA[4]:<br>1. The concern for both tangible (i.e., material culture) and intangible (i.e., customs, and cultural expression) elements in assessing cultural heritage within SEA and EIA<br>2. The attention to cultural landscapes and cityscapes as defined areas for assessment<br>3. The increasing concern for stakeholder identification and negotiated solutions, especially including local populations and indigenous peoples<br><br>We have raised these concerns in our impact assessment and during formulation of our recommendations for future planning processes with regard to possible impacts. These proposals also reflect suggestions stipulated in the relevant international treaties and guidance[5] in order to guide planning of interventions for sustainable use of cultural and natural heritage. For details, see section 5.8 of this SEA study. |

[4] https://www.iaia.org/IAIA08Perth/cs/session.aspx?id=CS2.9&ts=6

[5] World Heritage Convention (1972), Operational Guidelines for the Implementation of the World Heritage Convention (2013), International Charter for the Conservation and Restoration of Monuments and Sites (1964), Charter for the Conservation of Historic Towns and Urban Areas (1987), International Cultural Tourism Charter (1999), The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas (2011)

| | |
|---|---|
| | The generic nature of proposals contained in the cooperation programme did not allow identify any direct relationships between the proposed cooperation programme and the international conventions and charters signed by the Republic of Croatia per se. We were however able to analyse relationship to the Strategy of Conservation, Protection and Sustainable Economic Use of the Cultural Heritage of Croatia which are presumably aligned with the relevant international commitments by the Republic of Croatia.<br><br>The cartogram representing cultural heritage in relation to the planned programme was not prepared as it was not needed the assessment approach chosen and the nature of interventions proposed. |
| **Republic of Croatia, Ministry of Agriculture**<br><br>1. Directorate for Water Management has given only general guidance on what is needed to be considered in the SEA Report:<br>• compliance with relevant strategies and plans of the water management issues, such as Water Management Strategy, River Basin Management Plan, Draft Long-Term Programme for Construction of Water Regulation and Protection Structures and Amelioration Structures<br>• compliance with relevant water management legal framework.<br>In doing so the following principles must be observed:<br>• negative impacts on surface water and groundwater condition in accordance with Water Framework Directive should be analysed<br>• sustainable use of water based on long term protection of available water resources should be promoted<br>• impacts of climate changes in respect to flood and drought mitigation should be analysed<br><br>It pointed out the importance of ensuring water protection and good water status due to sustainable management and use of water. SEA Report should identify whether any proposed activity is in conflict with measures for obtaining water management objectives | With regard to water management, the SEA addressed the comments obtained within the baseline analyses (sections 3.2-3.4) and within assessment of impacts related to climate change adaptation and risk management (section 5.2) and water quality (section 5.5.)<br><br>The proposed programme does not have any strong direct relationship - neither conflicting nor synergistic - with objectives and measures prescribed within Croatian River Basin Management Plan (OG 82/13) and Water Management Strategy (OG 91/08). I also does not include any proposed activity which would be in conflict with measures for obtaining water management objectives.<br><br>The programme is not likely to have any significant effects on forests and forestry. Information related to management of forests are addressed in baseline analyses (section 3.5) and impact assessment (section 5.6). |

| | |
|---|---|
| prescribed by relevant water management legal framework. Also, it is especially important to take into account the constraints related to development in areas of special protection of waters.<br><br>2. Directorate for forestry, hunting and wood industry requested that description of forest ecosystems in the programme area, as well as assessment of possible impacts on forest is included in SEA Report especially due to implementation of activities under PA 2 and PA<br><br>3. Directorate for agriculture and food industry had no comments. | |
| **Republic of Croatia, Ministry of Social Policy and Youth**<br>Points out that activities in the Priority Axes addressing employment, social inclusions, health and social services are not expected to have significant effects on the environment and do not need to be included in the SEA | SEA team agrees that the expected impacts of interventions in health services would not have significant impacts on the environment. However, they were eventually addressed during the assessment as some opportunities for synergies with interventions related to energy and environment (Priority Axis 2) were found. |
| **Republic of Croatia, Ministry of Environmental and Nature Protection**<br>No substantive comments to the scoping report - only pointing out the need to correct the study area. | Noted and implemented. |
| **Republic of Croatia, Ministry of Entrepreneurship and Crafts**<br>No comments | Noted |
| **Republic of Croatia, Ministry of Tourism**<br>No comments | Noted. |
| **Republic of Croatia, Ministry of Economy**<br>No comments | Noted. |

## 2.3 Alternatives considered and analytical approach used in this SEA

The SEA process has been undertaken during June-September 2014 and has been integrated into the preparation of Versions 4 and 5 of the proposed cooperation programme. This choice was natural since the programming process was open and allowed changes to be made through various inputs obtained.

The SEA has focused on two alternatives - ´do nothing´ and ´proposed programme´. Information provided within Chapter 5 and Chapter 6 of this study outline the expected impacts of proposed programme as compared with ´do nothing´ option.

The assessment itself focused on three core questions:

| Core SEA questions | Relevant parts of the SEA study |
|---|---|
| Question 1: **What are the key cross-border or trans-boundary environmental issues of concern (management of shared natural resources, existing trans-boundary environmental problems and arising risks) in the programme area?** | Addressed in the Chapter 3 which examines key isues of interest. |
| Question 2: **How does the cooperation programme relate to international priorities for managing trans-boundary environmental risks and advancing sustainable use of shared natural resources in the programme area?** | Mainly done through appraisal of the proposed programmes against targets defined in the environmental pillar of the EU Strategy for the Adriatic and Ionian region (see Chapter 4), with additional suggestions generated through assessment of impacts on environment (Chapter 5). |
| Question 3: **Do the proposed interventions pose any specific risks that cannot be effectively addressed within decision-making on the specific projects that will be developed during programme implementation? If so, how can these be addressed within the proposed cooperation programme itself?** | Assessment of the likely expected impacts of the programme on the environment (Chapter 5) and on Natura 2000 network (Chapter 6) generated information on potential impacts and possible measures that could be taken for addressing the identified risks. |

Throughout the SEA process, the Managing Authority and the programming team strived to optimize the proposed interventions based on the inputs by the SEA team. Indeed, many suggestions provided by the SEA team, especially those related to Priority Axis 2, were directly incorporated into the final version of the cooperation programme. In this regard, recommendations provided within this SEA study should be treated as additional detailed safeguards for implementation of the programme that aim to avoid any risks to environment and maximize that opportunities for achieving positive impacts.

## 2.4 Difficulties and uncertainties

The assessment itself has not been constrained by any difficulties. However the general nature of proposed interventions and lack of information about their possible future locations - that are actually the inevitable features any cooperation programme - led to the need to envisage possible situations which may occur during the implementation of the proposed interventions. When doing so, the assessment considered the likely possible scenarios of possible implementation without being speculative (by e.g. considering extreme hypothetical options). The SEA described the various

assumptions and key features of identified impacts and immediately suggested possible measures that can be taken to prevent or reduce the potential adverse impacts and ehnace the positive impacts.

Other than these usual challenges, there were no constrains in the SEA process and the conclusions made are not bound by any significant uncertainties.

# 3 ENVIRONMENTAL BASELINE CONDITIONS

This chapter outlines the environmental characteristics of the programme areas, the relevant aspects of the current state of this environment and its likely evolution without implementation of the programme and the existing environmental problems which are relevant to the proposed programme. The baseline analysis has been structured in the following sequence in order to cluster issues with possible mutual linkages:

- Seismic risks
- Climatic conditions and related risks
- Hydrology and flood risks

- Water quality
- Forests and forestry
- Biodiversity, fauna, flora

- Cultural heritage

- Air quality
- Hazardous waste and pollution hotspots

Information provided in this chapter has been collected also with an aim to provide comprehensive information on the environmental status, trends and key issues of concern in the programme area so that it can be used during implementation of the proposed CBC programme or in its future revisions.

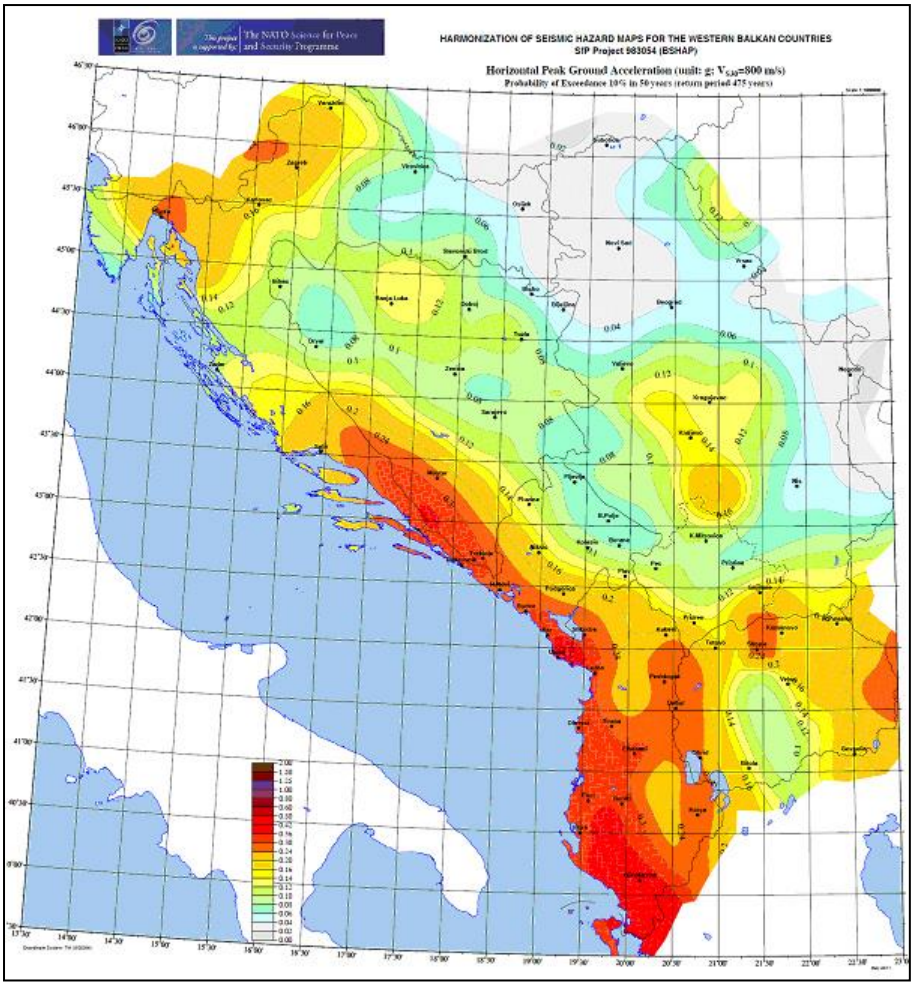
## 3.1 Seismic risks

The Natural Disaster Risks and Risk Assessment in South East Europe[6] indicates that programme area is a part of the Dinaric mountainous morphological region which is highly exposed to seismic hazards. On average in the Western Balkans, at least one earthquake strikes at VII intensity (MSK scale) every three years, at VIII intensity every 15 years, and at XI intensity or higher every 60 years. Seismic source zones include the Alpine orogeny , Outer Dinarides, Inner Dinarides, Pannonian basin, and the Carpathian orogens.

Earthquakes in the Western Balkans most frequently occur and seismic hazard is high in the southern Adriatic coastal region as well as most of Albania, northern Croatia and the southern portions of Bosnia and Herzegovina, FYR Macedonia, and Montenegro (see Figure 1 below). Seismic source zones are intersected by national boundaries, most containing multiple South East European and other countries.

[6] UNDP (2013) Natural Disaster Risks and Risk Assessment in South East Europe, available from www.unisdr.org/files/18136_seedrmapevaluation.pdf

***Figure 1: Distribution of earthquakes in the Western Balkans***




*Source: The NATO Science for Peace and Security Programme: Improvements in the Harmonized Seismic Hazard Maps for the Western Balkan Countries, http://www.wbalkanseismicmaps.org/*

## 3.2 Climatic conditions and related risks

Croatia[7]

Most of Croatia experiences a temperate and humid climate. In the far south of the country a Mediterranean climate prevails, with very dry and hot summers, while the majority of the country experiences warm summers, with only the high-altitude regions experiencing very cold winters. The mean annual temperature ranges from 12-17˚C along the coast to 3-4˚C in the mountains, with summer temperatures reaching the middle twenties Celsius along the Adriatic coast, and January averaging between ) and -2 ˚C in the coldest regions.

The highest rainfall tends to fall on the coastal slopes of the Dinarides mountains. The Adriatic coastal areas and islands experience as much as 2 700 hours of sunshine a year, while inland areas experience approximately 1800 – 2 000 hours of sunshine a year.

[7] Source: Zavisa Simac, Ksenija Vitale. Climate Vulnerability Assessment: Croatia. South East European Forum on Climate Change Adaptation. Zagreb, May 2012

Since the 19th century, meteorological data taken from five stations across Croatia, offer a reliable documentation of the following long-term climatic trends. Below are summarised the key trends:

- Air temperature: All weather stations indicated a rising average temperature, especially pronounced during the last twenty years. This rise is statistically significant at four out of five stations. Cold weather indicators (e.g. number of frost days) have registered a decline at a majority of stations.
- Precipitation: There has been a trend of declining rates of precipitation at all stations across the country, and an increase in the number of dry days at all stations, with a corresponding decrease in the number of wet days. The number of consecutive dry days has also risen, in particular along the Adriatic coast.

Bosnia and Herzegovina[8]

General climate characteristics of Bosnia and Herzegovina are greatly influenced by characteristics of Adriatic Sea, local topography-especially the Dinarides Mountains, which are located along the coast and run from NW to SE parallel to the coast - and atmospheric circulation on a macro scale.

On the basis of temperature characteristics, the territory of Bosnia and Herzegovina may be divided into three temperature zones: warm, moderate and cold:

- The warm zone corresponds to the Adriatic coast and lowland Herzegovina. In lowland Herzegovina, summers are hot and winters are very mild. Mean winter temperatures are above 5°C, whereas summer temperatures reach 40°C. Mean annual temperatures have the value of above 12°C.
- Moderate areas include plain and hilly regions in the central part of the country. Summers are warm and winters are moderately cold. Mean winter temperatures are around 0°C and summer temperatures reach 35°C. Mean annual temperature ranges between 10°C and 12°C, whereas in the area above 500 m, it is below 10°C.
- Cold regions refer to mountainous areas where summers are fair (days moderately warm and nights chilly), while winters are very cold. During at least 3 months of the year, these regions have a mean temperature lower than 0°C.

Annual precipitation amounts range from 800mm in the north along the Sava River to 2000mm in the central and southeastern mountainous regions of the country. Maximum rainfall occurs mostly at the end of autumn or beginning of winter; i.e., in November or December.

Montenegro[9]

The central and northern parts of Montenegro have some characteristics of mountain climate, but the influence of the Mediterranean Sea is also evident, which is reflected through the precipitation regime and higher mean temperatures in the coldest months. The far north of Montenegro has a continental climate and low annual precipitation evenly distributed over all months. In the mountainous areas in the north summers are relatively cool and humid, and winters are long and harsh, with frequent frosts and low temperatures, which rapidly decreases with height. Average annual air temperatures range from about 15.8°C in the south to 4.6°C in the north. Annual precipitation ranges from about 800 mm in the north to about 5,000 mm in the southwest. On the slopes Orjen, in the village of Crkvice (940 m above sea level), precipitation may even reach 7,000 mm in record years, which makes it the rainiest place in Europe.

[8] http://www.climateadaptation.eu/bosnia/climate-change/
[9] http://www.climateadaptation.eu/montenegro/climate-change/

Expected changes in the climatic conditions and related hazards[10]

In South East Europe meteorological hazards should be analysed against a backdrop of rising climate variability and change. Historically, data show only a small temperature rise for the region during the 20th century, and small decline in precipitation, although neither of these is significant enough to identify a clear trend separate from normal climate variability. However, major changes are predicted for the region during the next century. Climate models agree that South East Europe will experience significant rises in temperature, diminishing precipitation, and potentially damaging sea-level rise.

*Temperature:* The average temperature will rise across all four countries, within outside bounds of 1.0 to 5.5˚C by the end of the century. Climate models based on the A1B scenarios (assuming moderate increases in greenhouse gas emissions) predict that an increase in temperature of between 1.8 and 2.3˚C is likely by mid-century. The temperature increase is likely to manifest itself in hotter summers, although winter minimum temperatures are also likely to increase, with fewer frost days. Temperature increase will be greater along the coasts of Croatia and Montenegro.

*Precipitation:* changes in the rainfall patterns are more difficult to forecast, but most models agree that it will decrease throughout the eastern Mediterranean, and by the end of the century the region will be considerably drier, with winter precipitation diminishing more than summer precipitation. Surface runoff (a measure of water availability) will decline by up to 36 % by the end of the century, and peak flows of rivers during the summer will also decreases. While precipitation will decrease overall, most models agree that it will fall in fewer, more intense events, with longer dry periods between events. the risk of flash-flooding is likely to increase in the short term at least, as the rise in rainfall intensity makes this hazard more frequent, also raising the risk of associated hazards such as soil erosion and landslides. Towards the end of the century, flooding is likely to decrease in overall frequency, with extreme floods becoming less common, while warmer winter temperatures mean that snowmelt floods are likely to occur earlier in the year. Of particular concern is a potential repetition of devastating flood in Sava River Basin.

The diminished surface runoff is expected to contribute to the higher incidence of drought. Droughts will begin earlier in the year and last longer, as a significant rise in the number of consecutive dry days is predicted. The fall in winter precipitation means that reservoirs and groundwater resources are less likely to be replenished during that season, and water shortages are a risk. Simultaneously, extreme summer temperatures are likely to rise, along with the risk of heat waves, which will become more frequent and longer-lasting. The combination of high temperatures and drought will also provide conditions amenable to the spread of wild fires, which will be an increasing risk over the century. Extreme winter temperatures will also increase, and the number of frost days decrease, so the risk of sustained cold waves is likely to diminish.

*Sea-level rise:* Global sea levels are predicted to rise between 0.09 and 0.88 m by 2100, and sea-level rise in the Mediterranean is potentially a significant risk for Croatia and Montenegro. However, it is difficult to predict the exact effects of sea level rise along the Adriatic coast due to the fact that the area is tectonically highly active, and local uplift or subsidence could have a greater influence on coastal dynamics than sea level rise. Nevertheless, any sea-level rise is likely to increase the risk of coastal erosion and coastal flooding from storm surges.

Meanwhile, rising sea temperatures in the Adriatic are likely to lead to higher wind speeds along the coast, and stronger storms in general, raising the risk of coastal flooding from storm surges, and

[10] Adapted from the South East European Forum on Climate Change Adaptation (2012) Regional Climate Vulnerability Assessment Synthesis Report, available from http://www.seeclimateforum.org/upload/document/regional_cva_synthesis_report_final.pdf

increasing the likelihood of inundation of vulnerable and ecologically delicate habitats such as wetlands and river deltas in Croatia and Montenegro. More violent storms and even water spouts may threaten coastal areas of Croatia and Montenegro, and cause flash-flooding further inland.

## 3.3 Hydrology and flood risks

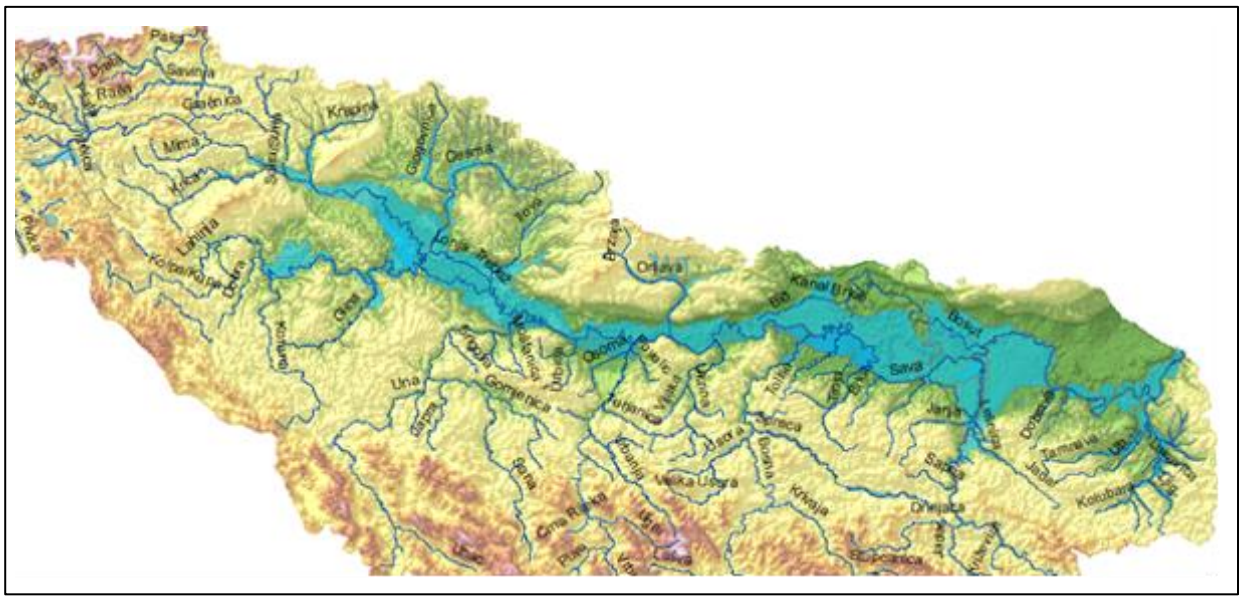
For the purpose of this study, the programme area can be in hydrological terms divided in two major basins: Sava River basin (a part of wider Danube River basin that belongs to the Black Sea drainage basin) and Adriatic Sea drainage basin.

Sava River Basin[11]

The Sava River is the largest tributary in terms of water flow within the Danube River system. The Sava River Basin; especially its middle part (from Zagreb to Županja) and the lower part (downstream of Županja), as well as the downstream sections of the Sava tributaries; are prone to flooding. The floods occur generally in spring, after snow melt, and in autumn, after heavy rainfall. The wide flood plains of the Sava River and the natural lowland areas act as detention areas and retentions of the flood waves.

Spring floods last longer and their maximum discharges are relatively low, while the autumn floods exhibit very high peak flows of short duration. However, they often overtop the river banks and inundate very large floodplain areas which remain under water for a long time. The location of important flood-prone areas in the Sava River Basin is shown in Figure 2 below.

***Figure 2: Indicative map of important flood-prone areas in Sava River Basin (2009)***




*Source: International Sava River Basin Commission, 2009.*

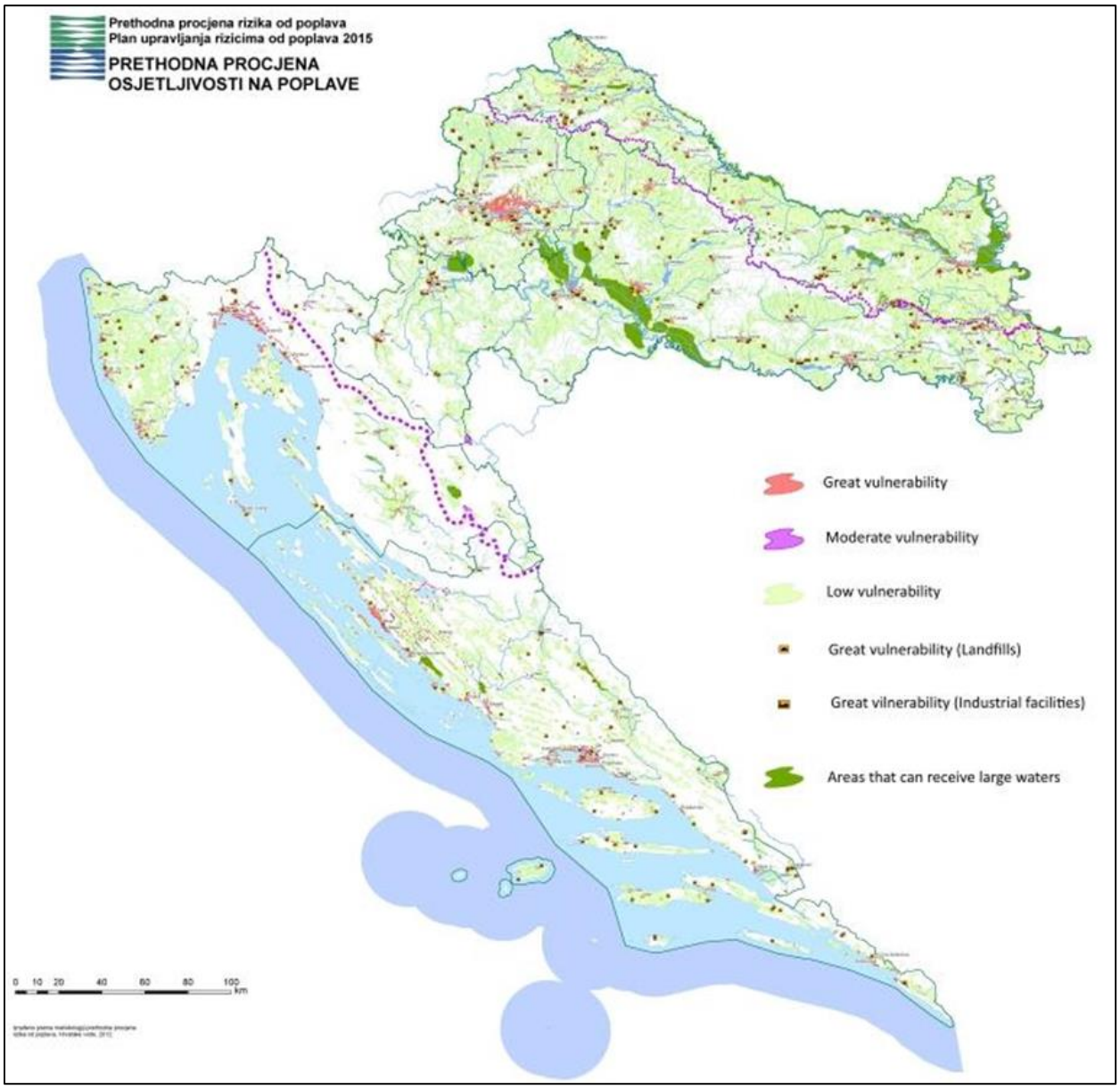
In Croatia[12] Sava basin is adequately protected from floods only in the city of Zagreb, which, according to estimates, is safe from 1,000 year waters. Other areas along the Sava are generally insufficiently protected. Downstream from Zagreb to the border with Serbia, many areas have a lower protected level

[11] Taken from World Bank and Water Partnership Programme (2014) Water & Climate Adaptation Plan for the Sava River Basin, Draft Final Report For Consultation, July 2014, available at http://www.savacommission.org/news_detail/151 (last accessed on 25 Sept 2014)

[12] Source: Report on status of spatial conditions in Croatia 2008-2012 and Water Management Strategy

than needed. Flood protection system of Srednje Posavlje is incomplete and existing embankments at many locations are lower than needed. Due to reduction in peak flows of flood waves in lowland retentions system of Srednje Posavlje is crucial in flood protection in Slavonian section of Sava downstream from Stara Gradiška and from floods from neighbouring countries. The concept of flood protection of the Danube is based on embankments and wide inundation zones along watercourses. On some sections they do not meet their required height, so they need to be reconstructed. The biggest remaining problem of flood protection in the Danube basin is uncontrolled torrents that threaten settlements and agricultural areas. The Figure 3a below shows flood vulnerable areas in Croatia with different degrees of vulnerability[13].

***Figure 3a: Flood vulnerable areas in Croatia (2014)***

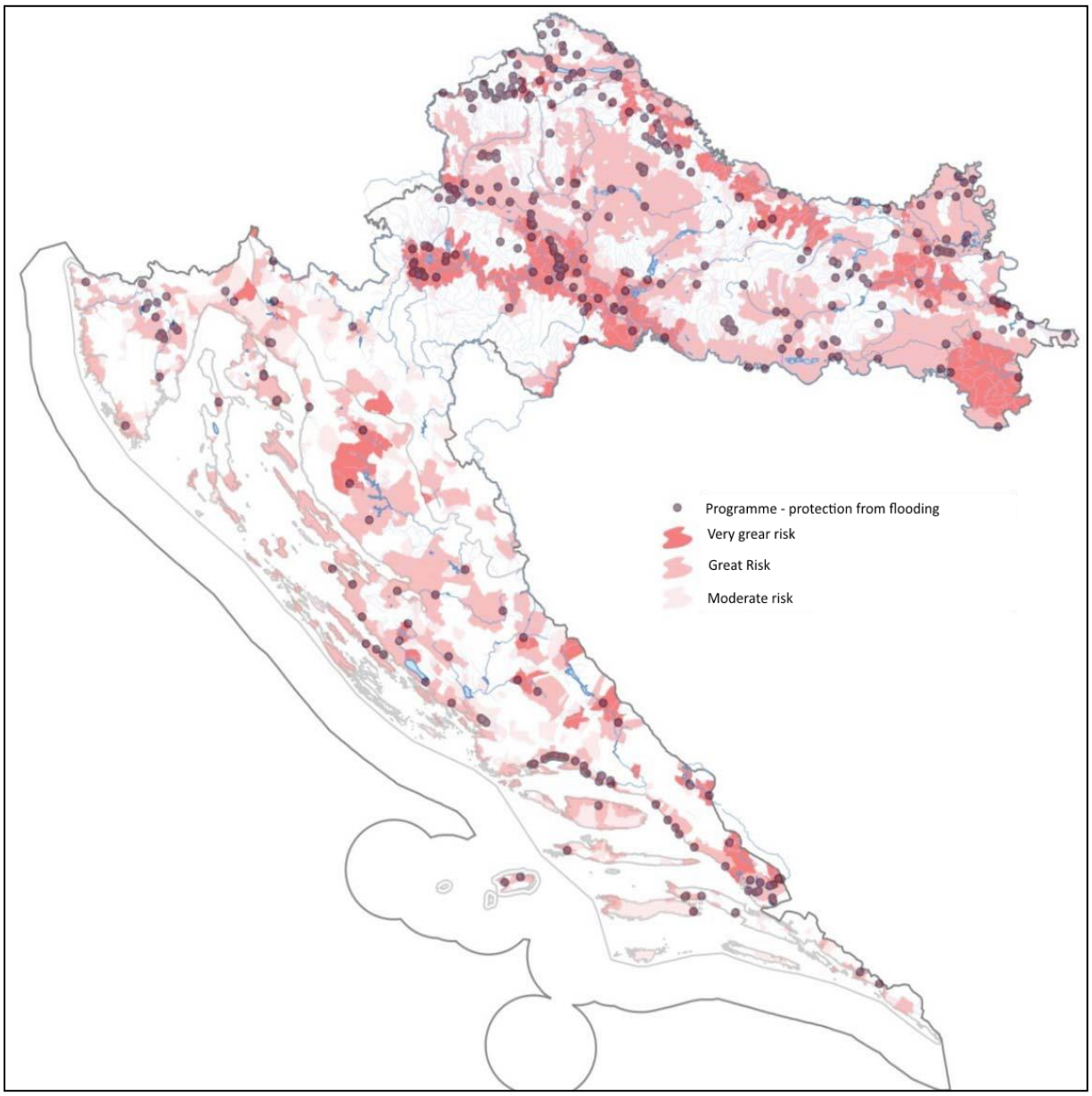



*Source: Preliminary assessment of flood risk, Hrvatske vode, 2014*

[13] For better resolution, see http://korp.voda.hr/pdf/Prethodna%20procjena%20rizika%20od%20poplava/9.%20KARTA%20-%20PRETHODNA%20PROCJENA%20OSJETLJIVOSTI%20NA%20POPLAVE.pdf

Currently around 15% of the Croatian mainland is under potential flood risk. However, in recent years, floods occur even where no one expects them and increasing high water events and new maximum water levels are recorded on many watercourses[14]. Figure 3b presents priority flood defense projects considered within the Long-Term Programme for Construction of Water Regulation and Protection Structures and Amelioration Structures in areas of various risk range.

***Figure 3b. Envisaged flood defense projects in various flood risk areas in Croatia***




*Source: Hrvatske vode, 2012.*

In BiH, there are no accurate data on flooded areas and damages at the annual level, since the Agency for Statistics of BiH does not collect such data. The following areas in Bosnia and Herzegovina are most exposed to floods[15]:

[14] Zoran Đuroković. Exposure to Flood Risks in the Republic of Croatia. 2014
[15] State of the environment report of Bosnia and Herzegovina 2012

- In the upper reaches of the Sava River tributaries: Drvar (Unac River), Tuzla (the Jala River), river valleys of rivers Spreča and Usora,
- In the middle and lower courses of the Sava River tributaries: Kulen Vakuf, Bihać, Bosanka Krupa (the Una River), Novi Grad, Prijedor, Sanski Most (Sana River), Gornji Vakuf Bugojno, Donji Vakuf (Vrbas River), Čelinac (the Vrbanja River), Zenica, Maglaj, Doboj (the Bosna River), Zvornik, Janja (the Drina River);
- In the valley of the Sava River, settlements: Dubica, Gradiška, Srbac, Brod, Derventa (Ukrina), Šamac, Brčko and Orašje;

Coincidence analysis indicates that floods on the right tributaries of the Sava River occur generally earlier than on the Sava River itself. The most severe floods occurred in 1932, 1942,1970 and 2014 in the Lower Sava region and in 1937, 1944 and 1974 in the Middle Sava region. These data are for constant durations of 60 days. However, for other durations, floods are different in terms of their significance, which must be kept in mind for future hydrological research.

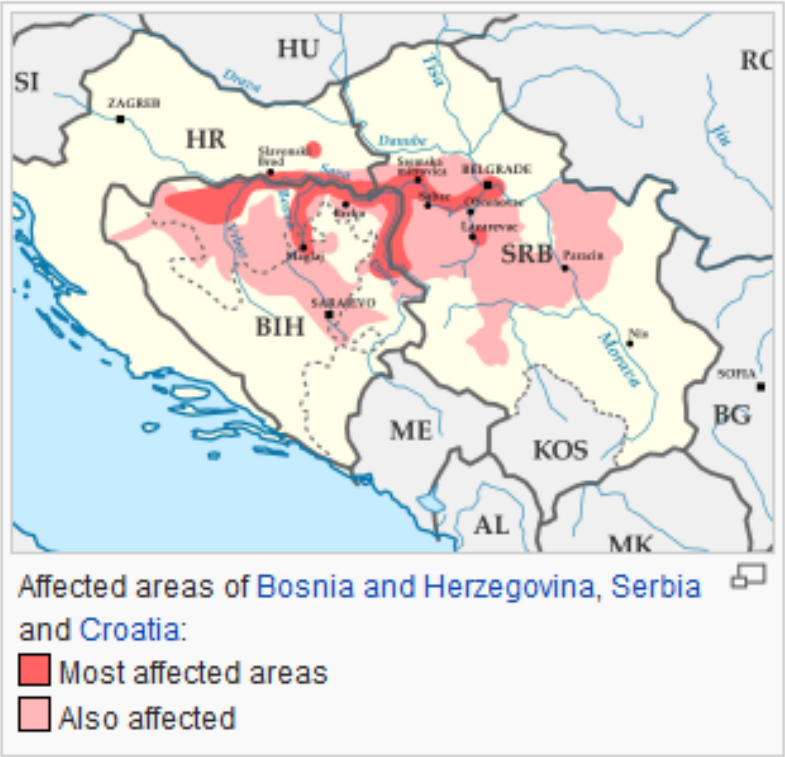
By reviewing the data from the flood hydrographs it can be confirmed that intensive floods occur over limited space. Most flood prone areas are within the regions of Donje Posavlje, downstream of Županja; Srednje Posavlje, from Zagreb to Županja; and upstream from Zagreb. The only floods ever to overtake the whole region from Belgrade to Zagreb occurred in 1933, 1937, 1940,1947 and in 2014.

Floods on the downstream part of the Sava River are closely related to the Drina River. There were significant floods in 1896, 1974, 2010 and 2014. The Drina River itself produces the maximum flood by a combination of snowmelt and precipitation. During the 1974 flood event, the Sava River discharge downstream of the confluence with the Drina River was greater than the 100-year flood. The maximum precipitation in the Drina River Basin occurred two days later than the maximum precipitation in Slovenia, which is further west, leading to a coincidence of the flood peaks in the Sava River and in the Drina River downstream of their confluence. In the late 1970's, Mratinje dam on the Piva River in Montenegro was constructed: Now some 50% of the discharges from Montenegro are completely under control. Flood peaks drop down significantly on the upper Drina watershed.

The heavy rainfall experienced in the Sava River Basin in 2010 particularly within the Drina River Basin and the subsequent floods led to loss of life and substantial damage to infrastructure. In February 2011, the World Bank held discussions with the four riparian governments in Sarajevo, Belgrade, Podgorica and Tirana that confirmed the need for a comprehensive regional program approach, encompassing the assessment of the natural resources potential of the Drina River Basin with focus on concrete measures to mitigate risks of floods and droughts at local (municipality) level, and sustainable water resources management at basin level, particularly with regard to hydropower generation.

In May 2014, multiple floods affected a large area of South Eastern and Central Europe. A low-pressure area named "Tamara" brought the worst of the flooding from 14–16 May, following three previous significant events which resulted in a high degree of soil saturation in the valleys of the main Sava course and its tributaries. Rainfall in BiH and Serbia was the heaviest in 120 years of recorded weather measurements. In terms of floods, the event corresponded to a 1in1000 year event. By 20th May, at least 48 people had died as a result of the flooding, and 30,873 people in Serbia alone have been forced from their homes. Official counts indicate over 1.6 million people have been affected in Bosnia and Herzegovina, Croatia and Serbia after only a week of flooding.

***Figure 4: Indicative map of areas affected by May 2014 floods in Sava River Basin***




*Source: Wikipedia*

Adriatic Sea drainage basin

North-east of Croatian and North of Bosnian and Herzegovinian part of the programme area as the south part of these two countries along river Neretva are at risk of floods, while the functionality of the flood protection system is at around 75%. According to estimates made within the situation analysis for the Interreg IPA CBC programme HR-BA-ME 2014-2020 there is approximately 20,600 ha at risk of flooding in the area of the Adriatic Sea.

Croatia[16]: In the Lika area, Otočac is inadequately defended from river Gacka and its tributaries as well as wider area of Gospic and Kosinjsko field from river Lika and its tributaries. Floods in Lika area threaten many agricultural areas and infrastructure buildings. The concept of flood protection in the Dalmatian catchments area is based on construction of dikes along major rivers (Zrmanja, Krka, Cetina and Neretva) and streams, and regulation of their channels is devised to increase the discharge capacity. The construction of channels or tunnels is designated to drain closed karsts fields, accompanied by more intensive erosion control works. In the area of the Lower Neretva River in Croatia, out of 155 $km^2$ of the total area, 45 $km^2$ are protected from floods. Dikes built during river regulation for navigation purposes protect these areas, but not satisfactorily. Particularly endangered are low lying parts of the right littoral area of the river Neretva with Metković, being the largest city here. Neretva Delta is particularly affected by the floods. Protective and melioration system is still incomplete and some parts of the delta are still insufficiently protected. Inappropriate construction in the immediate hinterland of Mala Neretva prevented the normal functioning protection system, which also affects the increase in the risk of flooding in the area. Since Mala Neretva can no longer serve as discharge channel for floods, there was a reconstruction constitutions in Opuzen, it is necessary to implement appropriate reconstruction and parts other protective structures along the river Neretva.

[16] Source: Report on status of spatial conditions in Croatia 2008 2012 and Water Management Strategy

Bosnia and Herzegovina[17]: In BiH, there are no accurate data on flooded areas and damages at the annual level, since the Agency for Statistics of BiH does not collect such data. The following areas are most exposed to floods:

- In the Neretva River valley: Čapljina valley, Gabela valley, Višići, Svitava, Hutovo Blato, Brotnjo plateau, Rastok Jezerac, Neretva valley (area Čapljina-Buna), Vir-Posušje, Ljubuški-Vitina valley (the Trebižat River), Bijelo and Bišće valley (the Buna River);
- In karst areas: Imotski-Bekija valley, Mostarsko blato, Livno valley, Kupres valley, Duvno valley with Šuica valley, the area around Bosansko Grahovo, Gatačko valley, Nevesinje valley, Dabarsko valley, Fatničko valley, Bileća valley, Trebinje (Mokro) valley, Ljubomir valley, Ljubinje valley and Popovo valley.

Montenegro[18]: Flooding occurs around the major river systems (e.g. the Morača and Bojana rivers) and on the plains (Bar, Cetinje, Dell Matica). There is also seasonal flooding around Lake Skadar. Measures to control water flow and protect against flooding are rudimentary. The need for flood protection is mainly related to areas around larger watercourses and fields. The work done so far on regulating watercourses and protection against floods is rather modest, mainly of local importance and not adequate in size and functionality.

In Montenegro, there are most diverse forms of erosion and torrents, since all Montenegrian rivers, in the upper course, or throughout their length, are of torrential character. The works conducted so far to regulate torrential areas mostly relate to technical measures, while biological measures on erosion protection have only rarely been used. Excess water of diverse origin puts in danger at the territory of Montenegro some 24,500 ha of farming and urbanized land (Cetinje). That phenomenon is particularly pronounced in the areas surrounding Skadar Lake and Bojana River, Zeta Valley, and areas around and Ćehotina river valleys. Most of the existing land-reclamation systems are currently not operational. A specific case for the need of protection against water is Kotor, which at times of heavy rains and south wind is partly flooded, because the level of its pavement is only 96 cm above the sea level, and the upper tide point is 130 cm.

General framework for disaster risks management in the programme area

With regard to various risks described in the preceding chapters of this analysis - UNDP[19], WMO[20] and World Bank and UN/ISDR secretariat[21] indicate that there is a considerable lack of capacities in the region, in general, with a couple of exceptions where strong expertise exists - such as in Croatia. Most of the efforts to understand disaster risk are led by central Governments but local authorities and communities show the strong need for building capacities in relation to disaster risk reduction, in general, and risk assessment, in particular. Applications and utilization of risk information remain a challenge. While the implementation of risk assessments is slowly increasing in the region, most of the efforts end up in data, technical reports and/or maps that are not necessarily utilized by end users (decision makers, communities, sectors) to support their decision processes or development planning.

[17] Source: State of the environment report of Bosnia and Herzegovina 2012
[18] Source: Spatial Plan of Montenegro Until 2020
[19] UNDP (2013) Natural Disaster Risks and Risk Assessment in South East Europe, available from www.unisdr.org/files/18136_seedrmapevaluation.pdf
[20] World Meteorological Organization (2012) Strengthening Multi-Hazard Early Warning Systems and Risk Assessment in the Western Balkans and Turkey: Assessment of Capacities, Gaps and Needs.
[21] World Bank and UN/ISDR: South Eastern Europe Disaster Risk Mitigation and Adaptation Initiative Risk Assessment for South Eastern Europe Desk Study Review

## 3.4 Water quality

Sava River basin

Within the basin constituted by the Sava River and its tributaries, a total of 189 surface water bodies have been delineated by Sava River Commission. Out of these, 126 are natural rivers and 63 heavily modified or candidates for heavily modified water bodies. An EC-supported study in 2013[22] assessed the ecological status of 183 of these water bodies. The study found out that a high ecological status has been achieved only in 10 water bodies. A good ecological status was assessed at 65 water bodies. The majority of water bodies (70) had moderate status. Poor status was found at 17 water bodies, while no water bodies had a bad status. The Figure 5 below summarizes ecological status and ecological potential of main surface water bodies in the basin.

***Figure 5: Ecological Status and Ecological Potential of main surface water bodies in the Sava River basin***


*Source: International Sava River Basin Commission, 2013*

[22] Sava River Basin Management Plan, Background paper No.1: Surface water bodies in the Sava River Basin, March 2013

Adriatic Sea drainage basin[23]

The Adriatic is a semi-enclosed sea forming a distinct sub-region within the Mediterranean Sea. Owing to its semi-enclosed and relatively shallow nature, the Adriatic is highly vulnerable to anthropogenic pressures. Its waters are exchanged with those of the open seas of the Mediterranean only once every 3 or 4 years and the North Adriatic is the shallowest part of the entire Mediterranean Sea, with an average depth of around 50 metres.

In 2011 the World Bank, with funding from the Water Partnership Program (WPP) Trust Fund, commissioned a study to update the inventory of pollution hotspots in the Adriatic. This Hotspot Assessment identified potential interventions, building upon the previous Transboundary Diagnostic Analyses (TDAs) conducted in 1997 and 2005. The study also confirmed that the three major causes of trans-boundary pollution in the Adriatic are: (a) municipal sewage point-sources and agriculture non-point discharges along the coast and the main rivers in the Adriatic basin, which pollute coastal waters and have created a highly eutrophic system in its northern sections; (b) chemical and oil discharges from point sources such as industry and port wastes; and (c) solid waste and litter from unsanitary waste dumping in cities and towns at the coast and/or transported via rivers discharging into the Sea, as well as its leachates. These are aggravated by the fact that tourism places unique technical and financial challenges to liquid and solid waste disposal management because of its seasonal concentration in summer months. Consequently, virtually all the priority investments identified in the Hotspot Assessment are liquid and solid waste treatment, disposal management plans, and monitoring programs for coastal zones and sensitive areas.

*Croatia*

About 1.5 million Croatian residents live in the Adriatic Sea discharge basin and about 9 million tourists visit the Croatian coast each year. The main identified pollution source at the Croatian coast is solid waste. In Croatia the Hotspot Assessment identified solid waste disposal as the main source of pollution, and noted that there are almost no properly operated sanitary landfills on the coast, but numerous dumping sites. Due to the karstic nature of terrain, leachates from waste dumping sites are thus released into the sea. The priority pollution hotspots identified through earlier studies and confirmed by the Assessment are the following (from North to South): Pula, Rijeka, Zadar Channel, Krka Estuary, Split-Kastela, Ploce-Neretva Delta (which also receives pollution originating in BiH), and Dubrovnik-Ston. Croatia's National Environmental Action Plan (NEAP) has also prioritized coastal pollution in these areas for intervention.

Of specific point of interest is Ploče and the Neretva Delta the pollution sources contributing to the pollution at this site originate from Croatia and Bosnia and Herzegovina. Total population of the area gathering Ploče, Opuzen, Metković and other villages is approximately 32,000 inhabitants. The main economy drivers are the port of Ploče and intensive agricultural activities in the Neretva Delta. The port of Ploče with the annual traffic of approximately 4,529,000 tones is a cargo port of special importance for the Republic of Croatia. Owing to its location, this port is of exceptional significance for the economy of the neighbouring state Bosnia and Herzegovina. There is an on-going project to develop the port of Ploče infrastructure. This will result in bigger environmental pressures from marine and land transport. As well, it is expected that the nonpoint source pollution will grow, if no measures are taken, with the increase of agricultural production in the Neretva river delta. The Neretva River is a recipient of the untreated municipal wastewaters from the Bosnian and Herzegovinian settlements upstream (such as Mostar, Čitluk, Široki Brijeg). The wastewater pollution of the Neretva Delta may have negative effects on the ecological balance of this natural wetland and the existing agricultural production impacting over

[23] Source: World Bank Report. Adriatic Sea Environment Program Rapid Assessment of Pollution Hotspots for the Adriatic Sea, October 2011

7,000 small agricultural producers. The non-sanitary landfills in the area Dubravica (Metković), Lovornik (Ploče), and other smaller ones gather approximately 20,000 t of waste per year. The construction of the regional waste management centre for the Dubrovnik – Neretva County is planned, but it is still in the early phase of project documentation development and the location still has to be selected.

*Bosnia and Herzegovina*

About 500,000 residents of Bosnia and Herzegovina live in the Adriatic Sea discharge basin. Bosnia and Herzegovina has 25 km of the Adriatic Sea coastline that belongs to the Municipality of Neum with a population of about 4,000 people. This region was not classified as a pollution hotspot site, but it is considered as an endangered area that should be closely monitored. While there are no identified pollution hotspot sites at BiH's short Adriatic Sea coastline, there are major municipal point pollution sources that contribute to the pollution load carried by the Neretva river into its delta (one of the identified Hotspots), as well as Krka and Cetina Rivers and the Karst aquifer. Wastewater treatment is a significant problem throughout the territory of BiH. Sewerage systems in the Mediterranean part of BiH, many of which were damaged during the war, are obsolete, and only a few municipalities in the programme area (Trebinje, Grude and Ljubuski) have wastewater treatment plants, which need to be upgraded. Solid waste is another critical problem. Local (municipal) landfills are mostly simple waste dumps set on inadequate locations without basic technical protection measures, and cannot therefore be considered proper sanitary landfills.

An exception is Mostar's landfill at Uborak, which has been recently upgraded with the construction of a new disposal site and the closing of the old waste dump; however the leachate treatment is still not adequate. It consists only of retention lagoons and does not include any treatment of leachates generated on the old disposal site. Neum, on the coast, while not reaching pollution levels already present in the identified hotspots, is also under threat because of its dependency on tourism and the sensitivity and fragility of the Mali Ston inlet.

*Montenegro*

In Montenegro, the majority of 625 thousand people live in the Adriatic Sea discharge basin, while an estimated number of 250 thousand live in the coastal zone. There is an estimate of 2.5 million tourists visiting the Montenegro coast each year. The priority pollution sources in Montenegro are untreated wastewater and solid waste. There have been improvements in the wastewater management infrastructure over the last decade, but there are still substantial funding required for developing treatment capacity and sewerage networks in the coastal municipalities. The pressure in summer months significantly increases with tourists contributing to elevated risks from microbiological pollution of bathing waters. Other pollution sources include nutrient loads from river discharges. The main contributor of nutrient loads is the River Bojana that discharges waters from the Skodra lake and the Drin river.

Currently, cross-border/international cooperation between the respective countries is well-established through initiatives such as the Trilateral Commission, the Adriatic-Ionian Initiative, the Adriatic Euroregion and projects under IPA Adriatic Cross-Border Cooperation. However, there is a potential to further assist countries involved to investigate and dissemination the concept of Maritime Spatial Planning as a cross-border/international tool to solve competition between maritime activities (and their environmental impact).

## 3.5 Forests and forestry

Croatia

Forest areas in Croatia have in last three decades constant increase. Total forest area in Croatia in 1986. was 2.061.509 ha, in 1996. it was 2.078.289 ha and in 2006. it was 2.402.782 ha (FRA 2010- Country Report, Croatia). Increment in forest area is a result of constant demographic changes in terms of the abandonment of rural areas which is the main reason for natural succession of forests over former agricultural lots, and also as a result of afforestation.

The most valuable forests within the programme area are pedunculated oak forests which appear alongside the northern border with BiH, especially within the Spačva basin in the Eastern part of Croatia. The remaining floodplain forests are of no major economic importance and the commonest tree species are willows, poplars, narrow-leafed ash and common alder. Alongside the western Bosnian and Herzegovinian border, forest types shift to hilly and mountainous forest types which to a high extent include coniferous tree species such as common fir, Norway spruce, Scots pine, black pine etc. Of broad-leaved tree species, the most abundant is European beech followed by common hornbeam, sessile oak, rowans, sycamore maple etc. In the Sub Mediterranean karst region, the most abundant tree species is pubescent oak followed by a variety of pines, junipers and other xerophytic trees and shrubbery. In general terms, coniferous forests cover approximately **13,6%** of the afforested territory, while the rest is covered with broad-leaved forests (**86,4%**)[24].

Croatia is still the only country in the world which has all of its state-owned forests certified since 2002 by the prestigious FSC certificate which guarantees sustainable, nature-oriented and responsible forest management. Approximately 75% of forests is state-owned (this figure varies in accordance with different interpretations of forests), while the rest is subject to various forms of private ownership (physical persons, companies, municipalities, institutions etc.). Recent most important trends in Croatian forestry include gradual increase in the percentage of private-owned forests due to continuation of the restitution process, increase in the overall annual cut[25] and the increased demand for woody biomass[26].

State-owned forests are managed by the state-owned company "Hrvatske šume Ltd.", while private forests are managed by their owners, which are greatly aided by the Advisory Service, Government's agency in charge of providing expert assistance in fields of agriculture, forestry and fishery. Major problems of Croatian forestry is great coverage of afforested land with mines (approximately 58,4% of all mine-infested area[27]), low management intensity, lack of institutional support and workforce for the management of private forests and continuous exacerbation of health state of Croatian forests as well as the non-resolved cadastral and proprietary issues.

Bosnia and Herzegovina

Forests, in regard to their renewability, natural structure, mixed composition and natural regeneration, are a basic natural resource of Bosnia and Herzegovina and present one of the strategic pillars in the Development Strategy of BiH for the coming period. Considering the variety of climatic and orographic

[24] Croatian Bureau of Statistics (2013): Statistical Yearbook of the Republic of Croatia 2013, Zagreb, December 2013, p. 274
[25] Ibid., p. 275
[26] Pavelić, I., Kuric, D. (2013): Realization of Projects and Investments in Energetical Facilities ran on Woody Biomass, PPT presentation, 8th Croatian Days of Biomass, Našice, 6th September 2013, slide No. 17, http://www.sumari.hr/biomasa/osmidanibiomase/06.pdf [30th September 2014]
[27] National Mine Action Plan and Humanitarian Demining of the Republic of Croatia, OG 120/09, p. 13

conditions in the country, there is a wide array of forest phytocoenoses comprised of more than a hundred tree species.

Phytocoenoses distribution within the programme region is analogue to that described for Croatia, while the major tree species are common fir, Norway spruce, Scots pine, black pine, common beach, various oak species and a smaller amount of noble broadleaves (maples, chestnut, walnut, crab apple, European pear, cherries, lindens and elms) and various fruit trees.

Forests and forest land cover approximately **53%** of the territory, of which **81%** is state-owned and **19%** privately owned. High forests amount for approximately **47.6%** of the state-owned afforested area while **33.9%** are coppices. Higher level of coppices lies in the fact of past clear-cuts, frequent wars and subsequent rejuvenations. Around **18.5%** of forest land comprises of barren land.

The ministry in charge of forestry does not exist on the state level. On the international level, forestry interests are represented by the Ministry of Foreign Trade and Economic Relationships, while each of the three entities (Federation of BiH, Brčko District and the Republic of Srpska) manages their forests through their eligible ministries. In accordance with the FBiH Constitution, jurisdiction over forests is divided between cantons and the FBiH. Pursuant to the general forestry planning development act, forests are considered as areas of general public interest of FBiH
Forests sustained major damage during the last war, which also resulted in over 100,000 hectares of forests and forest land being covered with mines. These forests are singled out from the management plans, and due to the lack of thinning and cleaning pose potential threat of spreading of harmful insects or fungi-induced diseases. After the war, prescribed annual yield has not yet been fulfilled anywhere in the country and the situation is getting worse due to over-growing and decay of old forests. Such situation also provides conditions for possible epiphytoses and causes great economic loss.

Country's forest development strategy encompasses institutional support to all companies in charge of the management of state-owned forests in all entities, restructuring of economic and financial forestry and wood processing industry framework, drafting of national certification standards for the FSC certification scheme and drafting of the action plan for combating illegal activities in forestry and wood processing industry. Project of monitoring of the health status of forests is in the preparatory phase which will take approximately three years.

Montenegro

There is no substantial difference between the programme area and the rest of the country in regard to forests.

According to the data of the latest National Forest Inventory of Montenegro[28], forests and forest land cover around **69.7%** of the country. Forests cover **59.5%,** while forest land accounts for **9.8%** of the country. Newest data from the Inventory show that forest abundance, growing wood stock and annual increment is much higher than estimated (**59.9%** forest coverage compared to **45%** estimated, 118 million cubic metres of wood stock compared to 72 million estimated and annual increment of 2.8 million cubic compared to 1.4 estimated). Although this situation provides for the increase in total annual cuts, the absence of financial effect is quite likely to appear due to high cutting intensity throughout the whole 20$^{th}$ century which significantly lowered the diameters of trees and accordingly worsened the structure of log assortment. Because of the country's orography, there is a large portion of coniferous forests (**32.5%** - the fact from which the country actually gained its name), and the most

[28] Ministry of Agriculture and Rural Development of Montenegro (2011): National Forest Inventory, Podgorica 2011.

abundant tree species are Balkan beech, Norway spruce, common fir, sessile oak, Scots pine, black pine, ash, hornbeam, pubescent oak and other pine and oak species.

State-owned forests account for **67%** of forests and forest land, while the remaining **33%** is privately owned[29]. Nevertheless, newest data from the National Forest Inventory indicate that the amount of privately owned forests is much higher, but this information cannot be verified prior to the completion of cadastral restitution. High economic forests cover approximately **61%** of the forest territory, coppices account for **25%** while the rest comprises of barren land. Recently, a significant increase of forest area is noticeable, mostly caused by the abandonment of rural areas and artificial afforestation.

Forestry activities in Montenegro are under the jurisdiction of the Ministry of Agriculture, Forestry and Water Management. Forestry operations are run by the Forestry Directorate and its 15 branch offices. Interesting thing to mention in the Montenegrin forestry is that all state-owned forests are given to concession to private forestry companies on an annual basis[30].

Most emphasized problems in contemporary Montenegrin forestry is low level of final products in comparison to the amount of available wood on the market, obsolete equipment and machinery, insufficient investments in forest production, bad condition of private forests, overall absence of thinning and cleaning measures, failure to fulfil the prescribed annual cut, insufficiency and inadequacy of the forest road network, inefficient concession system, insufficient activity of the extension service, insufficiency of work force and low level of education, insufficiently valorised general welfare forest functions in national parks etc.[31].

Major challenge set before the Montenegrin forestry which derives from the results of the National Forest Inventory is the improvement of quality of log assortment, which should be regulated by management plans, i.e. cutting intensities and cleaning and thinning measures. Strategic goals of the Montenegrin forestry, as defined by the National Forestry Policy, are boosting of the economic growth and mitigation of regional differences, reduction of poverty, providing for equal access to services and resources, ensuring efficient supervision and reducing pollution and enhancing management system and public participation through mobilisation of stakeholders on all levels.[32]

## 3.6 Biodiversity, fauna, flora

Introduction[33]

The programme area has a rich biodiversity in comparison to the average European region, with many endemic species. Several eco-regions stretch across borders. These eco-regions include the Illyrian deciduous forests, the Dinaric Mountains and the Pannonian mixed forests. The Region also contains a number of unique ecosystems, including karstic regions and tectonic lakes. It also host habitats and landscape elements of central importance for large carnivores such as the wolf, Eurasian lynx and brown bear which require large habitats to sustain viable populations.

[29] Ministry of Agriculture and Rural Development of Montenegro (2008): National Forest Policy of Montenegro, Podgorica 2008, p. 14
[30] Ibid, p. 15
[31] Ministry of Agriculture and Rural Development of Montenegro (2013): Working Draft of National Forestry Strategy with Forests and Forestry Development Plan, Podgorica, June 2013, p. 6
[32] Ibid, p. 22
[33] Source: http://www.eea.europa.eu/soer

*Croatia* is one of the richest European countries in terms of biodiversity because of its geographical position at the crossroads of several biogeographical regions and its characteristic ecological, climate and geomorphological conditions. These conditions in combination with various local traditions in the use of space, which have developed as a result of economic and historical circumstances, have also contributed to an exceptionally rich diversity of the landscape. The great diversity of terrestrial, marine and underground habitats has resulted in a wealth of species and subspecies with a high number of endemics. The number of known taxa (species and subspecies) in Croatia is 38,268, and they are believed to actually number between 50,000 and 100,000. Croatia is home to a considerable part of the populations of many species endangered at the European level. Based on the earlier estimate of the level of threat to the analysed plant, fungal and animal groups (vertebrates, butterflies, dragonflies, underground fauna, corals, ground beetles, stoneflies, vascular flora, lichen and fungi) there are 2,235 endangered taxa on the red list. The most highly threatened are freshwater fish, then reptiles, amphibians, dragonflies and birds.

*Bosnia and Herzegovina* is characterised by great abundance in terms of the diversity of its genes, species and eco-systems. Several factors have led to the development of the unique plant and animal life in the Dinaric Alps of Bosnia and Herzegovina: a unique process of bedrock formation, the types of soil, the relief, the ecoclimate and the water table, to name but a few. The isolation of distinct habitats, such as cliffs, canyons and the highest mountain peaks has resulted in the development of special types that are specific to certain areas. In fact, the territory of Bosnia and Herzegovina has acted as a dispersal centre for some types of flora that have expanded to other parts of the Balkan peninsula. Refugio-relict habitats represent the most unique element of Bosnia and Herzegovina's environment, created during the formation of the Earth's crust, geogenesis and the evolution of both climate and the living world. These habitats were the least altered during the period between pre- and post-glaciation and have preserved their natural ecological qualities. They contain many tertiary plant and animal species which were subject to drastic climate changes during the last glaciation period. Species living in these refugia are considered to be relicts. These types of habitat, where numerous tertiary relict species of plants and animals live, are of the greatest importance for Bosnia and Herzegovina's biodiversity, and also for global biodiversity. Tertiary relict ecosystems in Bosnia and Herzegovina are located mainly in canyons, cliffs and on the steep slopes of mountains in the basins of the Una, Vrbas, Bosna, Drina and Neretva rivers.

Wildlife is poorly researched at the moment. Data on biological diversity are scarce and Bosnia and Herzegovina still has no institution responsible for biological diversity state monitoring.[34]

*Montenegro* features a great diversity of geological background, areas, climate and landscape, as well as the position of Montenegro in the Balkans and on the Adriatic, which provide conditions for very high biological diversity, making Montenegro one of the hot spots of European and world biodiversity. Montenegro has two World Heritage sites, one biosphere reserve and four national parks. As a small European country and because of its geographical position, distribution, heterogeneity of habitats, topography, geological past and climate variations, Montenegro is characterised with high biodiversity in most taxonomic groups. In terms of wealth of flora and fauna and diversity of ecosystems Montenegro is among the leading countries of Europe. However, development in Montenegro in the last couple of years has brought significant pressures on biodiversity, including: increased urbanisation – mainly in the narrow strip along the coast, on the central plain and around the systems of natural lakes; increase in illegal construction and development in and around protected areas and along much of the coastal area and around mountain resorts; outflow and swamp pollution as a result of intense agricultural activities; illegal deforestation, illegal river gravel extraction, illegal fishing and other illegal

[34] State of the Environment Report of Bosnia and Herzegovina 2012, Ministry of Foreign Trade and Economic Relations

use of natural resources. Devastation of protected or core areas for migratory bird conservation are present due to illegal tourism development.

The state of biological diversity in Montenegro has been monitored, even though to a very limited scope, since 2000 within the national Environmental Monitoring Programme. Due to greatly reduced scope of financing of this Programme component, information collected to date does not yet allow for a more serious analysis of trends regarding the state of indicator species populations, changes at selected types of habitats and thus in the environment in general. By generalizing the results obtained through the Programme, it was stated that negative consequences were mostly present in water ecosystems and forests. In 2005, additional threats for dry grassland ecosystems (the Zeta and Bjelopavlićka Plain) and ecosystems of salt pans were stated (hinterland of Velika Plaza in Ulcinj). In the light of obligations stemming from the process of establishment of a network of protected areas and NATURA 2000 network systematic monitoring of the state and determining of distribution of particular plant and animal species and their habitats should be initiated and realized.[35]

Protected areas in the study area

*Croatia:* Protected areas now cover 8.19% of the Croatian territory, i.e. 11.61% of the land territory and 1.97% of the territorial sea. In the programme area there are 6 sites that are under international protection. All of them are also under some level on national protection.

*Bosnia and Herzegovina:* The territory of protected areas in Bosnia and Herzegovina is relatively small, and the percentage share as compared to the total BiH territory is very low and significantly below the European average and below the level of protection envisaged in numerous strategic documents. In 2011, the percentage of protected areas in BiH was 2%. There are three Ramsar sites in BiH: Hutovo Blato, Bardača and Livanjsko polje. The institutions of Bosnia and Herzegovina are also current supported by EU and other donors (such as Sweden) in their efforts to transpose and implement the provisions of the EU Birds and Habitats Directives into the entity Laws on Nature Protection. Initial steps for development of the Natura 2000 network across the country, as well as in the development of appropriate implementation strategies and management plans are being undertaken.
*Montenegro:* The national network of protected areas covers 124,964 ha or 9,047% of the territory of Montenegro. The international protected areas include the Tara river basin, M&B UNESCO Biosphere Reserve, including the NP Durmitor with the Tara River Canyon, the National Park "Skadar Lake" – Ramsar site, Tivat Salina, also Ramsar site, Kotor - Risan bay, the Municipality of Kotor (UNESCO). Emerald network in Montenegro counts 33 sites, of which 12 are located in the programme area. The programme area encompasses over 10,600 km$^2$ of protected areas, which are shown on the Table 4 below.

Protected areas in the programme area are shown in Table 4. The list of areas has been compiled from publically available documents, such as spatial plans, and shows currently protected areas of national importance. Apart from the listed areas, within the programming area are numerous other sites planned for protection, as well as sites of local importance.

**Table 4: Protected areas in the programme area**

| **Protected areas in the programme area** | | | |
|---|---|---|---|
| **Teritory** | **Name** | **Area (km2)** | **Territory covered** |
| **Croatian programme area**[36] | | | |

[35] National Biodiversity Strategy with the Action Plan for the period 2010-2015, Draft, July, 2010
[36] http://195.29.218.202/ZASTITA_PRIRODE/; *Situation Analysis for the IPA CBC Programme HR-BA-ME 2014-2020*

| | | | |
|---|---|---|---|
| **National parks** | | | |
| Lika-Senj County | Plitvice lakes | 295 | 0.5% |
| Zadar and Lika-Senj County | Paklenica | 102 | 0.2% |
| Dubrovnik-Neretva County | Mljet | 54 | 0.1% |
| Šibenik -Knin County | Kornati | 234 | 0.4% |
| Šibenik -Knin County | Krka | 110 | 0.2% |
| Lika-Senj County | Sjeverni Velebit | 109 | 0.2% |
| **Nature parks** | | | |
| Dubrovnik-Neretva County | Lastovo islands | 53land+143sea surface | 0.1% |
| Split-Dalmatia County | Biokovo | 196 | 0.3% |
| Sisak-Moslavina County | Lonjsko polje | 506,5 | 0.9% |
| Partly in ZagrebCounty | Medvednica | 225 | 0.4% |
| Partly Požega-Slavonia County | Papuk | 336 | 0.6% |
| ZadarCounty | Telašćica | 70,5 | 0.1% |
| Lika-Senj County | Velebit | 2276 | 4.0% |
| Šibenik-Knin County | Vransko lake | 57 | 0.1% |
| Zagreb and Karlovac County | Žumberak | 333 | 0.6% |
| **Bosnian and Herzegovinian programme area**[37] | | | |
| **Strict nature reserves (category Ia)** | | | |
| Šipovo | Virgin forest Janj | 2,95 | n/a |
| Petrovac, Istočni Drvar | Virgin Forest Lom | 2,98 | n/a |
| Ljubuški | Vodopad Kravice | | |
| Bihać | Virgin forest Plješevica | | |
| **Special nature reserves ( category Ib)** | | | |
| Bijeljina | Gromiželj | 8,31 | n/a |
| Mrkonjić Grad | Lisina | 5,61 | n/a |
| Bosansko Grahovo | Pećina Ledenica | | |
| Bosanska Krupa | Suvajsko međugorje | | |
| Sanski most | Pećina Hrustovača, Vrhpolje kod Sanskog Mosta | | |
| **National parks (category II)** | | | |
| Prijedor, Gradiška, Kozarska Dubica | Kozara | 39,08 | n/a |
| Gacko, Foča, Kalinovik | Sutjeska | 160,52 | n/a |
| Drvar, Bihać | Una | 198 | n/a |
| **Monuments of nature (category III)** | | | |
| Banjaluka | Pećina Ljubačevo | 0,45 | n/a |
| Kotor Varoš | Žuta Bukva | 0,005 | n/a |
| Teslić | Pećina Rastuša | 0,11 | n/a |
| Ribnik | Jama Ledana | 0,28 | n/a |
| Šipovo | Vaganska pećina | 0,12 | n/a |
| Bileća, Gacko | Pećina Đatlo | 0,43 | n/a |
| Trebinje | Pavlova pećina | 0,13 | n/a |
| Zavidovići, Kakanj | Tajan | 3.591,98 | n/a |

[37] Spatial plan of Una- Sana Canton, 2013; Amendments of Spatial plan of Republika Srpska by 2025- draft 2013; Spatial plan of Herzegbosnia County for the period 2008- 2028; Spatial plan of Western Hercegovina County for the period 2012-2032; http://nasljedje.org/prirodno-nasljedje/266; Spatial Plan of Zenica- Doboj Canton 2009-2029; Spatial plan of Tuzla Canton 2005-2025

| | | | |
|---|---|---|---|
| Glamoč | Šatorsko jezero | | |
| Kupres (FBiH) | Kukavičko jezero | | |
| Kupres (FBiH) | Turjača jezero | | |
| Kupres (FBiH) | Rastičevsko (Blagajsko) jezero | | |
| Tomislavgrad, Posušje | Blidinje jezero | 0,92 | |
| Drvar | Pećina u Bastasima | | |
| Livno | Mračna pećina „Mračnica“ na planini Dinari | | |
| Glamoč | Međugorska pećina na Šator planini | | |
| Glamoč | Ponor Bezdan u Borovom polju na Šator planini | | |
| Livno | Pećina Barzilovka (Snježnjača) na Malom Troglavu | | |
| Livno | Pećina Duman | | |
| Tomislavgrad | Mijatova pećina ispod Vran planine | | |
| Tomislavgrad | Veliki ponor kod sela Kovači | | |
| | Ponornica Šujica | | |
| Livno | Izvor Duman | | |
| Livno | Izvor rijeke Sturbe | | |
| Drvar | Izvor rijeke Bastašice | | |
| Livno | Runolist | | |
| Bihać | Sedreno područje Une u Martin Brodu | | |
| Bihać | Pećina kod Martin Broda | | |
| Bihać | Srednji buk na rijeci Uni, Martin Brod | | |
| Bihać | Štrbački buk na rijeci Uni, Martin Brod | | |
| Bihać | Milančev buk (Veliki slap) na rijeci Uni, Martin Brod | | |
| Bihać | Izvor rijeke Ostrovice, Kulen Vakuf | | |
| Bihać | Izvor rijeke Klokota | | |
| Bihać | Crni izvor na rijeci Unac, Martin Brod | | |
| Bihać | Vrelo Ostrovice | | |
| Bosanska Krupa | Izvor rijeke Krušnice | | |
| Sanski most | Izvor rijeke Dabar | | |
| Sanski most | Vodopad Bliha | | |
| Sanski most | Dabarska pećina | | |
| **Resoruces management areas (category IV)** | | | |
| Banjaluka | Univerzitetski grad | 0,27 | n/a |
| **Nature parks (category V)** | | | |
| Tomislavgrad, Posušje, Mostar, Jablanica, Prozor- Rama | Blidinje | 358 | n/a |
| Čapljina, Stolac | Hutovo blato | 11 | n/a |
| **Protected landscape (category V)** | | | |
| Banovići, Živinice, Kladanj | Konjuh | 80,2 | |

| | | | |
|---|---|---|---|
| Livno | Bašajkovac | ? | |
| **Montenegrin programme area**[38] | | | |
| **National parks** | | | |
| Cetinje, Budva, Kotor | Lovćen | 62,2 | n/a |
| Podgorica, Bar, Cetinje | Lake Skadar | 400 | n/a |

Specific trans-boundary interest

There are some specific trans-boundary interests in the programme area:

- Adriatic Flyway
- Distribution of large carnivores (wolf, brown bear and lynx)
- Sava River Basin
- Dinaric mountains
- Karst fields

Of specific trans-boundary interest in the programme area is the presence of *Adriatic Flyway* which is one of the main routes for millions of migratory birds crossing the Mediterranean, with birds making a resting stop along the eastern Adriatic. A number of bird species also spend winters in the area. Typical species that use this migratory route are Common crane (*Grus grus*), Great Egret (*Egreta alba*), garganey (*Anas querquedula*) and Eurasian spoonbill (*Platalea leucorodia*), some raptors etc. Alongside lack of areas in which hunting is banned, hunting rules that are not in line with EU legislation (as well as low enforcement of existing rules) result in vulnerable, threatened or endangered migratory bird species being killed. The issue of illegal hunting of migratory birds has impacts for the EU as a whole.[39]

The most important resting areas and wetlands along the Adriatic Flyway include:

- The Neretva Delta in Croatia and Bosnia and Herzegovina
- Lake Skadar, Bojana Buna Delate and Solana Ulcinj on the border of Albania and Montenegro
- The karst plain Livansko Polje in Bosnia and Herzegovina. [40]

Of specific trans-boundary interest is also the presence of *large carnivores* (brown bear (*Ursus arctos*), wolf (*Canis lupus*) and lynx (*Lynx lynx*)) because of their wide distribution and migration among the countries in the programme area. This issue, especially regards cooperation between Croatia and Bosnia and Herzegovina, is identified in Strategy and Action Plan for Biological and Landscape Diversity of Republic of Croatia (2008). Till today no cooperation is established, although it is recognized as important in order to ensure good shape and stability of population in whole.

Lynx population in Croatia and Bosnia and Herzegovina is part of a larger Dinaric population, which is shared between Croatia, Slovenia and Bosnia and Herzegovina. Dinaric population today counts no more than 130 individuals. Population is small and vulnerable, and the most important threats to its survival are illegal hunting, low density of prey populations and the possible consequences of reduced genetic diversity. Lynx in Croatia is permanently present on approximately 9,000 km2. There are no reliable data on the status of the lynx in Croatia but the estimated size of the population is between 40 and 60 individuals.[41] The number of lynx in Bosnia and Herzegovina is estimated at about 70 individuals, but the monitoring and enforcement of protection is insufficient. Lynx population in Montenegro is part of

[38] Situation Analysis for the IPA CBC Programme HR-BA-ME 2014-2020; Spatial Plan of Montenegro
[39] For details, see e.g. Denac, D., Schneider-Jacoby, M. & Stumberger, B. (eds.) (2010): Adriatic flyway – closing the gap in bird conservation. Euronatur, Radolfzell.
[40] For details, see e.g. Denac, D., Schneider-Jacoby, M. & Stumberger, B. (eds.) (2010): Adriatic flyway – closing the gap in bird conservation. Euronatur, Radolfzell.
[41] Lynx Management Plan for Croatia 2010.-2015

larger Balkan population which is shared between Macedonia, Albania, Kosovo, Serbia and Montenegro with total size of 40-50 individuals. There are no relevant data for Montenegro.

***Figure 6: Lynx distribution in the programme area for the period 2006-2011***


*Source: Status, management and distribution of large carnivores– bear, lynx, wolf & wolverine – in Europe; 2012/ 2013*

Wolf population in the programme area is part of a greater Dinaric-Balkan population inhabiting a wide area from Slovenia to the north Greece, including the entire Dinara mountain range that extends through Croatia, Bosnia and Herzegovina, Western Serbia, Kosovo, Montenegro, Macedonia, Albania and western and southern Bulgaria. It is considered that the population is more or less continuous throughout the region, although the data for some countries is quite incomplete.[42] The population is roughly estimated at 3,900 individuals[43]. It is estimated that in Croatia there are an average of 201 individuals distributed in 50 packs, of which 24 packs in the border area with Slovenia and Bosnia and Herzegovina. The number of wolves in Bosnia and Herzegovina is estimated at about 650 individuals with an increasing trend. There is no relevant data for Montenegro.

***Figure 7: Wolves distribution in the programme area for the period 2006-2011***

[42] Report on the status of the wolf population in Croatia in 2012; SINP; Zagreb
[43] Status, management and distribution of large carnivores– bear, lynx, wolf & wolverine – in Europe; 2012/ 2013

*Source: Ibid*

In all three countries brown bears are part of Dinaric- Pindos population with total size of 3,070 individuals. Current estimate of the number of brown bears in Croatia is about 1,000 individuals with distribution area over 11,000 km2 (of which 9,000 km2 of permanent presence). Population in Croatia is stable with a slightly increasing trend. In Bosnia and Herzegovina number of brown bears is estimated at about 550 individuals with an increasing trend and in Montenegro at about 270 individuals.

***Figure 8: Brown bear distribution in the programme area for the period 2006-2011***


*Source: Ibid*

Another trans-boundary interest in the programme area concerns the Sava River Basin system which features outstanding biological and landscape diversity. It hosts the largest complex of alluvial wetlands such as Posavina in the Central Sava Basin and large lowland forest complexes. The Sava River and some of its tributaries offer a unique example of a river with some of the floodplains still intact, thus supporting the flood alleviation and biodiversity. It hosts the largest complex of alluvial floodplain wetlands in the Danube basin and the largest lowland forests. The Sava is a unique example of a river where the floodplains are still intact, supporting both floods alleviation and biodiversity. It has been selected as a focal area in the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

Because of its great ecological value six Ramsar sites are establish, of which three in the programme area: Bardača wetland in Bosnia and Herzegovina (also Important Bird Area at the national level) and Lonjsko and Mokro polje (Nature Park and Ornithological reserve at the national level) and Crna Mlaka (Ornithological reserve at the national level) in Croatia.[44]

With the trans-boundary project *Protection of Biodiversity of the Sava River Basin Floodplains*, 32 sites in the programme area along the Sava River have been identified as sites important for biodiversity. The Sava River itself functions as the connecting backbone for the network of sites. The project proposes these sites included in a shared trans-boundary network of sites along the Sava River.

The 16 Bosnian-Herzegovinian sites, which are included in a proposed network of sites along Sava River, are currently not protected under any national protection scheme (except above mentioned Barača wetland). For the most biologically important sites, proposals for protection are under development. No

[44] Sava River Basin Analysis Report; International Sava River Basin Commission (ISRBC), Zagreb, 2009

official Bosnian-Herzegovinian ecological network is being established.[45] The 16 Croatian sites are all included in the Natura 2000 network.

The programme of work on *mountain biological diversity* under the Convention on Biological Diversity (CBD) recommends establishing regional and trans-boundary collaboration, and cooperative agreements for mountain ranges, as well as establishing and strengthening adequate, effective national and regional networks of mountain protected areas.[46] There are 6 countries included in this programme, of which Bosnia and Herzegovina and Montenegro in the programme area, with potential of joining also Croatia due to neighbouring and sharing mountain ranges. The Orjen- Snježnica Mountain represents the area of interest under this programme. It is located on the Croatian- Bosnia and Herzegovina- Montenegro border. Snježnica is the southernmost mountain ridge of Dinara mountain range in Croatia. Orjen is the highest mountain in the coastal Dinaric range. The both mountains have large ecological and landscape value in the area. Orjen Mountain is planned to be designated as National Park and together with Sutjeska in Bosnia and Herzegovina and Snježnica in Croatia it is proposed to create cross-border protected areas.[47] It is predicted that climate changes and consequently rise of the temperature will have impact on biodiversity as well. Especially vulnerable are Dinaric mountain regions as an extremely important area in the Balkan and rich in endemic species.[48]

The major part of the programme area belongs to the Dinaric karst area where *karst fields* (or 'krška polja') have great ecological, hydrological, cultural and economic value. According to literature, more than 130 karst fields exist in the Dinaric karst, about 50 larger ones. Thus, the Dinaric Karst harbours the largest number of karst fields worldwide.[49]

Fourteen major karst fields are with a surface larger than 10 km2 are located in Croatia. The largest field is the Ličko polje with a surface of 465 km2.[50] More than 50 karst fields are identified in Bosnia and Herzegovina. The largest fields areas are Livanjsko (about 400 km2), Popovo (68.4 km2), Nevesinjsko (170 km2),Glamočko etc.[51] The most important karst poljes in Montenegro are Nikšićko, Cetinjsko and Grahovsko polje. [52]

In terms of biodiversity, karst fields are important as wetlands and grasslands of high conservation value as well as important bird areas. The conservation value of the karst fields is threatened by different factors: changes of the hydrological regimes through drainage and other water engineering projects, changes in water flow through hydroelectric projects, depopulation of the area and declining of number of livestock etc.

[45] For details see: Protection of Biodiversity of the Sava River Basin Floodplains- Sites Important for Biodiversity along the Sava River
[46] Towards the Network of Mountain Protected Areas in the Balkans and the Dinaric Arc; UNEP Vienna ISCC, 2010. This programme was established under The Environment and Security Initiative (ENVSEC) Initiative for South East European region.
[47] Spatial Plan of Montenegro until 2020, Ministry of Economic Development, Podgorica, 2008
[48] State Of The Environment Report Of Bosnia And Herzegovina 2012, Ministry of Foreign Trade and Economic Relations
[49] Sackl P., Durst R., Kotrošan D. & Stumberger B. (eds.): Dinaric Karst Poljes - Floods for Life. EuroNatur, Radolfzell.
[50] DIKTAS Protection and Sustainable Use of the Dinaric Karst Transboundary Aquifer System – Country REport (Regional Aspect)- Croatia
[51] DIKTAS Protection and Sustainable Use of the Dinaric Karst Transboundary Aquifer System National Report Bosnia And Herzegovina, 2012
[52] DIKTAS Protection and Sustainable Use of the Dinaric Karst Transboundary Aquifer System – Montenegro Country Report, 2012

## 3.7 Cultural heritage

Croatia

Abundance of tangible and intangible cultural heritage is consequence of specific position on crossroads of different civilization impact zones, migration routes and Catholic, Orthodox and Islamic religion. Through the history in this area are overlaid impacts of prehistory cultures, Illyrians, Celts, Romans, Goths, Huns, Avars, Hungarians, Byzantium, Venetians, Turks, Slavs and Germans. Every nation has left traces of their culture which is often pervaded with existing and surrounding cultures.

Consequently, we find exceptional diversity of cultural heritage on a small surface. Monuments and archaeological findings have their origins from Ancient History to recent times. There is strongly presence of material remains, especially from the period of Prehistoric cultures, Illiryan tribes, ancient Greece, ancient Rome, Middle Ages, Mediterranean Renaissance, Middle European Baroque and 19th and 20th century.

Cultural heritage is divided into material - immobile and mobile or intangible cultural elements. Immovable cultural elements are archaeological sites, building elements and cultural landscapes. Movable cultural elements are the inventories of public and private collections - museum, archival and library materials. Main groups of intangible cultural elements are specific skills, crafts, customs and chants that belong to traditional context of specific cultural area.

The main responsibility for cultural heritage protection is given to Ministry of Culture and regional conservation departments. Except the conservation departments cultural heritage protection is implemented in spatial planning documentation. Through the institution and spatial planning work are defined categories: protected and inscribed in the Register on the List of Protected Cultural Goods, preventatively protected inscribed in the Register on the List of Preventatively Protected Gods, cultural goods protected by the representative bodies of a county, a city or a municipality if it is located on their territory and identified cultural goods. .

The current state of cultural heritage protection is relatively satisfying. Worse conditions are in the field of conservation of immobile and mobile cultural heritage. Except the past war destructions (1991-1995) many artefacts have been hampered by a lack of financial resources and skilled personnel which causes poor maintenance, restoration and sustainable use. Relatively similar conditions are in the field of intangible cultural heritage where the situation is more complex due to dependence of constant use and knowledge transmission.

Study area includes three major cultural areas which are defined according to the specific cultural context.

*Lowlands – Slavonia and Central Croatia*

The second largest Croatian historical region is defined by plain relief and continental climate conditions. It is surrounded by large rivers; Danube, Drava and Sava. Through the history in this area are overlaid impacts of prehistory cultures, Thracians, Illyrians, Celts, Romans, Goths, Huns, Avars, Hungaryans, Turks, Slavs and Germans.

Material elements of cultural heritage are diverse and come from all periods of human residence in this area. There are extremely important archaeological finds of Neolitic and Eneolitic culture. Ottoman presence from the 15th to the 19th century is an important factor for the current state of cultural heritage. Result of this military presence is a large number of forts and destroyed artefacts of other,

previous, cultural periods. After Ottoman withdrawal a Catholic restoration resulted in a large number of sacral and secular artefacts. Most of the cultural monuments in Slavonia are tied to the 18th, 19th and beginning of the 20th century. This period present numerous styles such as classicism, historicism and Art Nouveau.

Elements of cultural heritage from the period before the Middle Ages are linked to a series of smaller archaeological sites deployed across the lowland areas. Elements of architectural heritage from the later periods are villages, towns and fortification elements atop of hills. The largest number of architectural elements and mobile heritage is located in cities. Nearby towns are rural units, sacral objects of cultural heritage and cultural landscapes. Centres of cultural heritage that can be emphasized are: Osijek, Đakovo, Vinkovci, Ilok, Vukovar, Požega, Sisak.

Intangible cultural heritage is diverse and rich and largely consists of traditional crafts, folk customs and songs. Practises protected as UNESCO intangible cultural heritage are Bećarac and spring procession of the women's folklore group Ljelja.

*The mountainous area – Lika and Kordun*

Mountainous relief, often unfavourable climatic conditions and frequent war devastations have defined the cultural heritage of Lika and Kordun. Cultural impacts of Illyrians, Romans, Germans and Ottoman empire are overlaid in this area.

From the Bronze and Iron age period are present the findings of which belonged to the Illyrian tribes with most valuable find - a helmet which belonged to the Illyrian tribe Japoden. It is particularly important time of battle between the Christian Europe and the Ottoman Empire when this area was a turbulent border exposed to the largest destruction. Consequently most of survived historical monuments are in large part are related to the military use where weaponry, towers and castles dominates. As an example may be mentioned the town of Karlovac, established in 1579 and built as example of ideal Renaissance city concept. The 19th and 20th century are brought relatively stronger prosperity, especially in the area of larger settlements. All the more important sacred and secular buildings date from this period. Sacred and secular buildings and fortification elements are the most common elements of cultural heritage. A small number of rural entities and cultural landscapes although the mountainous area of Croatia has a great potential in this area. It is important to emphasize the area of Plitvice Lakes National Park, which is inscribed on UNESCO World Heritage List. As elements of intangible cultural heritage are protected traditional skills and singing.

*Coastal area with hinterland – Dalmatia*

Dalmatia is the largest and the richest historic region of Croatia. Connection with the sea, rocky relief and climate conditions are interwoven with the strong national identity of the local population and imperialist interests of surrounding nations. The result is culturally very dynamic area which reflected Illyrian, Greek, Roman, Byzantine, Slavic, Ottoman, Venetian and even the Germanic influences. Area of Dalmatian hinterland, but also and part of the coast, was a historically known as 'triple-frontier'. In this area are nearly 400 years entwined border of three large states: the Ottoman Empire, the Austro-Hungarian Empire and the Venetian Republic.

Historical heritage dating back to prehistoric times, but the largest number of elements belonging to the antique, the Middle Ages and the Renaissance. Continuity of settlement is occurred mostly on the same areas, often even to the prehistoric or Iron Age. Regarded to that should be noted several cultural centers: Zadar, Nin, Šibenik, Trogir, Split, Solin, Hvar, Dubrovnik. On hinterland area significant cities with surroundings are Knin, Metković and Sinj. According to the number of cultural heritage elements area can be separated into wealthier coastal area with islands and something poorer hinterland area.

Exceptional importance Dalmatian heritage is emphasized with five elements listed on UNESCO World Heritage list: Historical Complex of Split and Diocletian's Palace, the Old Town of Dubrovnik, old town of Trogir, the Cathedral of St. James in Šibenik, Starigrad Plain on the island of Hvar. Besides specified are present numerous buildings of religious and secular purposes, fortification elements, archaeological sites, and high value cultural landscapes. Movable cultural heritage includes numerous examples from all periods of history.

Thirteen elements of cultural heritage from the territory of the Republic of Croatia are inscribed on UNESCO's list of intangible cultural heritage. Eight of them are from Dalmatia. In the coastal area and islands there are: Lacemaking from Agave plant, Festivity of St. Blaise in Dubrovnik, procession 'Za Križen' (Following the Cross) form island of Hvar, Klapa multipart Singing, Mediterranean diet. In the hinterland area there are: the Sinjska Alka knight's tournament, silent circle dance of the Dalmatian hinterland. In addition to the above elements singing Ojkanje was included in the UNESCO list of Intangible Cultural Heritage in urgent need of protection. Besides UNESCO heritage there are many skills, traditions or singing which are cultural heritage elements of national and local importance.

Bosnia and Herzegovina and Montenegro

In the area of Bosnia and Herzegovina is, through the history, interwoven many nations and Catholic, Orthodox and Islamic religion. In this area are reflected influences of Prehistory cultures, Ancient Greece, Ancient Rome, Croatian Empire, Serbian Empire, Ottoman Empire, Republic of Venice, Austria-Hungary. It is also an area of turbulent boundary between western and eastern civilization circle. Above mentioned reasons created cultural heritage of Bosnia and Herzegovina as a complex mixture of Mediterranean, Byzantine, Ottoman and Central European influences.

Cultural heritage is divided into material - immovable and movable or intangible cultural elements. Immovable cultural elements are archaeological sites, building elements and cultural landscapes. Movable cultural elements are the inventories of public and private collections - museum, archival and library materials. The most significant group of cultural elements are immovable cultural elements - sacral and intangible elements like mosses, churches, monasteries, hans, bridges, fortification elements. Very rare are protected rural ensembles or the 20th-century architecture. Concept of cultural landscape has not been recognized yet although it has a very high potential. Mehmed pasha Sokolovic Bridge in Višegrad and Old Bridge Area of the Old City of Mostar are two properties from Bosnia and Herzegovina inscribed on the UNESCO World Heritage List. On the Tentative UNESCO list are several elements: The natural and architectural ensembles of Jajce, Blagaj, Blidinje, Stolac and Stećci - Mediaeval Tombstones. Main groups of intangible cultural elements belong to traditional context which specific skills, crafts, customs, pilgrimages and songs.

Some cultural centres on observed area are towns with surroundings: Mostar, Banja Luka, Bihać, Jajce. The main responsibility for cultural heritage protection is given to Ministry of culture. Within the Ministry there are two sectors: sector for cultural-history heritage and Institute for Protection of Monuments. Except the conservation departments cultural heritage protection is implemented in spacious-planning documentation. The 3 regional governments are responsible for providing the financial, administrative, technical, scientific and legal resources necessary to protect, preserve, present and restore national monuments and other categories of heritage.

Mostly unsettled political situation, lack of funding and war devastation caused the unfavourable situation of cultural heritage in observed area. Furthermore, cultural artefacts have been threatened by lack of professional personnel and adequate documentation, illicit building, unskilled conservation, and erosion of long-established communities. Significant part of architectural and archaeological heritage is

heavily damaged or destroyed during the war from 1992 to 1995. Relatively similar conditions are in the field of intangible cultural heritage.

Cultural-historical heritage is presently protected via planning documents and besides the Federal Ministry of Culture and Sport, the Federal Ministry of Spatial Planning is also in charge, especially regarding the approval of restoration works and protection of national monuments and drafting of the protection documents of these areas as important areas for the FBiH.

Montenegro

Rich tangible and intangible cultural heritage is consequence of specific position, hilly relief, diverse coast and position on boarder of eastern and western civilization. In this area are reflected influences of Ancient Greece, Ancient Rome, Christianity, Byzantine Empire, Bulgarian Empire, Serbian Empire, Ottoman Empire, Republic of Venice, Austria-Hungary, Kingdom of Italy, and Yugoslavia. There is also a interception area of Catholic, Orthodox and Islamic religion.

In a study area can be found monuments and archaeological findings which have their origins from Ancient History to recent times. There is strongly presence of material remains, especially from the period of antiquity, Middle Ages and Venetian republic.

Cultural heritage is divided into material - immovable and movable or intangible cultural elements. Immovable cultural elements are archaeological sites, building elements and cultural landscapes. Movable cultural elements are the inventories of public and private collections - museum, archival and library materials. In the Registry of cultural monuments, the most numerous group of cultural properties is that of sacral monuments, slightly less civil and fortified buildings. Very rare are protected rural ensembles, vernacular architecture, industrial architecture or the 20th-century architecture. Concept of cultural landscape has not been recognized yet although it has a very high potential.

Main groups of intangible cultural elements belong to traditional context which specific skills, crafts, customs, dances and songs. It can be separated: Oro and Shota - the traditional dances and Epic songs that are sung with gusle instrument.

The main responsibility for cultural heritage protection is given to Ministry of culture - Cultural heritage department. Except the conservation departments cultural heritage protection is implemented in spacious-planning documentation.

The current state of cultural heritage indicates satisfactory situation concerning the processes of protection although is missing a enhanced consideration towards certain types of cultural heritage such as cultural landscapes. Worse conditions are in the field of conservation of immovable and movable cultural heritage. Many artefacts have been threatened by lack of professional personnel, urbanisation, tourist investments, unskilled conservation, and erosion of long-established communities. Relatively similar conditions as in the field of intangible cultural heritage, where the situation is more complex due to dependence of this form of heritage regarded to frequent and constant use.

*Coastal area*

The Montenegrin coastal region is culturally rich area marked with influence of maritime affairs, religion and a range of cultural influences and especially Venetian culture. Area is especially well known for its valuable secular and religious monuments, mostly related to Venetian architecture. Besides that they are present elements of tangible heritage that belong to other periods of history, especially the period after 18.st Cultural centers on the coastal area are towns with surroundings: Herceg Novi, Kotor, Tivat,

Budva, Bar, Ulcinj. The ancient city of Kotor is listed on the UNESCO World Heritage list. On UNESCO-s tentative list are Old town of Bar and the Venetian works of defence between 15th and 17th centuries.

*Continental area*

Mountainous relief with hilly terrain and flattened platoes, strong national consciousness and the cultural influence of the Orthodox and Islamic religion are defined the cultural context of continental area. Especially apparent is the Byzantine influence in architecture and in religious artwork. Cultural centers are towns with surroundings: Nikšić, Cetinje and Podgorica. On UNESCO-s tentative list are Cetinje historic core, Doclea and Stećci – medieval tumbstones.

## 3.8 Air quality

Croatia[53]

Emission of all pollutants into the air (with exception of particulate matter) is generally on decrease in Croatia, as a result of accomplishing the basic goals in air protection during the period under consideration: improvement in air quality by reduction in harmful emissions to the levels where they do not affect physical health of population and environment, and upgrading and improving the air quality monitoring systems.

Croatian system of air quality protection is legally designated with Air Protection Act (Official Gazette 130/11) and a series of implementing regulations which regulates monitoring and improvement of air quality in state and on the local level. Basic provisions of the EU directives governing the field of transboundary air pollution were transferred to the Air Protection Act.

Croatia is a party of Convention on Long-range Transboundary Air Pollution (LRTAP). For the Convention purposes relevant information about the effects of pollution in various environmental components are preparing, based on the complex process of measurement and modelling results for the whole Europe (EMEP program).

During 2012., in the programme area on the Croatian side of the border, measurements of air quality were done in ZagrebCounty, Sisak-Moslavina County, Karlovac County, Bjelovar-Bilogora County, Brod-Posavina County, Zadar County, Šibenik-Knin County, Split-Dalmatia County and Dubrovnik-Neretva County on automatic and manual measuring stations.

Main problem which arises on the most measuring stations is concentration of ozone and dust particles. In whole Croatia, as well as in most other countries in Europe, only a portion of total deposition and ground-level ozone comes from their own sources. Therefore, solving ozone problem in Croatia depends largely on reducing emissions in other, especially neighbour countries, so Croatia has to be interested in successful implementation of obligations under international agreements and cooperation with these countries. Higher concentration of dust particles ($PM_{10}$, $PM_{2.5}$) are associated to large cities (Slavonski Brod, Zagreb, Sisak, Split), most likely as a result of the transport system and industry. Higher levels of $H_2S$ and $NO_2$ are also related to the large cities as a result of the transport system and industry in these cities or abroad cities in their vicinity (e.g. refinery in Bosanski Brod, Bosnia and Herzegovina). Croatia has made great effort with the aim of finding the solution of solving trans boundary pollutions caused by industry from the neighbouring country (e.g. air pollution in Slavonski Brod as consequence of pollution from Rafinerija nafte Brod in Brod)

[53] Source: Godišnje izvješće o praćenju kvalitete zraka na području Republike Hrvatske za 2012. godinu, AZO, listopad 2013.

Bosnia and Herzegovina[54]

Monitoring of air quality in BiH is done in only some cities and according to different methods. Until 2007., the responsibility for the air quality monitoring network was not given to anyone. Today, measuring of air quality in BiH is done by the Federal Hydrometeorological Institute and responsible cantonal bodies in the FBiH, the Republic Hydrometeorological Institute in the RS, a responsible department in the BD Government, and in certain cases even the municipalities. Laws on Environmental Protection in the FBiH, RS and BD and new regulations on air quality monitoring and defining kinds of air pollutants in both entities adopted in 2012 defined methodology and procedures for air quality monitoring according to the EU directives.

The majority of air pollutants in Bosnia and Herzegovina come from industrial activities, but a significant amount also comes from traffic. Before the war, the industry was the most significant polluter (steel industry in Zenica, thermal plants and cement factories in Kakanj and Tuzla and many other). During the war many industrial production facilities were damaged and destroyed, and the pre-war level of production has not been reached yet. Due to this, pollution is much lower now than before the war. Since many towns in BiH are situated in valleys, smog and air pollution have become common environmental issues during winter, when emissions from boiler rooms, traffic and industry become "trapped" in valleys. Air pollution in city areas is mainly caused by emissions from stationary sources caused by fuel combustion, then by emissions from traffic and industry. Fuel oil and coal used for heating are mostly of poor quality, which causes significant air pollution.

Of specific concern is air pollution in Slavonski Brod emitted from Rafinerija nafte Brod in Brod. This issues is of particular concern to Croatia which has made great effort to find the solution of solving trans boundary problems caused by this pollution source.

At present, some of the pollution is the consequence of long-range transfer of pollutants via air masses coming from abroad. However, in order to have a more complete general state of air quality in BiH, it is necessary to collect and analyze more data from different stations in the country. One fact is very obvious from the data on air quality: poor quality fuels like coal, fuel oil and gas contribute to low air quality.

Montenegro[55]

In 2006 Montenegro became a signatory (on the basis of succession) of the Convention on Long-Range Transboundary air pollution (CLRTAP) and its Protocol on Long-term Financing and Cooperative Programme for Monitoring and Evaluation of Long-range transmission of air pollutants in Europe (EMEP) but has not yet ratified all protocols to this Convention.

Ratification and implementation of international agreements relating to air quality, protection of the ozone layer and climate change is cited as an important strategic objective for the period 2007. – 2012. Accordingly, in 2010 Montenegro has adopted the Air Protection Act which is compliant with the relevant EU directives, resulting better established network for monitoring air quality, improved data quality, and enabled reporting of air quality in compliance with EU requirements.

In Montenegro, there are some hot spots of air pollution in industrial areas (Podgorica, Niksic, Pljevlja). In these areas, $SO_2$ and particulate matter (PM) largely exceed national standards for air quality. The

[54] Source: State of the Environment Report of Bosnia and Herzegovina 2012, Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina
[55] Source: Drugi izvještaj o stanju životne sredine - Republika Crna Gora, UN, 2007.

privatization of major industrial goods has been recognized as a potential problem. During the winter season, the emissions from households represent a major problem for the air quality in cities.

A significant source of air pollution is the use of leaded gasoline and high-sulfur diesel fuel and the air pollution associated with traffic is worrisome. Additionally, Montenegro does not take any measures to reduce dependence on outdated vehicles and gasoline of poor quality.

## 3.9 Hazardous industrial sites and environmental hotspots in the programme area

The first international overview of major hazardous industrial sites, water pollution, and mining hotspots relevant to the programme area has been provided by UNEP in 2007 (see the Figure 9 below)

**Figure 9: Major hazardous industrial sites, water pollution, and mining hotspots in the programme area**


*Source: UNEP, 2007, Balkans Vital Graphics, http://www.grida.no/graphicslib/collection/balkan-vital-graphics.*

The situation analysis for the IPA CBC programme HR-BA-ME 2014-2020 focused on detailed risks and identified the following environmental hot spots in the programme area.

Croatian part of the programme area features the following hotspot that are largely associated with the chemical, petrochemical, machinery manufacture, metallurgical, food and oil industries:

- Factory Salonit d.d. (asbestos cement waste), Mravinačka kava
- Red mud pool and the waste lye of the former alumina plant next to Obrovac
- Unarranged depository with location large quantities of hazardous waste Lemić Brdo next to Karlovac
- Site with slag and ashes-depository of slag in Kaštela Bay.

Furthermore, the Waste Management Plan identified four more "hot-spot" created by long-term inappropriate management of industrial (technological) waste:

- Factory Borovo in Vukovar (remediation of first phase finished in 2010);
- Fuel oil in the screw factory (former TVIK factory) in Knin (remediation plan prepared through Phare 2006 project);
- Area of the closed factory of electrodes and ferroalloys in Šibenik (EPEEF provided loan for remediation);
- Island of Biševo - tar on the Salbunara beach (remediation finished in 2008).

In Bosnia and Herzegovina, there are 6 hotspots in the programme area:

- Mostar Refinery & Smelter
- Jajce smelter
- Jalovište Srebrenica
- Modriča – gudronska jama
- Brod – gudronska jama
- Biračka regija – crveni mulj.

Opinions received from Bosnia and Herzegovina during the consultations on this SEA study also suggest that polluting facilities in Zenica and Maglaj should be added to the above six priority as well as the Pljevlje mine and the hydropower electricity plant on the river Piva in Montenegro that are sources of transboundary environmental risks that should be addressed accordingly.

In Montenegro, four industrial plants) were listed as potential hotspots (both national and/or transboundary), out of which 2 are in the programme area:

- Niksic steel plant;
- Podgorica Alumina plant, Aluminum smelter and rolling mill(s)

Considering the above facts, it can be concluded that decreasing of air pollution should be included as one of the priorities of the proposed Cooperation Programme.

# 4 CONSISTENCY OF THE PROPOSED PROGRAMME WITH THE RELEVANT ENVIRONMENTAL PROTECTION OBJECTIVES

This chapter analyses relationship between the cooperation programme and the relevant environmental objectives and actions established at the EU level. When doing so, it suggests opportunities for enhancing synergies between environmental actions proposed in this cross-border cooperation programme and regional territorial cooperation on environmental matters.

As mentioned in the chapter 1.2, the cooperation programme is meant to contribute to and interact with the EU Strategy for the Adriatic and Ionian Region which serves as the primary point of reference on regional environmental matters relevant to the proposed CBC programme.

**Consistency of the proposed cooperation programme with the environmental targets of the European Union Strategy for the Adriatic and Ionian Region**

The EU Strategy for the Adriatic-Ionian Region (EUSAIR) is described in two documents: in a Communication from the European Commission to the other EU Institutions, and in an accompanying Action Plan[56] which outlines actions which are at the responsibility of all relevant actors at country, regional, and local/municipal level within each participating country. The Action Plan suggests examples of targets to be achieved by 2020.

The Action Plan is conceived to be rolling - this means that new actions may be added as needs change over time while existing actions are adapted as they move closer to completion. The adopted Action Plan includes ´Environmental Quality´ component which is of relevance to this SEA and which suggests the following indicative targets:

| Priority concerns | Examples of targets to be achieved by 2020 |
|---|---|
| Threat to coastal and marine biodiversity | 1. Establishment of a common infrastructure platform with participation of all countries for data collection, research, and laboratory analysis by end of 2015<br>2. 10% surface coverage of Adriatic and Ionian Seas by marine protected areas<br>3. Adoption of maritime spatial planning and integrated coastal management strategies by EU Member State by 2017 and for coastal candidate and potential candidate Countries by 2018<br>4. Achieving Good Ecological Status of the Adriatic and Ionian Seas by 2020<br>5. Enhancement of a marine NATURA 2000 network and a coherent and representative network of marine protected areas under the Marine Strategy Framework Directive by 2020 |
| Pollution of the sea | 6. Reduction of marine litter in line with Marine Strategy Framework Directive and 7th Environment Action Programme targets by 2020<br>7. Reduction of anthropogenic nutrient flows to the Adriatic and Ionian seas to ensure that by 2021 eutrophication is minimised<br>8. A joint contingency plan for oil spills and other large scale pollution events adopted by 2016 and measures to enable joint and coordinated emergency response implemented by 2020 |
| Transnational terrestrial | 9. Establishment of transnational management plans for all terrestrial eco-regions, shared by two or more participating countries |

[56] COM(2014) 357 final

| | |
|---|---|
| habitats and biodiversity | 10. Enhancement of NATURA 2000 and Emerald networks in the Region |

The above specific targets have been used as the primary environmental policy objectives which are relevant for the proposed IPA cross-border cooperation programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020. The appraisal has focused largely on the programme Priority Axis 2 which is the most relevant in terms of logical linkages between the planned interventions. The Table 5 below indicates relationships found and accompanying recommendations for consideration.

***Table 5: Relationship between results of the proposed programme and environmental targets under the EU Strategy for the Adriatic-Ionian Region***

| EUSAIR indicative targets | Relationship with the proposed IPA CBC PROGRAMME HR-BA-ME 2014-2020 | Recommendations |
|---|---|---|
| Establishment of a common infrastructure platform with participation of all countries for data collection, research, and laboratory analysis by end of 2015 | Fully addressed under the programme Specific Objective 2.1, activity: Developing and implementing joint environmental management initiatives. (e.g. monitoring and exchange of data, biodiversity and geo-diversity maps, etc.) | Consider adding ´monitoring and management of large carnivore populations and their habitats´ amongst examples of eligible activities. |
| 10% surface coverage of Adriatic and Ionian Seas by marine protected areas | The programme Specific Objective 2.1, activity: Developing and implementing joint environmental management initiatives crates a basis for initiatives on transboundary marine protected areas but does not specifically list these as examples. | Consider adding ´joint initiatives on transboundary marine protected areas´ amongst examples of eligible activities. |
| Adoption of maritime spatial planning and integrated coastal management strategies by EU Member State by 2017 and for coastal candidate and potential candidate Countries by 2018 | The programme Specific Objective 2.1, activity: Developing and implementing joint environmental management initiatives includes maritime spatial planning and integrated coastal management for cross-border areas as an example of measures to be supported. | None. |
| Achieving Good Ecological Status of the Adriatic and Ionian Seas by 2020 | No relationship. This EUSAIR target appears to be outside the scope of influence of the proposed CBC programme. | None. |
| Enhancement of a marine NATURA 2000 network and a coherent and representative network of marine protected areas under the Marine Strategy Framework Directive by 2020 | The programme Specific Objective 2.1, activity: Developing and implementing joint environmental management initiatives crates a basis for initiatives on trans-boundary marine protected areas but does not specifically list these | Consider adding joint initiatives on transboundary marine protected areas into examples of eligible activities. |

| EUSAIR indicative targets | Relationship with the proposed IPA CBC PROGRAMME HR-BA-ME 2014-2020 | Recommendations |
|---|---|---|
| | as examples. | |
| Reduction of marine litter in line with Marine Strategy Framework Directive and 7th Environment Action Programme targets by 2020 | No relationship. This EUSAIR target appears to be outside the scope of influence of the proposed CBC programme. | None. |
| Reduction of anthropogenic nutrient flows to the Adriatic and Ionian seas to ensure that by 2021 eutrophication is minimised | The programme does not directly address this activity due its nature and small funding. However its Specific Objective 2.1, activity ´Cross-border measures and tools for reducing or mitigating environmental problems and risks, including small-scale infrastructure and equipment´ may have some minor positive impacts on Ecologic Status of the Adriatic Sea. Such impact is however marginal. | None, as the large-scale infrastructural activities needed for this EUSAIR target are outside the scope of influence of the proposed CBC programme. |
| A joint contingency plan for oil spills and other large scale pollution events adopted by 2016 and measures to enable joint and coordinated emergency response implemented by 2020 | The programme will contribute - within its own specific mandate and resources - to this EUSAIR target by encouraging activities for ´Improving emergency preparedness and risk prevention systems that addresses existing as well as expected cross-border hazards´ | Consider adding a dedicated activity on emergency preparedness and risk prevention systems for Neretva river and Mali Ston Bay. |
| Establishment of transnational management plans for all terrestrial eco-regions, shared by two or more participating countries | Fully addressed under the programme Specific Objective 2.1, activity: Developing and implementing joint environmental management initiatives. (implementing joint initiatives for designation of cross-border habitats and ecosystems with high biodiversity value, management plans for nature protected areas of cross-border interest | It appears useful to consider need for increased transboundary cooperation related to protection of Sava River Basin Floodplains and connecting National Park Sutjeska in Bosnia and Hezegovina with National Park Durmitor and the planned Regional Park Maglic, Bioc and Volujak in Montenegro. |
| Enhancement of NATURA 2000 and Emerald networks in the Region | The programme intends to support such activities - see the Specific Objective 2.1, activity ´Developing and implementing | Consider adding ´Protection and restoration of coastal wetland areas and karst fields´ amongst examples of |

| EUSAIR indicative targets | Relationship with the proposed IPA CBC PROGRAMME HR-BA-ME 2014-2020 | Recommendations |
|---|---|---|
| | joint environmental management initiatives. (e.g. implementing joint initiatives for designation of cross-border habitats and ecosystems with high biodiversity value, management plans for nature protected areas of cross-border interest)´ | eligible activities. |

The conclusion is that the proposed Interreg IPA cross-border cooperation programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020 directly addresses the relevant EUSAIR environmental quality targets and there is no need for adjustments.

**Relationship to objective of the UNECE Convention on Long-range Transboundary Air Pollution**

In order to address interest of the Ministry of Environmental and Nature Protection of Croatia in transboundary air protection, the environmental protection objectives of the EU Strategy for the Adriatic-Ionian Region were supplement by another objective ´To limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution´ that is based on the UNECE Convention on Long-range Transboundary Air Pollution.

In this regard, it should be noted that the Specific Objective 2.1 of the proposed Cooperation Programme has a potential to include activities related to cross-border cooperation on transboundary air pollution.

# 5 EXPECTED ENVIRONMENTAL IMPACTS, ASSUMPTIONS AND OPPORTUNITIES FOR MITIGATION AND ENHANCEMENT

This chapter presents the expected effects of proposed programme on the environment. It focuses on the following key categories of potential environmental impacts of the proposed programme that were identified during the scoping process and during preparation of baseline analyses that further refined our understanding of the possible issues of concern that are associated with the proposed interventions:

- Greenhouse gas emissions
- Climate change adaptation and risk management
- Air Quality
- Soil
- Water quality
- Forests
- Biodiversity, fauna, flora
- Cultural heritage including architectural and archaeological heritage, landscape
- Population and human health
- Possible synergistic and cumulative effects

Each of these impact categories are presented below. The presentation offers a broad overview. It lists interventions that are expected to achieve positive or adverse impacts and outlines assumptions behind these expectations. If identified impacts were deemed significant, the analysis also presents the main characteristics of such impacts without being speculative - i.e. it does not present possible impacts that may occur under purely hypothetical assumptions, neither it provides details of such impacts that cannot be established due to lack of information on locations and nature of proposed activities.

In order to facilitate consideration of options for mitigation and enhancement, the impact presentation is directly combined with an overview of measures that can be deployed to avoid or minimize the risks and increase the positive impacts of the proposed actions.

## 5.1 Greenhouse gas emissions

The proposed CBC programme is expected to have positive impacts on both climate change adaptation and mitigation efforts in the programme area.

Expected positive effects

The programme will contribute to reduction of emissions of greenhouse gasses through the following activities under its Specific Objective 2.2:

- Transfer of knowledge (awareness rising), exchange of experience and capacity building on the utilization of renewable energy resources and energy efficiency.
- Elaboration of joint studies and documentation on (the utilization of) renewable energy resources and energy efficiency.
- Developing and implementing joint pilot and demonstration projects on innovative technologies and solutions in the field of energy efficiency and renewable energy resources.
- Joint investing in public infrastructure on sustainable energy production and energy efficiency.
- Joint incentives in order to improve planning and regulatory framework in the area of renewable energy resources and energy efficiency (e.g. analyses, comparisons, recommendation, local/regional action plans etc.).

In order to enhance the positive effects of the proposed programme to local efforts to reduce emissions of green-house gasses, it is suggested to consider:

- prioritizing energy efficiency measures for public buildings (such as hospitals, schools) where possible synergies exist with interventions under Specific Objective 1.1
- prioritise the use of agricultural waste for energy (which may achieve positive impacts also on waste management and the water quality) and also small-scale solar power (on roofs and built surfaces).

Risks of adverse impacts

There are no interventions proposed in the CBC programme that are expected to lead to increased emissions of greenhouse gases.

## 5.2 Climate change adaptation and risk management

Expected positive effects

The proposed cooperation programme is expected to contribute to climate change adaptation efforts. Most positive impacts can be expected especially from the following interventions under the Specific Objective 2.1:

- Developing and implementing joint management initiatives in relation to emergency preparedness with focus on risk prevention and mitigation as response to natural disasters (floods, draughts, fire, etc).
- Developing and implementing pilot and demonstration projects including innovative technologies to enforce for risk prevention and mitigation.

In order to ensure the above interventions achieve positive impacts on climate change adaptation and risk management efforts, it is important to ensure that they are linked to larger-scale and long-term risk protection planning for the programme area (mainly flooding and forest fires). This concern requires careful attention.

In this regard, it is recommended that Supported flood protection arrangements should promote a long-term flood protection and retention approach and maintenance of the traditional land use systems that respect the ecological keystone processes. Supported measures must not restrict natural retention of flood plains - ideally should expand natural retention by e.g. promoting the ´room for river´ approach that allows flooding during periods of high discharge. In Sava River Basin, interventions on flood risk management should be coordinated with e.g. recommendations formulated within the World Bank´s Water & Climate Adaptation Plan for the Sava River Basin (2014). Special attention should be given to the Central Posavina region which is an very important flood retention basin that needs to be protected from further development (building of flood protection structures, levees etc.).

Potential adverse impacts

Leaving the above concerns about the necessity to coordinate the local planning for flood prevention with flood management strategy for the entire basin, the proposed CBC programme does not include any additional activity that would constrain capacity for the natural flood passage through the programme area.

Activities with indirect positive effects on resilience to extreme climatic events and disasters

Activities related to energy saving schemes under Specific Objective 2.2 can easily increase resilience of the programme area to climate change, especially if energy saving interventions include increased insulation of public buildings and hence achieve both climate change mitigation and adaptation objectives. In this regard, it is suggested to prioritize support to hospitals and schools.

Interventions related to improvement of health and social support services under Specific Objective 1.1 will also have positive impacts on the resilience of the study area in case of extreme climatic conditions (such as heat strokes, floods or forest fires). In this regard, it is suggested to prioritize support to those facilities that are easily accessible even in the case of natural disasters (i.e. their access routes are not cut-off by floods, etc.). Such consideration would also enhance possible synergies with interventions related to risk management under the Specific Objective 1.1.

## 5.3 Air Quality

The proposed CBC programme **does not contain any activity that is expected to cause significant positive or adverse impacts on air quality**. The only impacts that might occur are associated with the activities on promotion of renewable energy under the Specific Objective 2.2.

These interventions may - if inappropriate technologies for the energetic use of biomass would be supported - worsen the air quality. Given the limited scale of funding allocated to these interventions under the programme Specific Objective 2.2, the risk of such impact is very low and effects of any supported infrastructure for ´sustainable energy´ on air quality can be safely managed through EIAs and/or standard environmental permitting processes.

In order to ensure that this takes place, we reiterate the need to ensure that the project selection mechanism guarantees that any supported projects meet applicable air quality protection standards and are subject to environmental impacts assessments if EIAs are requested for the proposed facilities under the national legislative framework.

## 5.4 Soil

The proposed cooperation programme is **not expected to cause any significant risk of adverse impacts on soil quality**.

The only adverse impacts on soil could occur under Specific Objective 2.2 and be associated with development of ´sustainable energy´ options based on extensive biomass farming. Possible promotion of biomass farming for energetic use may have adverse impacts on soil properties (especially increased erosion and pollution by pesticide residues), depending on the type of crops chosen. It this regards, it appears useful to consider targeted support to elaboration of renewable energy plans in countries that wish to promote use of 'sustainable energy´ and their optimizing through SEA processes. Such plans may address wider issues - such as impacts on biodiversity, soil, water pollution - that could be associated with uptake of various options for future uptake of renewable energy in the programme area.

The programme may on other hand have positive impacts on soil quality by supporting under Specific Objective 2.1 activities for ´Developing and implementing pilot and demonstration projects including innovative technologies to enforce for risk prevention and mitigation´ that may address issues related to pollution resulting from floods (soil contamination with pollutants that may be flushed under various flood scenarios), industrial accidents (such as spillage), past environmental liabilities (host spots) and

other hazards (such as mines). In this regard, it is suggested to coordinate all concerns related to various risks into a single disaster risk prevention and management system that would respect also requirements of the EU Floods Directive and mapping of various water pollution hazards in the flood zones. Integrating information on various risks would be an effective tool setting priorities and making further technical, financial and political decisions regarding integrated risk management.

## 5.5 Water quality

The proposed CBC programme can have mixed indirect **impacts on water quality** which **can be both either minor positive or adverse, and minor or significant** - depending on the choice of the specific activities that will be actually supported during the programme implementation. The proposed programme does not have any strong direct relationship - either conflicting or synergistic - with objectives and measures prescribed within Croatian River Basin Management Plan (OG 82/13) and Water Management Strategy (OG 91/08).

Expected positive effects

The programme may trigger some positive indirect impacts on water quality through implementation of the following activities under the Specific Objective 2.1: ´Developing and implementing joint environmental management initiatives ´ and ´ Improving emergency preparedness and risk prevention systems that addresses existing as well as expected cross-border hazards ´ and ´ Cross-border measures and tools for reducing or mitigating environmental problems and risks, including small-scale infrastructure and equipment´. These activities may comprise actions addressing various water pollution hazards in the programme area. If suitable applications arise, it appears useful prioritize support to interventions addressing water pollution hazards in Neretva river, Una river, Krka river and Cetina river whose transboundary management can be achieved only through cross-border cooperation.

Potential mixed - positive or adverse - effects

Activities on ´sustainable energy production´ supported under Specific Objective 2.2 may have mixed effects on water quality, depending on the types of actions that will be actually supported.

For the purpose of this assessment, we have concluded that that it is unlikely that support would be provided to large hydropower plants due to the small scale of funding provided through this CBC programme. But even support to small- hydropower may have adverse impacts on water quality (especially sediment flows) which should be managed through the application of EIA (in case of individual projects) or SEA (in case of possible provision of support to a cascade of hydropower projects within one basin).

Potential support to uptake of biomass farming for fuel or energy production may also easily lead to increased pollution of surface and ground water bodies by fertilizer and pesticide residues. Any intervention supporting biomass farming should ensure that production of these crops takes place only on lands which are: not erosion prone, not directly adjacent to water bodies, maintain sufficient riparian buffer zone from water courses and strictly adhere to principles of sound farming practices (with regard to fertilizer and pesticide use). Any larger-scale promotion of biomass farming should be permitted only if it can be proved that it will not lead to the deterioration of an already achieved state of any water body surface and groundwater (which is e.g. a fourth objective of Croatian River Basin Management Plan). In this regard, we suggest to support renewable energy strategies or plans in those counties that wish to consider significant uptake of ´sustainable energy´ and that these strategies are subject to thorough environmental scrutiny through SEA.

Lastly, it should be noted that potential support to energetic use of agricultural waste can achieve some positive local impacts on water quality by reducing leachate that are normally associated with disposal of manure, provided that appropriate technologies are chosen and well managed. In this regard, we suggest to prioritize such projects in case suitable applications arise.

Potential risks of small-scale local adverse impacts

Strategic project ´Adriatic Hinterland´ that aims to increase of tourist visits by 15% by the end of the project implementation (whole area of the proposed Adriatic hinterland), increase of overnight stays by 10% by the end of project implementation in project implementation area may have some adverse impacts on local water quality by increasing amounts of disposed of waste and waste-water pollution loads. In this regard, it is suggested to address the needs related to waste management and also waste-water treatment (using e.g. cheap decentralized options such as reed-bed systems that can well cope with short-term pollution peaks during summer periods) during preparation of projects in the destination that will be prioritized for targeted promotion.

Except the interventions listed above, the proposed CBC programme does not include any activities which could have significant impact of water quality.

## 5.6 Forests

The programme is not likely to **have significant effects on forests and forestry**.

Positive impact on forest can be expected from Specific Objective 2.1 activities ´Improving emergency preparedness and risk prevention systems that addresses existing as well as expected cross-border hazards´ that aim to address forest fires. In this regard, note must be taken of the FAO advice[57] that excessive prevention of forest fires may actually erode longer-term resilience of those forests types that are actually adapted to frequent and low-intensity wildfires caused naturally by lightning. Spontaneous wildfires control understory vegetation growth, limiting fuel loads and preventing severe wildfires that can burn all vegetation strata and have a huge impact on ecosystem function and resilience. In this regard, it may be useful to consider exchange of lessons between the participating countries on various aspects (legal, safety, ecological, social) of potential fire-control approaches based on small scale prescribed and well controlled burning. This approach to prevention of large/scale forest fires can offer a cost-effective means of limiting the build-up of fuel loads and, from an ecological point of view, can improve forest health and vitality provided that conditions are suitable (no wind and no imminent danger to the closest settlements or facilities). It can also be a useful tool for the recovery and conservation of certain habitats. This recommendation is meant as a preliminary idea which can be taken up only if approved by the relevant forest management authorities.

Other adverse impacts could be associated with hypothetical larger-scale uptake of biomass farming for energetic use that would trigger conversions of current forest estates. Considering the budget of the cooperation programme, such expectation would be however highly speculative.

[57] FAO, State of Mediterranean Forests, 2013

## 5.7 Biodiversity, fauna, flora

The proposed programme may have **mixed effects on biodiversity**. It is likely to **achieve positive impacts on biodiversity because of interventions on biodiversity protection under** Specific Objective 2.1 and possibly also due to preservation and sustainable use of natural heritage under Specific Objective 4.1. **But the programme also poses risks of adverse impacts to biodiversity with regard to interventions for emergency preparedness and risk prevention** (under Specific Objective 2.1), **promotion of renewable energy** (under Specific Objective 2.2) **and support of tourism** (under Specific Objective 3.1) and the strategic project ´Adriatic Hinterland´.

Expected positive effects

The Specific Objective 2.1 includes the following eligible activities that aim to directly promote biodiversity protection - i.e.:

- Developing and implementing joint environmental management initiatives. (e.g. monitoring and exchange of data, biodiversity and geo-diversity maps, implementing joint initiatives for designation of cross-border habitats and ecosystems with high biodiversity value, management plans for nature protected areas of cross-border interest, maritime spatial planning and integrated coastal management for cross-border areas, protection and restoration of coastal wetland areas and karst fields relevant for the Adriatic Flyway, etc.)
- Awareness raising activities, information campaigns and education and training concerning environmental and nature protection.

It is assumed that nature protection authorities will be directly involved in implementation of these activities and they will ensure that no adverse impacts which could hypothetically arise from e.g. inappropriate designation or management of protected areas will occur. In order to maximize positive impacts of these interventions, it appears useful to prioritize activities related to increased transboundary for cooperation related to:

- protection of Sava River Basin Floodplains[58] with long-term objective to establish UNSECO biosphere reserve in Central Posavina
- connecting National Park Durmitor and the planned Regional Park Maglic, Bioc and Volujak in Montenegro with the National Park Sutjeska in Bosnia and Herzegovina[59].
- Designation of a new National Park Orjen (in Montengro) and its connection to Snežnica in Croatia
- protection of carst fields in Croatia and Bosnia and Herzegovina (e.g. Livansko Polje} and of wetland areas important for Adriatic Flyway (Neretva delta, Lonjsko polje, Solana Ulcinj)
- improved monitoring of transboundary movement of large carnivores (esp. wolves, bears) and of birds due to potential pressures of wind farms on the Adriatic Flyway

Potential adverse impacts

The programme Specific Objective 2.1 includes also the following activities which may - in the case of inappropriate implementation - pose risks of adverse impacts to biodiversity:

- Cross-border measures and tools for reducing or mitigating environmental problems and risks, including small-scale infrastructure and equipment,
- Implementing joint interventions in case of accidents and natural disasters and establishment of joint emergency centres, including small-scale infrastructure and equipment

[58] Sava river is one of the 'focus regions' described in the Pan-European Biological and Landscape Strategy, p. 43
[59] Planned through Spatial plan of Montenegro until 2020

While it is assumed that no major structural measures will be implemented within this CBC programme, there is still a risk that the supported activities may support such flood protection or drought protection measures that could affect riverine ecosystems or wider ecosystems either directly (by altering natural habitats) or indirectly (by changing the water flow or water tables). In this regard, it is recommended to support only ecosystem-based flood management strategies which integrate biodiversity and provision of ecosystem services into one overall approach to flood prevention and management.

Other possible risks arise with regard to activities related to ´Developing and implementing pilot and demonstration projects on innovative technologies and solutions in the field of sustainable energy and energy efficiency´ and ´Investing in joint infrastructure on sustainable energy and energy efficiency´ within the programme Specific Objective 2.2. Many renewable energy options cause potentially significant adverse impacts on biodiversity. Wind turbines negatively affect birds and bats, biomass farming may easily lead to habitat conversions and degradation of water ecosystems through increased erosion and nutrient and fertilizer loads, hydropower plants can easily adversely impact on riverine ecosystems, sediment flows, fish migration, etc.

Generally, the biodiversity concerns surrounding possible future larger uptake of ´sustainable energy´ in the programme area reiterate usefulness of preparation of renewable energy strategies or plans that fully take into account environmental constrains and risks and are subject to SEA. Even if direct funding for infrastructure is unlikely within the scope of this CBC programme, the general condition applies - that supported infrastructural activities must be subject to relevant permits, including any applicable EIA, assessment of impacts on Natura 2000 network (see chapter 6 for details) and possibly trans-boundary consultations if trans-boundary impacts are suspected.

The last series of interventions that may pose risks to biodiversity are activities under the programme Specific Objective 3.1. on development, promotion and branding of joint tourism niches and products: e.g. hunting, bird and animal watching, eco-tourism, sport and cycle-tourism, rural tourism and also proposed active promotion of the destination within strategic project ´Adriatic Hinterland´.

The above activities may affect biodiversity either directly through habitat changes or fragmentation (buildings, trails, access routes) or indirectly (through disturbance of species by visitors, use of unauthorised paths and shortcuts, littering, illegal collection of protected plant species, etc.). On the other hand, such activities contribute to environmental education of visitors and generate resources for sustainable management of protected areas by the residing human population. In order to reduce possible adverse impacts, it is recommended to prioritize projects that have been prepared in cooperation with nature protection authorities and adhere to the principles of EU Agenda for a sustainable and competitive European tourism such as: taking a holistic, integrated approach; planning for the long term; involving all stakeholders; recognizing, minimising and monitoring risks.

Needless to reiterate that any supported activities that may have impacts on Natura 2000 sites need to be subject to assessment of their effects on integrity of those sites in accordance with provisions of the Habitat Directive.

## 5.8 Cultural heritage including architectural and archaeological heritage, landscape

The programme is expected to have **positive impacts** on the cultural heritage, however it poses **some risks of adverse impacts** that should be addressed during selection of project applications.

Expected positive effects

The programme under its Specific Objective 3.1 includes the following activities that are designed with purpose of having positive impacts on cultural heritage:

- Valuating, preserving, restoring and reviving (e.g. animation of site) cultural, historical and natural heritage e.g. UNESCO and other historical and cultural sites and landscapes, including enabling or improving access to them, and
- Investments in certification including training, equipment supply but also small scale infrastructure on cultural and natural heritage.

The above measures are directly supporting the three strategic objectives for conservation, protection and commercial exploitation of the cultural heritage of Croatia defined in the Strategy of Conservation, Protection and Sustainable Economic Use of the Cultural Heritage of Croatia as follows:

- Increase the efficiency and effectiveness of protection and preservation of cultural heritage due to its sustainable use.
- Increase revenues and other benefits from the sustainable use of cultural heritage.
- Raise the level of awareness of individuals and communities about the importance of cultural heritage and sustainable use of cultural heritage.

Potential adverse impacts on heritage sites

It should be noted that although the above activities are expected to improve the state of the respective cultural heritage objects, they may - if inappropriately conceived - have unintended negative impacts by:

- adversely affecting the physical aspects (tangible attributes) of the respective heritage objects by e.g. disrespecting the original design, degrading the site amenity through inappropriate access routes, use of inappropriate materials, damage during construction works, etc., or
- changing the non-physical aspects (intangible attributes) related to use the culturally significant heritage properties that may be important for maintenance of local customs, spiritual purposes, and other traditional uses.

In order to ensure that none of these effects occur, the following generic recommendations have been formulated on the basis of common elements stipulated in the relevant international treaties and guidance[60] in order to guide planning of interventions for sustainable use of cultural and natural heritage under the Specific Objective 3.1.:

- Conservation plan must contribute to the authenticity and integrity of the sites and monuments and their tangible and intangible elements.
- Conservation plan must address all relevant factors necessary for adequate long-term safeguarding and sustainable use of the heritage site or monument. Management systems may vary according to protection needs and the resources available and other factors. They may incorporate traditional protection and management, land-use planning approaches, and other planning control mechanisms, both formal and informal.

[60] World Heritage Convention (1972), Operational Guidelines for the Implementation of the World Heritage Convention (2013), International Charter for the Conservation and Restoration of Monuments and Sites (1964), Charter for the Conservation of Historic Towns and Urban Areas (1987), International Cultural Tourism Charter (1999), The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas (2011)

- The principal objectives of the conservation plan should be clearly stated. The proposals in the conservation plan must be articulated in a realistic fashion, from the legislative, financial and economic point of view, as well as with regard to the required standards and restrictions.
- The conservation plan should aim at ensuring a harmonious relationship between the heritage sites and monuments and the surrounding environment as a whole. Wherever necessary for the proper protection of the property, an adequate buffer zone should be provided.
- New functions and activities should be compatible with the character of the heritage sites and monuments. Proponents must ensure that such changes do not impact adversely on the outstanding value of the heritage site or monument.
- Before any intervention, existing conditions in the area should be thoroughly documented.
- The conservation plan should be supported by the residents of the historic area. Conservation planning should therefore encourage the active participation of the communities and stakeholders concerned with the property as necessary conditions to its sustainable protection, conservation, management and presentation.

It is also recommended to ensure that authorities in charge of cultural heritage protection are directly involved in implementation of these activities and that supported projects meet all applicable national rules for cultural heritage protection. Since the exact nature of the activities that will be supported and their locations is at this point unknown, it is impossible to further assess their possible impacts on specific cultural heritage sites or suggest any specific mitigation measures.

Potential adverse impacts on landscape

The programme also features under its Specific Objective 2.2. following interventions related sustainable energy that may have some, even if unlikely, adverse impacts on cultural and natural heritage:

- Developing and implementing pilot and demonstration projects on innovative technologies and solutions in the field of sustainable energy and energy efficiency
- Investing in joint infrastructure on sustainable energy and energy efficiency

Inappropriate implementation of these activities that would e.g. promote large scale uptake of solar panels or wind power plants may have adverse impacts on amenity of cultural heritage and landscape.

Demonstration projects for solar power on roofs or build surfaces should be promoted only when they do not have significant adverse visual impacts on the landscape amenity. In this regard, we need to reiterate our previous recommendation about benefits of longer-term planning of ´sustainable energy´ that integrates requirements for protection of environment, including natural heritage and landscape to enable conservation and maintenance of the significant or characteristic features of a landscape - justified by its heritage value derived from its natural configuration and/or from human activity - as required by the European Landscape Convention

Additionally, we again point out the necessity to ensure that proposed investment projects (if supported) obtain all applicable permits with regard to their possible impacts on cultural heritage site and are subject to EIAs processes, if required under national legislation.

## 5.9 Population and human health

The programme is likely to have **indirect positive impacts on public health** because a number of actions proposed will positively influence the key core determinants of health defined by WHO[61]. The key determinants that influence health status are: income and social status, education, physical environment and employment and working conditions, social support networks, genetic, personal behaviour, and accessibility and quality of health services.

Expected positive effects

Direct positive impacts on health can be expected from all of the following interventions under programme Specific Objective 1.1:

- Developing and implementing lifelong learning programmes aiming to provide programme area inhabitants the possibility to gain knowledge / experiences / qualifications in the area of health and social care in line with the labour market needs.
- Joint vocational / adult (youth) training projects addressing skills needs & sectorial needs in the area of health and social care.
- Developing and implementing joint initiatives to improve accessibility to and effectiveness of public health care and social services and institutions (e.g. small infrastructure and/or equipment), including related pilot projects.
- Developing and implementing joint activities on enhancing the quality of health care and social care: e.g. joint health services delivery, active and healthy aging and disease prevention implementation plan, implementing small-scale infrastructure activities, etc.
- Implementing ICT solutions in order to improve public health and social care services.
- Joint strengthening of health care for vulnerable groups with focus on elderly, palliative care and persons with disabilities.
- Networking of institutions in the area of enhancing health and social care facilities, services and skills.

The proposed programme features also additional interventions that may - depending on the exact modalities of their implementation - positively influence determinants of health. The most relevant interventions in this regard are:

- actions related to joint management initiatives in relation to emergency preparedness with focus on risk prevention and mitigation under programme´s Specific Objective 2.1, and
- actions for developing and implementing joint initiatives on valuation, preservation, restoration and revitalisation of cultural and natural heritage sites programme´s Specific Objective 4.1.

Potential adverse impacts

The programme includes only two interventions under the Specific Objective 2. 2 - activity ´Developing and implementing joint pilot and demonstration projects on innovative technologies and solutions in the field of energy efficiency and renewable energy resources´ and ´Joint investing in public infrastructure on sustainable energy production and energy efficiency´ - that may potentially cause indirect potential adverse health impacts if inappropriate technologies for energetic use of biomass and waste would be supported. The risks of such affects are however marginal, given the focus and the scale of funding under the proposed programme. Nevertheless, in order to ensure that such risks do not materialize, all supported projects must meet applicable environmental and health protection standards and be subject

[61] This assessment uses WHO definition of health as ´a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity´ and operates with evaluation framework based on determinants of health as recommended by the UNECE Manual for the practical application of SEA Protocol.

(when needed) to environmental impacts assessment based on the applicable national legislation. Additionally, it appears useful to consider support to targeted planning for future uptake of ´sustainable energy´ in the programme area that would address relevant environmental, including health, concerns.

## 5.10 Possible synergistic and cumulative effects

The SEA Directives requires assessment of impact interactions - i.e. synergistic and cumulative effects.

Cumulative effects are the results of individually minor but collectively significant effects on the environment taking place over a period of time. Due to the lack of information on the locations of proposed activities, it is impossible to determine whether any significant cumulative impact would arise. Given the nature of the proposed CBC programme, risks of such impact is negligible and if they do arise, they can be managed on project-by-project basis within the applicable permitting or EIA processes for proposed activities.

Synergistic effects arise when two or more impacts interact and produce an effect greater than the sum of their individual effects. The programme features two types of interventions that may cause possible synergistic impacts:

- Improving emergency preparedness and risk prevention systems that address existing as well as expected cross-border hazards under the Specific Objective 2.1. which may - if appropriate approaches are promoted - cause combination of effects on biodiversity, Natura 2000 network and flood water passage.

- Developing and implementing pilot and demonstration projects on innovative technologies and solutions in the field of sustainable energy and energy efficiency and Investing in joint infrastructure on sustainable energy and energy efficiency under Specific Objective 2.2. which might cause combined effects on biodiversity, Natura 2000 network water quality, soil, and cultural heritage and landscape - depending on the exact nature of renewable energy sources promoted, their locations and technologies used.

The above impacts are not expected to be a major source of concern and can be managed by adopting integrated recommendations summarized in the Chapter 7.

# 6 APPROPRIATE ASSESSMENT OF IMPACTS ON NATURA 2000 NETWORK

## 6.1 Characteristics of the Ecological Network Areas

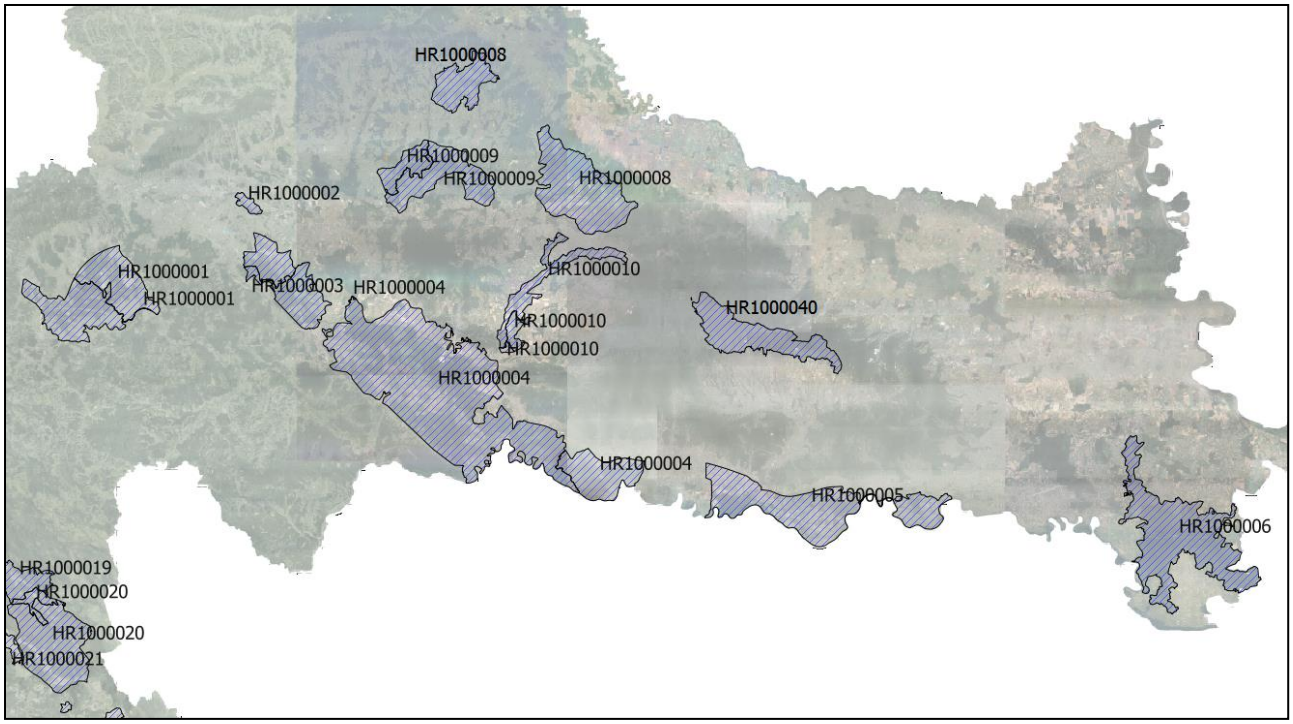
Croatian Ecological Network was established pursuant to the Regulation on the Ecological Network (Off. Gazette 124/13), and the designated areas are considered to be Natura 2000 areas. Ecological Network consists of the following areas:

- Areas important for bird preservation (Special Protection Areas, SPA)
- Areas important for preservation of species and habitat types (Special Areas of Conservation, SAC). (Figure *13: Ecological Network - areas important for preservation of species and habitat types (Special Areas of Conservation, SAC) in the south of the programme area*

Ecological network encompasses approx. 37% of Croatian land territory and approx. 16% of the Croatian Adriatic. In total there are 780 areas, 742 SAC and 38 SPA areas.

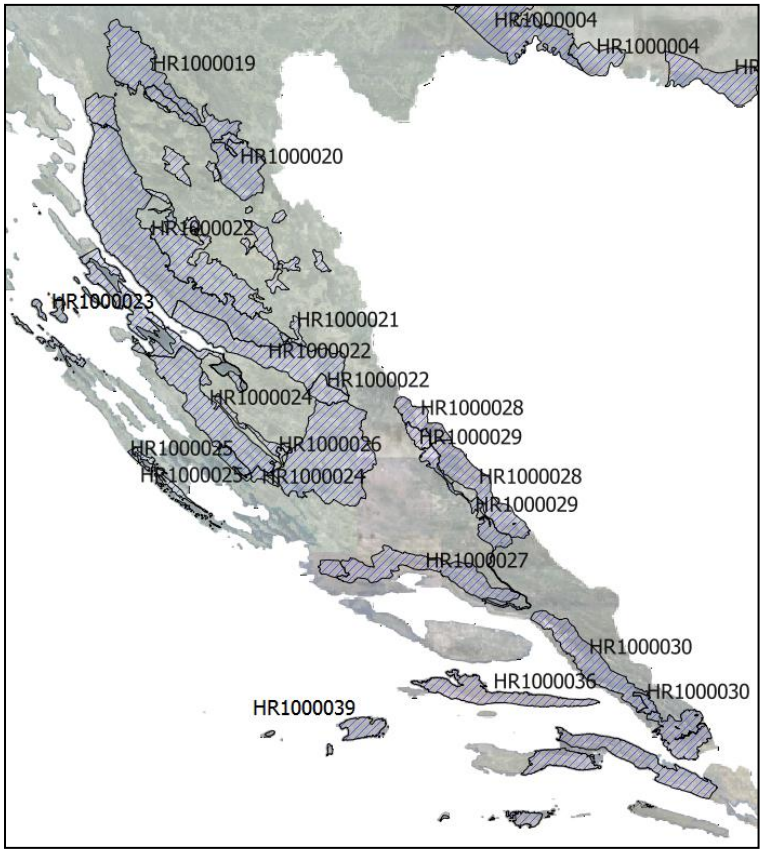
The CBC Programme area includes territories of 12 Croatian Counties: Brod-Posavina, Vukovar-Srijems, Karlovac, Sisak-Moslavina, Lika-Senj, Zadar, Šibenik-Knin, Split-Dalmatia, Dubrovnik-Neretva, Bjelovar-Bilogora, Požega-Slavonia and Zagreb County. Within this area there are 30 SPA areas (Areas important for bird preservation) and 409 SAC areas and 111 SAC point localities (Areas and localities important for preservation of species and habitat types). They are presented in the following figures.

***Figure 10. Ecological Network- areas important for bird preservation (Special Protection Areas, SPA) in the north of the programme area***



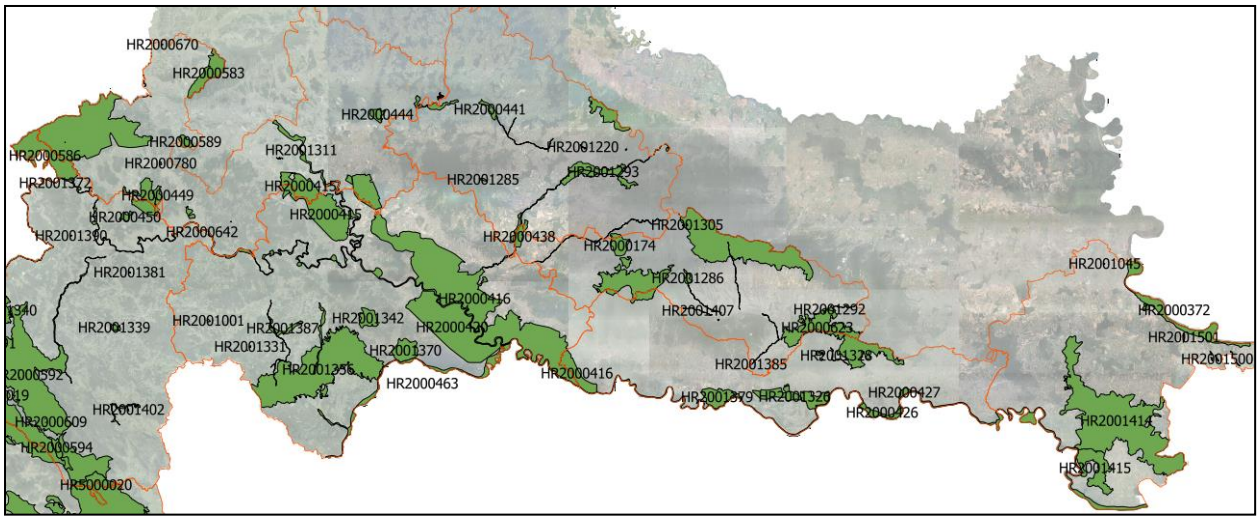

*Source: State Institute for Nature Protection (WMS Service)*

***Figure 11. Ecological Network- areas important for bird preservation (Special Protection Areas, SPA) in the south of the programme area***



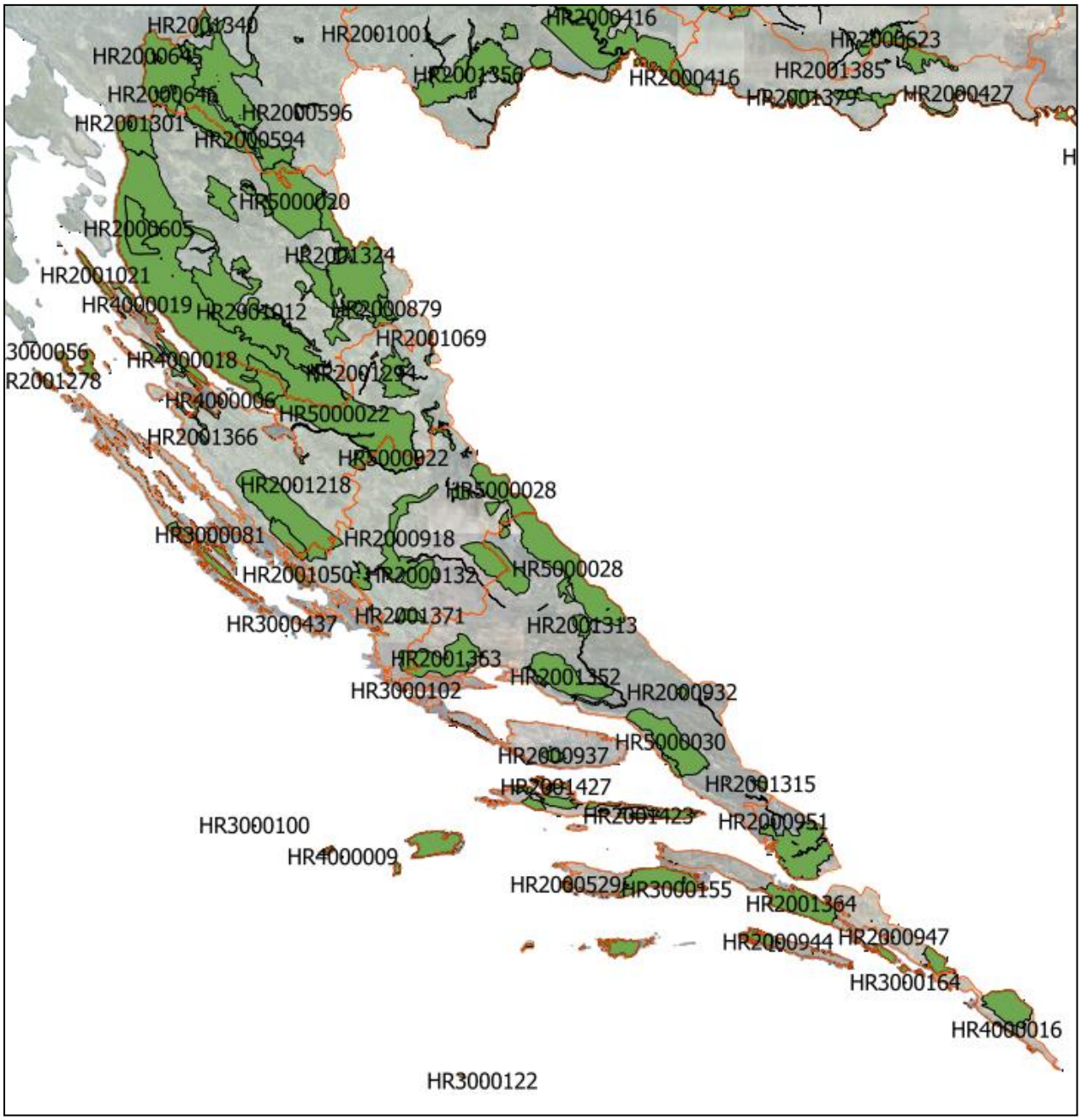

*Source: State Institute for Nature Protection (WMS Service)*

***Figure 12. Ecological Network - areas important for preservation of species and habitat types (Special Areas of Conservation, SAC) in the north of the programming area***



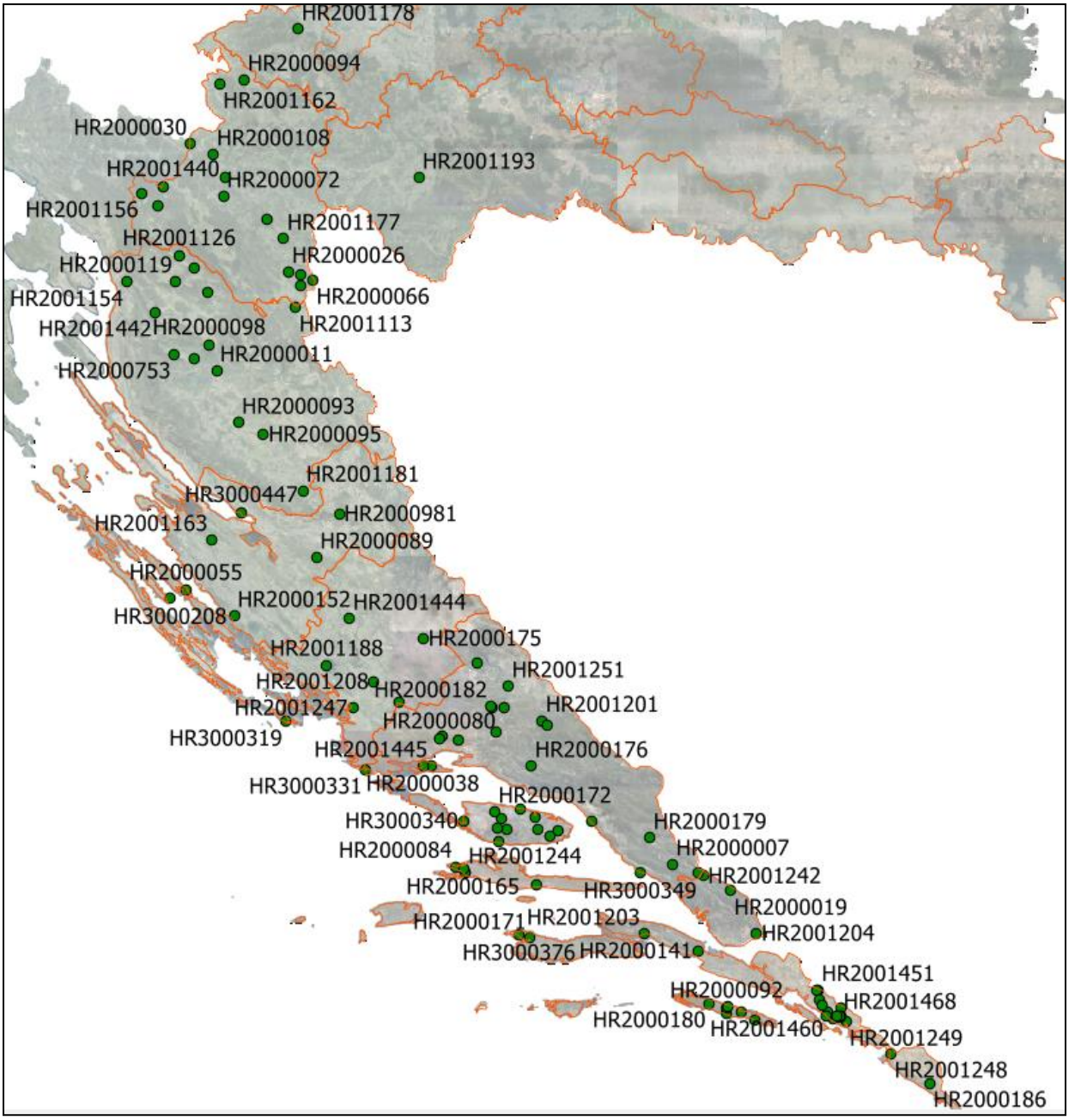

*Source: State Institute for Nature Protection (WMS Service)*

***Figure 13: Ecological Network - areas important for preservation of species and habitat types (Special Areas of Conservation, SAC) in the south of the programme area***




*Source: State Institute for Nature Protection (WMS Service)*

***Figure 14. Ecological Network - areas important for preservation of species and habitat types (Special Areas of Conservation, SAC) – point localities of the programme area***




*Source: State Institute for Nature Protection (WMS Service)*

Because of the number of sites, within the programme area, only general information regarding the areas was given in this chapter, while more detailed information is available at http://natura2000.dzzp.hr/natura/, and the list of the target species and/or habitats are given in the Regulation on the Ecological Network (Off. Gazette 124/13) - http://narodne-novine.nn.hr/clanci/sluzbeni/2013_10_124_2664.html.

## 6.2 Characteristics of the CBC programme implementation impacts on the ecological network

The Ministry of Environmental and Nature Protection, Directorate for Nature Protection issued a Decision (Klasa: UP/I 612-07/14-71/142, Ur. broj: 517-07-2-14-3, Zagreb 1st of August 2014) in which is stated that it is not possible to exclude all likelihood of a significant negative impact on the Croatian Ecological Network which would arise from the implementation of the CBC Programme, and that it is necessary to prepare an Appropriate Assessment, as part of the SEA.

It is pointed out in the Decision, that **it is possible to exclude significant negative impacts from**:

- Priority axis 1– specific objective *1.1. To improve services in the area of public health and social welfare sector*,
- Priority axis 4 – specific objective *4.1. To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area*.

According to the current Programme draft, activities of the priority axis 1 will include soft measures aimed at improving the public health and social welfare sector. While priority axis 4 will include measures aimed at increasing competitiveness and development of business environment in the programme area (business support institutions, developing and supporting existing business clusters and networks, improving communication and cooperation between SMEs and business support institutions, improving the capacity of entrepreneurs, support to actions linked to attracting investments, increasing cooperation between research institutions, businesses, public sector and development organisations, support to development of innovative products and services, certifications, joint R&D).

However, the Decision states that **it is not possible to exclude significant negative impacts from**:

- Priority axis 2– specific objectives *2.1. To promote and improve environment and nature protection through natural resources protection and management systems for risk prevention* and *2.2 To promote utilization of renewable energy resources and energy efficiency*,
- Priority axis 3– specific objectives *3.1 To strengthen and diversify the tourism offer and to enable a better management and sustainable use of the cultural and natural heritage*.

Since the Priority axes 2 and 3 include potential actions relating to the changes in land or resource use and nature management they could have a negative impact on some of the Ecological Network target features.

**Assessment Methodology**

The methodology applied was described in the guidelines report General Guidance on SEA in Croatia - Annex 1: Considerations related to Appropriate Assessments[62]. Relating to these kinds of programming documents the Guidance states:

*„Some other plans do not contain geographically localizable elements (e.g., some development strategies like county development strategy or tourism development strategy) but from their subject and description it is apparent that their implementation will be likely to have territorial impacts. Most such plans cannot factually be assessed as to their likely impacts on Natura 2000 due to the lack of localizable data; however, their environmental report should highlight the key risks that may be associated with the*

[62] This report has been prepared within EU-funded (IPA 2010) project ´Strengthening capacities for Strategic environmental assessment at regional and local level´ headed by the Ministry of Environmental and Nature Protection and implemented by EPTISA Servicios de Ingeniería S.L. and Dvokut Ecro d.o.o

*proposed interventions and have to always contain a reference to the need of detailed assessment of impacts of all their elements in the subsequent stages of planning or implementation process".*

The CBC programme is a framework document which will focus on achieving specific objectives in the programme area using grants from EU Funds (ERDF/IPA). At this stage, only the area problems and desired outcomes of the programme implementation are known. The activities that will be financed in order to achieve the CBC set goals are only given in the CBC Programme as examples. This means that all potential projects which could be financed later on, and their impacts, should be considered. The precise strategic assessment is furthermore hindered by the lack of a spatial component of the programme (this in particular relates to the cumulative impact of the CBC Programme on the Ecological Network).

Because of this the Assessment focused, following the above mentioned guidelines, on pointing out possible risks for the Ecological Network area cohesion and target features that could arise from potential project implementation.

In order to assess the potential impact of the programme an environmental goal was set, based on the EU[63] and Croatian[64] regulations:

***EN 1 Protect Ecological Network area cohesion and target features (both target species and target habitats).***

**Impact Assessment**

| **PRIORITY AXIS 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency** | |
|---|---|
| **Specific objective 2.1. To promote and improve environment and nature protection and management systems for risk prevention** | |
| **Possible impact** | **Impact significance** |
| Negative impacts can be caused by the risk prevention in relation to natural disasters (in particular floods and droughts), especially if the cross-border measures and tools for reducing the risk of natural disasters or joint interventions would include infrastructure. At the moment the CBC Programme anticipates only small-scale infrastructure.<br><br>Potential flood prevention infrastructure, but also various possible joint management initiatives, can cause significant changes of the habitat conditions, especially the flood regimes, of numerous Ecological Network areas. These types of projects can have potential impacts on | Negative influence can potentially be significant for river and swamp habitats and species (target features) in the event of river canalization or dam (reservoir) construction. These types of projects can have a particularly negative impact when constructed within Ecological Network areas, how ever since their impacts are not localised but extend both downstream and upstream from the project location, their construction near Ecological Network areas can also have significant impact (if the area of the impact extends over the Ecological Network). Dam construction can have a negative impact not only on the target features but also on the area integrity (significant habitat changes from |

[63] Council Directive 92/43/EEC of May 21st 2992 on the conservation of natural habitats and of wild fauna and flora, also known as the Habitats Directive, amended by Directive 2013/17/EU of May 13th 2013 regarding Croatian accession, and the Directive 2009/147/EC of the European Parliament and of the Council of November 30th 2009 on the conservation of wild birds, also known as the Birds Directive.
64 Nature Protection Act (Off. Gazette 80/13), Regulation on bird target species and basic measures for their protection in Ecological Network area (Off. Gazette 15/14) and Regulation on the list of habitat types, habitat map and endangered and rare habitat types (Off. Gazette 88/14).

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| the underground aquifers and water tables, these types of projects can also have negative impact on the flood plain forests (target feature).<br><br>Potential infrastructure for mitigating drought effects (irrigation systems) can also have significant impacts on the habitat conditions as well as will lead to the changes in land use, in particular if they include reservoir construction (water source selection is also important). Intensifying agriculture activities, as a result, can have a negative impact on the locally present species through pesticide and fertilizer use (possible negative impacts on the water quality, both surface waters and underground waters). | riverine ecosystem into reservoirs).<br><br>Additional channel construction (for water wave relief) can have a slightly positive and local impact by creating new habitats that can add to area biodiversity.<br><br>Irrigation systems construction could have a significant negative impact if they are positioned within or near Ecological Network areas.<br><br>However, since the CBC plans for only small-scale infrastructure, the impacts from risk prevention activities are not expected to be significant, still this will have to be determined at the project level. |
| Fire prevention measures, especially in respect to forest fire prevention, can have a positive impact on the Ecological Network, particularly in the Mediterranean region. Potential actions have to be performed by relevant authorities. While locally certain possible measures (such as backfires) can have a negative effect, however, preventing large fires, on the whole will have a positive effect. | The significance will depend on the type of activities and their effectiveness. |
| All potential activities included in the awareness raising activities, information campaigns and education and training concerning environmental and natural resources protection as well as in developing and implementing joint environmental management initiatives. (e.g. development of joint management plans for nature protected areas, protection of natural resources, monitoring and exchange of data, biodiversity and geo-diversity maps, conservation of natural habitats) can potentially have positive impacts on the Ecological Network and target features. | The significance of the effect will depend on the sites selected for activity implementation.<br>Also, this positive effect will be the most significant if the actions and activities would include endangered habitats and species, since they are usually included in the Ecological Network areas as target features. |
| **Conclusion:**<br>The CBC Programme plans only small-scale nature disaster prevention, partly due to its limited budget, so the overall impact is not expected to be significant, however without concrete projects and their locations this cannot be concluded with full certainty. Given the above listed potential negative impacts of such infrastructure it is important to use programme support for only such activities that will not have a significant impact on the Ecological Network. All planning should therefore include the least invasive protection measures such as planning and construction of retention basins and other activities that have less negative impacts on the biodiversity and habitat conditions in general such as improving emergency services preparedness and cooperation, joint forecasting and warning, rising local communities preparedness. | |

If effective, fire prevention activities/measures implemented by the authorities can overall have a positive impact on the Ecological Network, especially in the Mediterranean region.
Activities aimed at awareness rising, biodiversity protection and management, will have to be performed by nature protection authorities, and can therefore have an overall positive impact on the Ecological Network, however, this will depend on the locations and planned activities (whether they will be aimed at areas that are part of the Ecological Network, or its target features).

**Mitigation measures / activity implementation prerequisites:**

- → Promote joint activities in the field of natural disaster forecasting and warning, rising emergency services and local communities preparedness
- → For all flood prevention activities potential impacts on the Ecological Network must be taken into account, and activities that are least invasive should be selected. It is therefore recommended to support only ecosystem-based flood management strategies which integrate biodiversity and provision of ecosystem services into one overall approach to flood prevention and management
- → Plan long-term flood protection and retention strategy based on the enhancement of natural retention whenever possible
- → All flood prevention projects, whenever possible, should be planned on locations where they will not have a negative impact on the Ecological Network target features or integrity
- → Irrigation systems planning /construction or reconstruction must take into account potential impacts on the Ecological Network
- → Give preference to irrigation systems that are not planned or already located within or in the vicinity of Ecological Network areas
- → Give preference to irrigation systems that do not require reservoir construction (especially not on the rivers) for their water source

| **PRIORITY AXIS 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency** | |
|---|---|
| **Specific objective 2.2. To promote utilization of renewable energy resources and energy efficiency** | |
| **Possible impact** | **Impact significance** |
| Negative impacts can be expected from developing and implementing pilot and demonstration projects on innovative technologies and solutions in the field of renewable energy resources as well as from investing in joint public infrastructure on sustainable energy production and energy efficiency.<br><br>Improving energy efficiency will not have a significant impact on the Ecological Network.<br><br>However, renewable energy resources are known to have various negative impacts on the biodiversity and are therefore likely to have negative impacts on the Ecological Network areas and their target features. Exploitation of wind energy can have negative impacts on bird and bat populations (deaths by wind turbines). | The significance of the potential negative impact depends on the scale of renewable energy projects and their location, and it cannot therefore be assessed with certainty on the strategic level. However, due to the budget allocation, it is not likely that any major project in renewable energy resources will be financed from this programme, and therefore the impact is not expected to be significant.<br><br>In addition, to minimize potential negative impacts from solar energy use, it is recommended that smaller scale projects are planned (use of several panels, rather than large parks) and that these solar panels are limited to already built urban area. |

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| Exploitation of river energy, by constructing hydropower plants, can have a significant impact on the riverine ecosystems and cause significant changes in the habitat conditions and through that influence all river species. Larger hydrotechnical projects can lead to changes of underground aquifers and water tables which in turn are important for flood plain forests. Large solar parks can have a significant negative impact on the bird population, however use of smaller numbers of solar panels does not exhibit such negative impacts. Biofuel cogenerations in general do not have major impacts on the biodiversity; however this depends on their location and the manner in which they obtain biomass (biomass farming can cause land use changes and degradation of water ecosystems through increased erosion and increase in nutrient and fertilizer loads). Combustion of biomass – if inappropriate approaches are used - can cause air pollution which may indirectly adversely impact biodiversity and status of ecological network. | |
| **Conclusion:**<br>While renewable energy resources are regarded as a positive approach to energy generation, various methods of exploiting renewable energy resources have been noted to have negative impacts on the biodiversity, and are therefore likely to have a negative impact on the Ecological Network areas and their target features. This, however, greatly depends on the scale of the projects as well as on their locations. Since the CBC Programme does not give such details, the significance of the impact cannot be assessed with certainty on the strategic level and it will therefore have to be addressed at the project level. However, given the available budgets for the interventions proposed, it is not likely that any large scale infrastructure for renewable energy will be financed from the CBC Programme, and therefore it is unlikely its implementation will have a significant impact on the Ecological Network. | |
| **Mitigation measures / activity implementation prerequisites:**<br>→ Wind turbines and large solar parks should not be planned within areas important for bird preservation (Special Protection Areas, SPA).<br>→ Large solar parks and hydropower plants should not be planned within areas important for preservation of species and habitat types (Special Areas of Conservation, SAC)<br>→ It is recommended to finance smaller-scale solar power projects (use of several panels, rather than large parks).<br>→ Solar parks should be limited to already built urban areas. | |

| PRIORITY AXIS 3: Contributing to the development of tourism and preserving cultural and natural heritage | |
|---|---|
| **Specific objective 3.1.To strengthen and diversify the tourism offer and to enable better management and sustainable use of the cultural and natural heritage** | |
| **Possible impact** | **Impact significance** |
| Activities included in developing joint tourism activities and diversification of tourism offer (inclusion of other sectors e.g. agriculture, sustainable transport, etc. in order to develop projects in ecotourism, hunting, rural, mountain, excursion, adventure, nautical), developing and improving small-scale tourism infrastructure such as: walking paths, cycling routes, hiking, riding trails, signposting, visitor centres, etc. and joint incentives of integrating nature and leisure activities into tourism offer could all potentially have a negative impact on the Ecological Network if located within its areas. These impacts can include land use changes as well as limiting flora and fauna species distribution area. Hunting itself can have a negative impact on the faunal species (and potentially on target species). | The significance of this impact is not expected to be significant, especially due to the allocated budget. Still, actual significance will depend on the actions undertaken and their locations.<br>Planning such project outside of Ecological Network areas, would ensure that they do not have any adverse impact on the Ecological Network. |
| Investing in small scale infrastructure within protected nature areas (natural heritage sites) can have a negative impact on the Ecological Network, since often protected areas are also Ecological Network areas. This impact can include land use changes and changes of habitat conditions as well as limiting flora and fauna species distribution area. | The significance of the potential negative impact will depend on the scale of projects and their proximity to area target features. For all National Parks and Nature Parks special spatial plans have to be prepared, and all infrastructure within them will have to be planned accordingly, which will reduce the possibility of a significant impact on the protected area (and on the Ecological Network). |
| Activities for valuating, preserving, restoring and reviving (e.g. animation of site) cultural, historical and natural heritage e.g. UNESCO and other historical and cultural sites and landscapes, including enabling or improving access to them can potentially have bot a positive (valuation, preservation, restoration and revitalisation of protected nature areas - natural heritage sites) and a negative (improving access may lead to exceeding the visitor capacity of protected areas) impact on the Ecological Network since often protected nature areas are Ecological Network areas as well. | The significance of this potentially positive impact will depend on the actions undertaken and their location, however due to the limitations in the budget it is not expected to be significant |

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| **Conclusion:**<br>Some of the actions within the specific objective 3.1. could potentially have a negative impact on the Ecological Network if located within, Ecological network areas, however due to the limited budget it is not likely to be significant.<br>Since all infrastructure projects within protected nature areas have to be in accordance with the relevant spatial plans, and if visitor capacity of protected areas are carefully set and not exceeded the negative impacts of the CBC would be minimal. It is advised to implement as many as possible activities of evaluation, preservation, restoration and revitalisation of protected nature areas.<br>Since the impact some of the potential projects cannot be assessed with certainty on the strategic level it will have to be done on the project level. |
| **Mitigation measures / activity implementation prerequisites:**<br>→ It is necessary to ensure, in the project preparatory phase, that no important and protected habitats and species (target features) are endangered by the planned infrastructure and activities. |

## 6.3 Alternative solutions and their possible impact on the ecological network

The CBC Programme defined the priorities, measures and activities necessary for an affective Programme implementation in order to obtain the goals set out according to the situation/needs in the programme area. Given the character of the Programme, no alternatives were considered. Therefore the Appropriate Assessment focused on assessing potential impacts on the Ecological Network areas and target features and on proscribing implementation criteria for potential types of actions. These criteria will assist in future project selection so that the Programme implementation does not endanger Ecological Network areas nor their target features.

## 6.4 Mitigation measures for the programme implementation

The following mitigation measures are envisioned as project criteria which will ensure the protection of the Ecological Network integrity and its target features.

Since the CBC Programmes does not give specific project locations, the measures do not apply to specific projects, Ecological Network areas or target features. Specific measures, for all projects that could potentially have negative impacts on the Ecological Network, will be determined in the Appropriate Assessment at the project level, according to the Nature Protection Act.

The following table shows the mitigation measures grouped according to the specific objectives and potential types of actions.

| Mitigation measure | |
|---|---|
| **PRIORITY AXIS 2: Protecting the environment and nature, improving risk prevention and promoting sustainable energy and energy efficiency** | |
| **2.1.** | **To promote and improve environment and nature protection and management systems for risk prevention** |
| General measure | Promote joint activities in the field of natural disaster forecasting and warning, rising emergency services and local communities preparedness |
| Risk prevention in relation to natural disasters (cross-border measures and tools for reducing the risk of natural disasters or joint interventions including small-scale infrastructure) - floods | For all flood prevention activities potential impacts on the Ecological Network must be taken into account, and activities that are least invasive should be selected. It is therefore recommended to support only ecosystem-based flood management strategies which integrate biodiversity and provision of ecosystem services into one overall approach to flood prevention and management. |
| | Plan long-term flood protection and retention strategy based on the enhancement of natural retention whenever possible. |
| | All flood prevention projects, whenever possible, should be planned on locations where they will not have a negative impact on the Ecological Network target features or integrity. |
| Risk prevention in relation to natural disasters (cross-border measures and tools for reducing the risk of natural disasters or joint interventions including small-scale infrastructure) - mitigating drought effects | Irrigation systems planning /construction or reconstruction must take into account potential impacts on the Ecological Network |
| | Give preference to irrigation systems that are not planned or already located within or in the vicinity of Ecological Network areas |
| | Give preference to irrigation systems that do not require reservoir construction (especially not on the rivers) for their water source |
| **2.2.** | To promote utilization of renewable energy resources and energy efficiency |
| Renewable energy resources (developing and implementing pilot and demonstration projects on innovative technologies and solutions in the field of renewable energy resources and investing in joint | Wind turbines and large solar parks should not be planned within areas important for bird preservation (Special Protection Areas, SPA). |
| | Large solar parks and hydropower plants should not be planned within areas important for preservation of species and habitat types (Special Areas of Conservation, SAC) |

| Mitigation measure | |
|---|---|
| public infrastructure on sustainable energy production) | It is recommended to finance smaller-scale solar power projects (use of several panels, rather than large parks). |
| | Solar parks should be limited to already built urban areas. |
| **PRIORITY AXIS 3:** | |
| **3.1.** | **To strengthen and diversify the tourism offer and to enable better management and sustainable use of the cultural and natural heritage** |
| General measures | It is necessary to ensure, in the project preparatory phase, that no important and protected habitats and species (target features) are endangered by the planned infrastructure and activities. |

## 6.5 Conclusion on the CBC programme impact on the ecological network

Ecological Network of the programme area consists of 30 SPA areas (Areas important for bird preservation) and 409 SAC areas and 111 SAC point localities (Areas important for preservation of species and habitat types).

In the stage of the preliminary assessment it was possible to exclude significant negative impacts from:

- Priority axis 1: Enhancing public health and social care – specific objective *1.1. To improve services in the area of public health and social sector across the borders*,
- Priority axis 4: Enhancing competitiveness and developing business environment in the programme area – specific objective *4.1. To enhance institutional infrastructure and services in order to accelerate the competitiveness and development of business environment in the programme area*.

According to the current Programme draft, activities of the priority axis 1 will include soft measures aimed at improving the public health and social welfare sector. While priority axis 4 will include measures aimed at increasing competitiveness development of business environment in the programme area (business support institutions, developing and supporting existing business clusters and networks, improving communication and cooperation between SMEs and business support institutions, improving the capacity of entrepreneurs, support to actions linked to attracting investments, increasing cooperation between research institutions, businesses, public sector and development organisations, support to development of innovative products and services, certifications, joint R&D).
However, the preliminary assessment did not exclude a possibility of significant negative impacts from:

- Priority axis 2: Protecting the environment, improving risk prevention and promoting sustainable energy and energy efficiency – specific objectives *2.1. To promote and improve environment and nature protection through natural resources protection and management systems for risk prevention* and *2.2 To promote utilization of renewable energy resources and energy efficiency*,
- Priority axis 3: Contributing to the development of tourism and preserving cultural and natural heritage – specific objectives *3.1. To strengthen and diversify the tourism offer* and to *enable a better management and sustainable use of the cultural and natural heritage*.

Since the Priority axes 2 and 3 include potential actions relating to the changes in land or resource use and nature management they could have a negative impact on some of the Ecological Network target features. The proposed actions can be implemented throughout the programming area, and the lack of data (spatial, project scale and number) makes the assessment of the Programme impact on particular Ecological Network areas and target features impossible, as well as hinders the assessment of the impact significance or potential cumulative effects of the Programme implementation.

The assessment, however, has pointed out that potentially the most significant impact on the Ecological Network would arise from large scale infrastructure projects (flood prevention, irrigation systems, renewable energy resources), which in turn are not likely to be financed from the CBC Programme primarily due to the budget limitations.

All projects/activities will apply for funding under Priority axes 2 and 3 and could potentially have a significant impact on the Ecological Network will have to provide information on their effect on the Ecological Network (undergo an Appropriate Assessment on the project level, in accordance to the Nature Protection Act), since the CBC Programme can only support activities that will not have any significantly adverse impact on the integrity and/or target features of the Ecological Network areas.

# 7 RECOMMENDED MITIGATION AND ENHANCEMENT MEASURES

## 7.1 Introduction

This chapter summarizes proposals for potentail measures that can be deplyoed to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the programme as well as measures for enhancing positive impacts of the programme on environment. It and integrates various recommendations formulated during assessment of consistency of the proposed programme with the relevant environmental protection objectives (Chapter 4), during assessments of its potential impacts of environment (Chapter 5), as also within appropriate assessment of impacts on Natura 2000 network (Chapter 6).

The proposed mitigation measures are meant as guidance for reducing environmental risks associated with proposed interventions and maximing their positive impacts on the environment. This SEA report will be subject to consultations with relevant authorities which maz further suggest to modify proposed recommendations. The SEA Report and obtained inputs must be considered by the Managing Authority before the final adoption of the proposed CBC programme which can address recommendations provided through variety of means, including e.g.:

- Accepted recommendations can be directly incorporated into the programme itself - e.g. when defining the ´Examples of actions´ to be supported or ´Specific territories targeted´.

- Proposed conditions for implementation can be used as used as requirements for project applicants (e.g. all projects that require EIA or assessment of impacts on Natura 2000 network must demostrate that such assessments were conducted, infrastructural projects must have valid building permit and must meet applicable environmental standards, etc.)

- Recommendations for enhacing positive effects on the environment can be used during project selection for bonification of applications that achieve the desired positive impacts (e.g. bonification criteria can be established for project applications supporting eco-tourism, organic agriculture, resource reuse and recycling, contributing to the establishment or sustainable management of transboundary protected areas, incrasing connectivity of ecosystems, etc.).

- Information generated withion this SEA can be provided to prospective applicants for project support so that they are informed about any relevant recommendations and adjust project proposals to optimize their environmental performance.

- Recommendations provided within this SEA can be considered on *ad hoc* basis as an internal *aid memoir* during selection of project applications.

- Lastly, the Managing Authority for this programme can refuse recommendations on the basis of overriding economic concerns or if the proposed measures cannot be addressed within programme implementation modalities.

The main specific recommendations for proposed interventions generated within this SEA are summarized in the following sections.

## 7.2 Recommendations for implementation of activities within programme Specific Objective 1.1.

| Type of measure | Recommendation |
|---|---|
| General (for all activities under this Specific Objective) | Supported facilities for health and social services should be located in flood-safe areas and should be easily accessible in emergency situations (e.g. not be cut-off by floods).<br><br>Development or modernization of buildings must meet all applicable environmental requirements and should ideally demonstrate good environmental building practices - e.g. easy accessibility for public transport, accessibility for people with disabilities, energy efficiency, sound waste collection, etc. |

## 7.3 Recommendations for implementation of activities within programme Specific Objective 2.1.

| Type of measure | Recommendation |
|---|---|
| General (for all activities under this Specific Objective) | Supported infrastructural projects must be subject to applicable environmental standards and be subject - as and when needed - to applicable environmental impacts assessments, assessments of impacts on Natura 2000 network and possibly consultations on trans-boundary impacts (if such impacts are expected). |
| Specific - for actions related to joint environmental management initiatives | Consider adding ´monitoring and management of large carnivore populations and their habitats´, ´protection and restoration of coastal wetland areas and karst fields´ and ´joint initiatives on trans-boundary marine protected areas´ amongst examples of eligible activities.<br><br>If suitable applications arrive, prioritize trans-boundary cooperation related to protection of Sava River Basin Floodplains and connecting National Park Sutjeska in Bosnia and Hezegovina with National Park Durmitor and the planned Regional Park Maglic, Bioc and Volujak in Montenegro.<br><br>The eligible activities may also include those related to trans-boundary air pollution, especially air pollution in Slavonski Brod and Brod-Posavina County which is caused by industry “Rafinerija nafte Brod” from the Bosnia and Herzegovina, as well as pollution from other potential sources that could be significant in trans boundary terms.<br><br>Potential applications for environmental monitoring systems should be cross-verified with the relevant national authorities (e.g. State Institute for Nature Protection, Croatian Waters, etc.) in order to maximise potential synergies with higher-level monitoring systems on national or international levels. Monitoring parameters, periods, data collection methods, frequency and information formats should ideally allow the various monitoring systems to build on one another and fill in the priority information gaps. The data obtained should be shared with any interested institutions and made publicly available to allow their wider |

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| | use. |
| Specific - for actions related to emergency preparedness and risk prevention systems | As part of emergency preparedness and risk prevention systems consider also adding mapping of various water pollution hazards in the flood zones in accordance with the EU Floods Directive as part of a single disaster risk prevention and management system.<br><br>All supported activities on flood protection should promote a long-term flood protection and retention approach and maintenance of the traditional land use systems that respect the ecological keystone processes. Flood prevention and drought protection projects should not be planned on locations where they will not have a negative impact on the Ecological Network target features or integrity.<br><br>Should suitable application arise, a priority attention should be given to:<br>• protection of flood plains in Central Posavina as key flood retention basin that needs to be saved from further developments<br>• emergency preparedness and measures to address water pollution hazards in Neretva river and Mali Ston Bay, Una river, Krka river and Cetina river where trans-boundary management can be achieved only through cross-border cooperation.<br><br>With regard to forest fires, consider supporting activities on exchange of lessons on various aspects (legal, social, safety, ecological) of potential approaches to prevention of large-scale forest fires based on prescribed burning in the programme area. |
| Specific - for actions related to measures and small/scale investments for reducing or mitigating environmental problems and risks | Supported measures must not restrict natural retention of flood plains - ideally should expand natural retention by e.g. promoting the ´room for river´ approach that allows flooding during periods of high discharge.<br><br>In case of support to irrigation, give preference to irrigation systems that do not require reservoir construction (especially not on the rivers) for their water source and that are not planned or already located within or in the vicinity of Ecological Network areas. |

## 7.4 Recommendations for implementation of activities within programme Specific Objective 2.2.

| Type of measure | Recommendation |
|---|---|
| General (for all activities under this Specific Objective) | Priority support should be given to:<br>• energy efficiency measures in public buildings (such as hospitals, schools - where possible synergies with interventions under Thematic Priority 1 Employment, Social Inclusion, Health and Social services exist)<br>• use of agricultural waste for energy production,<br>• demonstration projects for solar power on roofs or build surfaces as long as they do not have adverse visual impacts on the amenity of landscape and cultural heritage. |

| | |
|---|---|
| | Supported projects must be subject to applicable environmental and health protection standards and be subject (when needed) to: environmental impacts assessments, assessments of impacts on Natura 2000 network and consultations on trans-boundary impacts (if such impacts would be expected). |
| Specific - for actions related to joint studies and incentives to support the utilization of renewable energy resources and energy efficiency | Consider targeted support to elaboration of renewable energy plans for counties in the study area and their optimizing through SEA processes. Such plans may be helpful for guiding preparations of specific investment projects and they can simplify environmental permitting processes (if SEA id done well). Such plans, can also consider any possible trans-boundary impacts.<br><br>Any larger-scale promotion of biomass farming should be permitted only if it can be proved that it will not lead to the deterioration of already achieved state of any water body surface and groundwater (which is e.g. a fourth objective of Croatian River Basin Management Plan). Biomass farming should not be supported on vulnerable areas under Nitrate Directive, unless such project applications prove that the choice of crops and framing practice will not increase fertilizers and pesticides loads. |
| Specific - for actions related to joint pilot projects on innovative technologies in the field of renewable energy and joint investing in public infrastructure on sustainable energy production and energy efficiency. | Wind turbines and large solar parks should not be planned within areas important for bird preservation (Special Protection Areas, SPA).<br><br>Wind turbines and solar parks should not be located on very valuable agricultural soil (P1) and valuable agricultural soil (P2).<br><br>Large solar parks and hydropower plants should not be planned within areas important for preservation of species and habitat types (Special Areas of Conservation, SAC)<br><br>It is recommended to finance smaller-scale solar power projects (use of several panels, rather than large parks). Solar parks should be limited to already built urban areas. |

## 7.5 Recommendations for implementation of activities within programme Specific Objective 3.1.

| Type of measure | Recommendation |
|---|---|
| General (for all activities under this Specific Objective) | Consider prioritizing eco/agro-tourism activities that contribute to sustainable development in protected areas.<br>Ensure in the project preparatory phase, that no important and protected habitats and species (target features) are endangered by the planned infrastructure and activities. |
| Specific - for actions within strategic project ´Adriatic Hinteland´ | Ensure, in the project preparatory phase, that no important and protected habitats and species (target features) are endangered by the planned infrastructure and activities. |

| | |
|---|---|
| | Consider needs related to waste management and also waste-water treatment (using e.g. cheap decentralized options that can well cope with short-term pollution peaks during summer periods) as part of preparation of projects in the destination that will be prioritized for targeted promotion.<br><br>The project should at the end prioritize activities that have been prepared in cooperation with nature protection and culture protection authorities and adhere to the principles of EU Agenda for a sustainable and competitive European tourism such as: taking a holistic, integrated approach; planning for the long term; involving all stakeholders; recognizing, minimising and monitoring risks. |
| Specific - for actions related preserving, restoring and reviving cultural, historical and natural heritage, including improving access to them; and small scale infrastructure related to cultural and natural heritage. | The supported projects must meet all applicable national rules for cultural heritage protection.<br><br>It is also recommended to inform prospective applicants about the following principles that should guide their planning of interventions for sustainable use of cultural and natural heritage:<br>• Conservation plans must contribute to the authenticity and integrity of the sites and monuments and their tangible and intangible elements.<br>• Conservation plans must address all relevant factors necessary for adequate long-term safeguarding and sustainable use of the heritage site or monument.<br>• The principal objectives of the conservation plans should be clearly stated. The proposals in the conservation plan must be articulated in a realistic fashion, from the legislative, financial and economic point of view, as well as with regard to the required standards and restrictions.<br>• The conservation plans should aim at ensuring a harmonious relationship between the heritage sites and monuments and the surrounding environment as a whole. Wherever necessary for the proper protection of the property, an adequate buffer zone should be provided.<br>• New functions and activities should be compatible with the character of the heritage sites and monuments. Proponents must ensure that such changes do not impact adversely on the outstanding value of the heritage site or monument.<br>• Before any intervention, existing conditions in the area should be thoroughly documented.<br>• Conservation planning should therefore encourage the active participation of the communities and stakeholders concerned with the property as necessary conditions to its sustainable protection, conservation, management and presentation. |

### 7.6 Recommendations for implementation of activities within programme Specific Objective 4.1.

| Type of measure | Recommendation |
|---|---|
| General (for all activities under this Specific Objective) | Consider potential support to business clusters that address opportunities arising from:<br>• organic agriculture products,<br>• sustainable farming and collection of organic aromatic herbs and their promotion on international markets. |

## 8 MEASURES ENVISAGED CONCERNING MONITORING

Article 10 of the SEA Directive requires Member States to 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. It also states that in order to comply with this obligation, existing monitoring arrangements may be used if appropriate, with a view to avoiding duplication of monitoring.

We have considered whether any of the identified impacts requires a systemic monitoring and concluded that due to the absence of significant risks and uncertainties on the programme-wide level, there is no need for dedicated environmental monitoring system for the proposed IPA CBC programme Croatia-Bosnia and Herzegovina-Montenegro 2014-2020.

With regard to the proposed monitoring system for environmental activities under the programme Specific Objective 2.1, it suggested to consider the following additional outcome indicators:

- Area covered by improved emergency preparedness and risk prevention systems (km2)
- Area of terrestrial ecosystems with enhanced protection regime (km2)
- Area of newly established marine protected areas or maritime spatial plans (km2)

For the Specific Objective 2.1, it is suggested to replace indicators:

- Number of joint pilot projects implemented in the areas of sustainable energy and energy efficiency
- Number of joint projects implemented in the area of increasing energy efficiency in public infrastructures
- Number of events (information campaigns, conferences, training programmes, awareness raising programmes) on promoting sustainable energies organised and implemented

with the following indicators:

- Decrease of annual energy consumption of public buildings (kWh per year)
- Additional capacity of renewable energy production (MW)

Lastly, we have also evaluated applicability of the proposed programme indicators for collecting any relevant environmental data that would support other needs for improved monitoring. To this end, the actions on developing and implementing joint environmental management initiatives under the programme Specific Objective 2.1 may provide useful inputs to national or region-wide monitoring for purposes of biodiversity protection, water quality, flood risks and related hazards. In this regard, recommendation for cross-verification of proposed monitoring systems by the relevant national authorities (e.g. State Institute for Nature Protection, Croatian Waters, etc.) has been proposed for

the Specific Objective 2.1 in order to maximise potential synergies with higher-level monitoring systems (see section 7.2 for details).

# 9 CONTENTS CONTROL SHEET

This SEA study contains all information required by the Annex I of the SEA Directive (2001/42/EC). The table below presents how the requirements of the SEA Directive were addressed in this SEA study.

| Annex I of the SEA Directive | Addressed within this SEA Study |
|---|---|
| a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes; | Chapter 1 |
| (b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme; | Chapter 3 |
| (c) the environmental characteristics of areas likely to be significantly affected; | Chapter 3 |
| (d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC; | Chapter 3 |
| (e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation; | Chapter 4 |
| (f) the likely significant effects(1) on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors; | Chapter 5 |
| (g) 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; | Chapter 7 |
| (h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information; | Chapter 2 |
| (i) a description of the measures envisaged concerning monitoring in accordance with Article 10; | Chapter 8 |
| (j) a non-technical summary | Non-technical summary |

The SEA Study also in its Chapter 6 presents appropriate assessment of implications of the proposed programme on the conservation objectives of Natura 2000 framework in accordance with the requirements of the Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC

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