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**REGIONAL STRATEGY FOR
SUSTAINABLE HYDROPOWER IN
THE WESTERN BALKANS**

**Background Report No. 3
Environmental considerations**

Final Draft 4

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List of abbreviations and symbols

Abbr. & Symbols	Description / Meaning
ALB	Acronym used for Albania
a.s.l.	Above sea level
BAT	Best available technology
BEP	Best environmental practices
BiH	Acronym used for Bosnia and Herzegovina
BR	Background report
CIA	Cumulative Impact Assessment
CO2	Carbon Dioxide
CP	Contracting Party
CSO	Civil Society Organisation
CORINE	Coordination of Information on the Environment
DCG	Drin Core Group
DG NEAR	Directorate-General for Neighbourhood and Enlargement Negotiations
DRB	Drin River Basin
EAF	Ecologically Acceptable Flow
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECS	Energy Community Secretariat
ECT	Energy Charter Treaty
EIA	Environmental Impact Assessment
ELEM	Elektrani na Makedonija (a power utility of the former Yugoslav Republic of Macedonia)
EIB	European Investment Bank
EnC	Energy Community
EP BiH	Elektroprivreda Bosne i Hercegovine (a power utility of Federation BiH)
EPCG	Elektroprivreda Crne Gore (a power utility of Montenegro)
EP HZHB	Elektroprivreda Hrvatske Zajednice Herceg Bosne (a power utility of Croatian Community of Herceg Bosna)
EPS	Elektroprivreda Srbije (a power utility of the Republic of Serbia)
ERS	Elektroprivreda Republike Srpske (power utility of Republika Srpska)
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
EU	European Union
FASRB	Framework Agreement on the Sava River Basin
FBiH	Federation of Bosnia and Herzegovina, entity of Bosnia and Herzegovina
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gases
HEP	Hrvatska elektroprivreda (a power utility of Croatia)
HET	Hidroelektrane na Trebišnjici (a power utility under the mixed holding of ERS)
HPP	Hydro power plant

Abbr. & Symbols	Description / Meaning
IBRD	International Bank for Reconstruction and Development
ICJ	International Court of Justice
ICPDR	International Commission for the Protection of the Danube River
ICSID	International Centre for Settlement of Investment Disputes
IDMS	Information and Document Management System
IFC	International Finance Corporation
IFI	International Financing Institution
IPA	Instrument for Pre-accession
IPF	Infrastructure Project Facility
IPF3	Infrastructure Project Facility - 3rd Technical Assistance Window
IRBM	Integrated River Basin Management
IRC	International River Commission
ISRBC	International Sava River Basin Commission
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
KESH	Korporata Elektroenergjitike Shqiptare (a power utility of Albania)
KOS	Acronym used for Kosovo
MCA	Multi-Criteria Assessment (a methodology used in the sub-project)
MCDA	Multi-Criteria-Decision-Analysis
MKD	Acronym used for the former Yugoslav Republic of Macedonia
MNE	Acronym used for Montenegro
MoU	Memorandum of Understanding
Mott MacDonald-IPF Consortium	The Consortium carrying out the sub-project under WBIF-IPF3
NGO	Non-governmental organisation
NHMS	National Hydro-Meteorology Service
PECI	Projects of Energy Community Interest
PEEREA	Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
PRCC	Prespa Park Coordination Committee
PSHPP	Pump-storage Hydro Power Plant
RB	River Basin
RBD	River Basin District
RHPP	Reversible Hydro Power Plant
RS	Republika Srpska, Entity of Bosnia and Herzegovina
SAA	Stabilisation and Association Agreement
SFRJ	Social Federal Republic of Yugoslavia
SE	South-East
SEA	Strategic Environmental Assessment
SER	Acronym used for Serbia
TA	Technical Assistance
ToR	Terms of Reference
TWRM	Transboundary Water Resources Management
VEC	Valued ecosystem components
WB(g)	World Bank (Group)

Abbr. & Symbols	Description / Meaning
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WBEC-REG-ENE-01	WBIF designation of this sub-project
WBIF	Western Balkans Investment Framework
WB6	Western Balkans consisting of 6 countries: Albania, Bosnia and Herzegovina, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro and Serbia
WFD	Water Framework Directive (Directive 2000/60/EC)
WMMP	Water Management Master Plan

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0 Preamble

The REGIONAL STRATEGY FOR SUSTAINABLE HYDROPOWER IN THE WESTERN BALKANS¹ — referred as “the Study” — is a sub-project under implementation by the WBIF-IPF3 Consortium led by Mott MacDonald, with the European Commission, DG NEAR D.5, being the Contracting Authority for the WBIF-IPF3 contract.

The six Western Balkans beneficiary countries comprise Albania, Bosnia and Herzegovina, the former Yugoslavia Republic of Macedonia, Kosovo*, Montenegro and Serbia - the WB6 region.

The work programme of the Study includes 13 Tasks as stipulated in the Terms of reference (ToR):

- ❖ Task 1: Hydropower role (past and future) in the regional and national context;
- ❖ Task 2: Assessment of the current situation in the institutional-organisational framework relevant for hydropower development;
- ❖ Task 3: Assessment of the current situation in the legal-regulatory framework relevant for hydropower development;
- ❖ Task 4: Assessment of hydrology baseline, water-management by country and by river basin with transboundary issues;
- ❖ Task 5: Grid connection issues in network development context;
- ❖ Task 6: Identification of HPP projects and acquiring relevant information for the HPP inventory and investment planning;
- ❖ **Task 7: Environmental, Biodiversity and Climate Change Analysis on (i) river basin level and (ii) country-level of identified hydropower schemes;**
- ❖ Task 8: Establishment of the central GIS database;
- ❖ Task 9: Development of a web-based GIS application;
- ❖ Task 10: Multi-Criteria Assessment (MCA) of prospective hydropower projects;
- ❖ Task 11: Drafting of Regional Action Plan on Hydropower Development and compilation of Final report on the Study;
- ❖ Task 12: Establishment of IT-supported Information and Document Management System (IDMS);
- ❖ Task 13: Training and dissemination of Study results.

The Study deliverables encompass separate Background reports (BR) that focus on specific technical issues in professional areas related with hydropower sector development, e.g.:

- Background report n° 1 (BR-1) – Past, present and future role of hydropower
- Background report n° 2 (BR-2) – Hydrology, integrated water resources management and climate change considerations
- **Background report n° 3 (BR-3) – Environment considerations**
- Background report n° 4 (BR-4) – Regulatory and institutional guidebook for hydropower development
- Background report n° 5 (BR-5) – Transboundary considerations
- Background report n° 6 (BR-6) – Grid connection considerations
- Background report n° 7 (BR-7) – Inventory of planned hydropower plant projects
- Background report n° 8 (BR-8) – Identification of potential sustainable hydropower projects

This Background report no. 3 (BR-3), is the output and deliverable of Task 7.

* This designation is without prejudice to position on status, and is in line with UN Security Council Resolution 1244/99 and the International Court of Justice Opinion on the Kosovo declaration of independence.

¹ The designated WBIF code of this sub-project is WBEC-REG-EN-01.

Enlargement process

The EU Enlargement process is the accession of new countries to the European Union (EU). It proved to be one of the most successful tools in promoting political, economic and societal reforms, and in consolidating peace, stability and democracy. The EU operates comprehensive approval procedures that ensure new countries will be able to play their part fully as members by complying with all the EU's standards and rules (the "**EU acquis**"). The conditions of memberships are covered by the Treaty on European Union.

Each country moves **step by step** towards EU membership as it fulfils its commitments to transpose, implement and enforce the Acquis.

The EU relations with the Western Balkans countries take place within a special framework known as the **Stabilisation and Association Process (SAP)** in view of stabilising the region and establishing free-trade agreements. To this end, all WB6 countries have signed contractual relationships (bilateral **Stabilisation and Association Agreements, or SAAs**) which entered into force, depending on the country, between 2004-2016.

The **accession negotiations** are another step in the accession process where the Commission monitors the candidate's progress in meeting its commitments on 35 different policy fields (chapters), such as transport, energy, environment and climate action, etc., each of which is negotiated separately.

At the time of writing (November 2017), there are four WB6 countries that have been granted **Candidate Country** status: the former Yugoslav Republic of Macedonia, Montenegro, Serbia and Albania, while Bosnia and Herzegovina and Kosovo have the status of **Potential Candidate** countries at this date. With two countries, Montenegro and Serbia, the **accession negotiations** have already started and several of the chapters of the EU *acquis* have been opened.

To benefit from EU financing for projects, each country **should respect the EU legislation relevant to that project**, even if the national legislation has not been yet fully harmonised with the EU *acquis*.

The "Regional Strategy for Sustainable Hydropower in the Western Balkans" aims to set guidelines for a sustainable development of hydropower in the Western Balkans.

EU Acquis relevant to the Study

In the context of this Study, **the most relevant thematic areas are spread mainly over two Acquis Chapters** (15 on Energy and 27 on Environment) relating to water resources, energy, hydropower development and environmental aspects including climate change.

- Chapter 15 Energy Acquis consists of rules and policies, notably regarding competition and state aid (including in the coal sector), the internal energy market (opening up of the electricity and gas markets, promotion of renewable energy sources), energy efficiency, nuclear energy and nuclear safety and radiation protection.
- Chapter 27 relates to 10 sectors / areas: 1 - Horizontal Sector, 2 - Air Quality Sector, 3 - Waste Management Sector, 4 - Water Quality Sector, 5 - Nature Protection Sector, 6 - Industrial Pollution Sector, 7 - Chemicals Sector, 8 - Noise Sector, 9 - Civil Protection Sector, and 10 - Climate Change Sector.

Commission President Juncker said in September 2017 in his State of the Union address that: "*If we want more stability in our neighbourhood, then we must also maintain a credible enlargement perspective for the Western Balkans*". To Serbia and Montenegro, as frontrunner candidates, the perspective was offered that they could be ready to join the EU by 2025. This perspective also applies to all the countries within the region. This timeline also corresponds to the period for preparing such major infrastructures and their lifetime. Consequently, WB6 countries have to demonstrate now that they are and will develop sustainable hydropower according to EU rules.

Relevant pieces of EU legislation and international agreements

Hydropower development should be done while respecting relevant EU legislation and international agreements to which the WB countries are Parties. This includes:

- Renewable Energy (Renewable Energy Directive 2009/28/EC)
- Energy Efficiency Directives (2012/27/EU; 2010/30/EU; 2010/31/EU)
- Environmental Impact Assessment Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) and Strategic Environmental Assessment Directive (Directive 2001/42/EC)

- Water Framework Directive (Directive 2000/60/EC)
- Habitats Directive (Directive 92/43/EEC) & Birds Directive (Directive 2009/147/EC)
- Floods Directive (Directive 2007/60/EC)
- Paris Agreement on climate change
- Aarhus Convention (the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters)
- Espoo Convention (the UNECE Convention on Environmental Impact Assessment in a Transboundary Context)
- Berne Convention (the Berne Convention on the Conservation of European Wildlife and Natural Habitats)

The framework conditions and legal obligations for hydropower development stem from the EU acquis and international obligations, the implementation of which should be supported through the Energy Community Treaty (to which all of the WB6 countries are signatories) as well as International River Basin Organisations.

As **Contracting Parties (CPs) to the Energy Community Treaty (ECT)**, the WB6 countries have obligations and deadlines to adopt and implement acquis closely related to the energy sector / market development and environment such as:

- Electricity (Directive concerning common rules for the internal market in electricity (Directive 2009/72/EC); Regulation on conditions for access to the network for cross-border exchanges in electricity (Regulation (EC) 714/2009); Regulation on submission and publication of data in electricity markets (Regulation (EU) 543/2013))
- Security of supply (Directive concerning measures to safeguard security of electricity supply and infrastructure investment (Directive 2005/89/EC))
- Infrastructure (Regulation on guidelines for trans-European energy infrastructure (Regulation (EU) 347/2013))
- Energy Efficiency Directives (2012/27/EU; 2010/30/EU; 2010/31/EU)
- Renewable Energy (Renewable Energy Directive 2009/28/EC)
- EIA Directive (Directive 2001/92/EU);
- SEA Directive (Directive 2001/42/EC);
- Birds Directive (Directive 79/409/EEC);
- Directive on environmental liability with regard to the prevention and remedying of environmental damage (Directive 2004/35/EC as amended by Directive 2006/21/EC, Directive 2009/31/EC)
- Large Combustion Plants Directive 2001/80/EC

Note: We recognise that close coordination between the energy, environment and climate change legislation and policies is necessary in the context of sustainable hydropower development.

However, to avoid duplications in the BRs, issues related to the WFD and Floods Directives are addressed in more detail in BR-2 (Hydrology, integrated water resources management and climate change considerations) and BR-5 (Transboundary considerations), respectively while all other Directives (in addition to the WFD and Floods Directives) comprising the EU environmental legislative package (Habitats, Birds and SEA/EIA) are addressed in more details in BR-3 (Environment considerations).

Small Hydropower Plants in the Regional Strategy for Sustainable Hydropower in the Western Balkans

While the 390 small hydropower plants in the Western Balkans 6 region represent almost 90% of all hydropower plants, they only produce 3-5% of the total hydropower generation and constitute 7% of the total hydropower capacity, most of hydropower energy and capacity in the region being delivered by the large hydropower plants.

This raises the question of the role of small hydro power plants and the pertinence of further developing such infrastructures. Their contribution to the global energy production and security of supply, or to the renewable energy sources targets, is extremely limited. In parallel, their impacts on the environment are severe, as they

create multiple interruptions in water flows and fish passages, increase habitat deterioration and require individual road access and grid connections. Furthermore, while most of these small hydropower plants were commissioned after 2005, when the state-support schemes – mainly feed-in tariffs – which will be phased out after 2020 and hence it is expected that the private sector interest in developing small hydropower plants will diminish significantly.

Due to the large number of small hydropower existing plants and projects, and due to the questions on their role and pertinence, the Regional Strategy for Sustainable Hydropower in the Western Balkans focused on major hydropower contributors to the power system, that is to say large hydropower plants of a capacity above 10 MW. Nevertheless, wherever possible, small hydropower plants have also been addressed in the study.

1 Introduction

1.1 Background and objectives of this background report

The purpose of this report is to present the main results of the environmental and social assessment activities carried out under Task 7 of the ToR at (i) river basin level and (ii) country-level of the greenfield hydropower schemes identified and under consideration in the Study. The main goal is to develop a sound environmental basis, including the social aspects (resettlement, land use, cultural heritage), for the classification and evaluation of the hydropower proposals under consideration. Furthermore, in association with Task 10, the Multi-Criteria Assessment (MCA) of prospective HPP projects, it is to assist in determining the sustainability aspects of proposed HPP development projects from the ecology, environmental and social perspectives. Additionally, recommendations for the rehabilitation of existing HPPs are stipulated, with a focus on watercourse connectivity.

Hydropower projects in WB6 are diverse in terms of state and concepts - from large dams to run-of-river plants. Hydropower development project documentation varies greatly from Ideas and Concepts through to Detailed Designs. The associated environmental documentation also varies throughout the region, notwithstanding the fact that most of the governing environmental legislation is harmonised to a great extent with EU legislation. However, gaps do seem to exist in the regulations and procedures for obtaining environmental consent (for detail, see BR-4), and especially the time required to gain an environmental consent, which is mandatory for hydropower development planning.

The MCA scoring system defined the criteria and sub-criteria to be used from the environmental perspective, their relative weights and the scoring system to be applied. In addition, “deal-breaking” criteria were identified and defined (for detail, see BR-8).

1.2 Activities undertaken under this topic

Activity 7.1: Environmental data collection, establishment of an appropriate database, analysis and integration with HDS-GIS system

A geo-referenced database with typical environmentally-significant issues is developed, containing, among others, the protected areas:

1. National Parks based on national and international acts or conventions of protection;
2. Ramsar Sites, Biosphere Reserves and World Heritage Sites (Nature); in most cases, these international categories are transposed under national regulations;
3. Natura 2000 Network for EU countries (Slovenia, Croatia, Bulgaria and Greece);
4. Natura 2000 under preparation in the EU candidate countries of the WB6 (Albania, the former Yugoslav Republic of Macedonia, Montenegro, Serbia);
5. Strictly protected areas in the non-EU countries; mainly comprised of smaller areas (nature reserves) but also of “nature parks” formerly designated by the Former Republic of Yugoslavia (FRY) in Bosnia and Herzegovina, Republic of Serbia, Montenegro, Kosovo and the former Yugoslav Republic of Macedonia with strict protection. Furthermore, EMERALD zones in non-EU countries;
6. Other protected areas such as landscape protection, natural monuments, official enlargement proposals and other officially designated areas with a lesser level of protection.

Activity 7.2: Analysis of adverse impacts and benefits

This activity provides an assessment of the significant effects of hydropower development on the environment. Impacts analysed are evaluated from the point of view of: construction and operation phases, direct and indirect effects, long- and short-term effects, positive and negative aspects. For typically unacceptable impacts (rare species, habitats and others), general guidelines for the development of mitigation measures are proposed, such as habitat protection or species protection.

Activity 7.3: Environmental directions and recommendations

This activity specifically uses guidelines that exist regarding good sustainable practice of hydropower schemes planning and development (e.g. European Commission, Danube River Basin – ICPDR, IHA, ICOLD, EBRD, World Bank, etc.), adjusted for the WB6 region. Since the EU environmental legislation has not yet been fully transposed and implemented, some of these guidelines and recommendations are not yet applicable. However, their transposition is inevitable and the assessment of future hydropower schemes is undertaken “as if” the EU environmental legislation is already binding on the WB6 countries.

This Background Report has its focus on the main issues and problems of hydropower generation in the context of sustainability as follows:

- Hydropower production environmental & social benefits / impacts / issues and mitigation concepts;
- Fish fauna and ecologically acceptable flow;
- Transboundary impacts, Cumulative Effects and Impacts on Rivers with Reservoirs.

Activity 7.4: Residual flow

The residual flow (also reserved or basic minimum flow) of water released downstream of a reservoir must preserve the aquatic habitat downstream and at same time provide for the rational generation of electricity. Residual flow has been traditionally discussed between developers on the one hand and fishermen, environmental agencies and associations for the preservation of the environment on the other. Residual flow is analysed using the current, commonly accepted approach of Ecologically Acceptable Flow (EAF).

1.3 Links with other tasks / background reports of the Study

In undertaking the activities under Task 7 of the ToR (as presented above), certain activities are dependent on, and support other tasks undertaken within the scope of the Study. The integration of Task 7 with other reports in the study are elaborated below:

- **HPP location definition for assessment** – Task 6: Identification of HPP projects and acquiring relevant information for the HPP inventory and investment planning,
- **Defined HPP location in GIS** - Task 8: Establishment of central HMP-GIS database,
- **Definition of river basins** (basis for river basin approach), **Cumulative effects** (water flows, sediments, fishes, etc.), **Ecologically Acceptable Flows** - Task 4: Assessment of hydrology baseline, water-management on country and river basin and transboundary issues,
- **Protected areas data input preparation for MCA** - Task 10: Multi-Criteria Assessment (MCA) of prospective HPP projects.

2 Methodology including relevant EU directives and policies

2.1 General methodology

The first step for the Environmental Analysis undertaken in the Study is the assembly and collection of all relevant and available data. In the context of this project, the environmental data collected is geospatially positioned in order to assemble, evaluate and present a clear baseline of the environmental characteristics throughout the WB6 as a whole and at the level of specific river basins / sub-basins. Once all available data were collected, and HPP locations confirmed, an analysis of environmental issues was conducted, based upon the HPP location / river stretch / watershed / river basin.

Spatial and environmental data were acquired through available sources; open source data, through consultations with environmental authorities, and confirmed through dialogue with all other relevant stakeholders and interested parties.

The relevant reference documents consulted and appraised for the development of this background report are the following:

- CIS Policy Paper on WFD and Hydro-morphological pressures;
- Water management, Water Framework Directive & Hydropower, Common Implementation Strategy Workshop, Brussels, 13 - 14 September 2011, Issue Paper (final version), November 2011;
- Water Framework Directive & Hydropower, Common Implementation Strategy Workshop Berlin, 4-5 June 2007, Key Conclusions;
- Common Implementation Strategy for the Water Framework Directive; WFD and Hydro-morphological pressures; POLICY PAPER; Focus on hydropower, navigation and flood defence activities; Recommendations for better policy integration, 2006;
- WFD and Hydro morphological pressures, Technical Report; Good practice in managing the ecological impacts of hydropower schemes; flood protection works and works designed to facilitate navigation under the Water Framework Directive, 2006;
- Sustainable Hydropower Development in the Danube Basin, Guiding Principles, 2013;
- Hydropower Case Studies and Good Practice Examples; ANNEX to "Guiding Principles on Sustainable Hydropower Development in the Danube Basin", 2013;
- Measures for ensuring fish migration at transversal structures, Technical paper, 2013 and others.

The current state of applicable acquis related with natural / water resources and environment is different between the countries. However, independently of this, full and detailed assessment, in full compliance with EU legislation, based on relevant and valid data must be conducted prior to planned HPP construction.

The potential environmental and social effects of both greenfield HPP construction and the rehabilitation of existing HPPs were analysed. The most adverse environmental impacts of project development were identified and analysed for priority HPP schemes by river basin, and both the upstream and downstream river stretches were taken into consideration. Any other area potentially affected by the project, such as reservoir areas and local communities, was also considered. This analysis also specifically includes the environmental assessment and potential mitigation of any new electricity transmission lines for the connection of a greenfield HPP site to the appropriate node on the electricity grid.

According to ICPDR², since the adoption of the Water Framework Directive (WFD) in the year 2000, the protection of Europe's waters is regulated in one single piece of framework legislation including the expanded scope of water protection, management and utilisation to all waters (surface water, groundwater, transitional and coastal water), the achievement of "good status" for all waters (including the preservation of the

²ICPDR. 2013. Assessment Report on Hydropower Generation in the Danube Basin, ICPDR

hydromorphological characteristics), as well as water management based on river basins. In addition, a strong linkage of the implementation of the Water Framework Directive is made with the provisions of the Birds and Habitats Directives aiming at the protection of Europe's most valuable species and habitats. Both the nature Directives and the WFD aim at ensuring healthy aquatic ecosystems while at the same time ensuring a balance between water/nature protection and the sustainable use of nature's resources.

In order to achieve the above-mentioned goals, a river basin management plan should be prepared. The plan is a detailed account of how the objectives set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the timescale required.³ The plan should include the following: the river basin's characteristics, a review of the impact of human activity on the status of waters in the basin, an estimation of the effect of existing legislation and the remaining "gap" for meeting objectives along with proposed measures for the specific river basin.

The requested "River Basin" management approach in the Study by the client (DG NEAR) has been introduced by the Water Framework Directive, as mentioned above, and has been followed throughout the study process. The "River Basin" approach is a commonly agreed principle in various guidelines (e.g. Guiding Principles on Sustainable Hydropower Development in the Danube Basin") and in worldwide hydropower development practice generally. This principle states that water management and utilisation must be considered in the context of a whole catchment area and not river-by-river⁴.

For the purpose of this Study, given the current lack of Water Management Plans in this region, the Classification of Watersheds and River Basins in the WB6 region was prepared to facilitate the river basin approach. This has enabled the simplification of the very complex system of water resources in the WB6 countries into a more transparent and manageable water network for the purposes of the Study.

The definitions of terms used regarding a particular catchment area (run-off) are:

- a. **Drainage Basin (DB)** – the area between the point of entry of a river to the sea to the source points of all water-streams found in that particular area;
- b. **Watershed (WS)** – a run-off area surface, but also large river catchment area system;
- c. **River Basin (RB)** – an area within a watershed draining through a main water-stream and several tributaries;
- d. **(Sub)River Basin (SRB)** - smallest unit within River Basin.

Eventually, the Study will deal with: 4 DBs, 13 WSs, 18 RBs, 10 SRBs, 27 Rivers, 78 Tributaries 1, and 25 Tributaries 2.

In coordination with the WFD, the Floods Directive must be implemented. The Floods Directive (Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks³⁷) requires a good coordination in the river basin and in the cases where river basin is shared between 2 or more countries, trans-boundary coordination. Flood risk management plans and river basin management plans should be coordinated, and through coordination of the public participation procedures in the preparation of these plans.

According to the Floods Directive, in cases of the multi-purpose use of bodies of water for different forms of sustainable human activities (flood risk management or hydropower) and the impacts of such use on the bodies of water, the Directive provides for a clear and transparent process for addressing such uses and impacts, including possible exemptions from the objectives of 'good status' or of 'non-deterioration' in Article 4 of WFD.

More on the WFD and Floods directive is presented in BR-2: Hydrology, integrated water resources management and climate change considerations. Both protected areas and protection zones are analysed for each HPP location (138 in the Study). Natura 2000 areas are not yet designated in WB6, and because of that, the analysis was focused on those areas already identified such as Ramsar, Emerald, Biosphere Reserves, World Heritage Sites (Nature) and protected areas categories transposed and proclaimed, according to current national legislation. Since HPPs may have irreversible impacts on protected areas, especially within the HPP direct

³ http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm

⁴ Notes and remarks to the Classification of Watersheds and River Basins in the WB6 region for the purpose of this study, Zoran Stojič, WBIF-IPF3, 2016

impact area, potential impacts were identified and used in the MCA⁵ assessment process of greenfield HPP projects. For derivation / reservoir type of HPPs, the direct impact area is designated as the “planned flooded area”. These flooded areas were defined according to the technical data available on the elevation of the accumulation / retention basin, the coordinates and height of the planned dam and were estimated using a 3D elevation model.

The environmental and social assessment work focused on developing a set of measures to mitigate expected impacts to acceptable levels wherever possible. Alternative mitigation measures were developed and the effectiveness of the proposed measures were estimated. The mitigation solutions proposed or assessed and the mitigation approach in general were developed based on proposing implementable solutions in practice.

The cumulative effects were assessed against a maximum development scenario of HPPs to determine the theoretical overall cumulative effect. Within the context of HPP development in the WB6, cumulative effects focus on sediment transport, water balance and migratory fish obstacles. At this stage, not knowing which HPPs are going to be eventually supported for development and possible construction, it is not possible to undertake a full cumulative assessment for the region, and especially not in quantitative terms; it is expected that a full cumulative SEA will be undertaken for river basins (where appropriate in the transboundary context) when countries develop their national SEAs to accompany their hydro development plans for specific rivers or hydropower cascades. Therefore, instead of a comprehensive cumulative effect study for the region, an overview of the possible impacts and consequences relating to cumulative impacts of hydropower have been prepared in this report.

For a detailed quantitative assessment of cumulative impacts assessments (relating to, for example, water flows, sedimentation transport, fish paths) by river basin, one needs to have; (i) an integrated water management plan, (ii) a plan of construction of HPPs (small and large) on the main water streams and tributaries including the dynamics of their commissioning, (iii) developed HPP proposals (i.e. PFS and FS studies completed) etc. In practice, these preconditions are fulfilled in very rare cases in the WB6 region at present. Therefore, only a qualitative cumulative impact assessment by river system has been completed in the Study.

To minimise the negative environmental effects of HPP projects, the required environmentally acceptable flow (EAF) must be analysed and assessed. Formulas for the determination of residual flow are numerous and this is a real problem for the legislator who should set up the regulation governing these flows, and in practical terms this makes it difficult to establish reference values or formulas to comply with. Within a given group of methods, the differences in the results can vary significantly from one method to another. Therefore, existing legislation has been analysed based on national legislation, and a recommendation on next steps for reserved flow estimation in the WB6 countries is proposed.

The full scope of environmental and social impacts of hydropower projects depends on many intertwined factors, but mainly on project size, type or technology used and the site's local conditions regarding environmental conditions and the social features of local population. The impacts of each HPP project are quite unique, however, it is possible to distinguish the impacts on the environment and local population between two traditional types of power plants: large HPPs and small HPPs. Large HPP projects with large dams and large surface accumulation reservoirs have so far attracted most of the negative connotations in discussions between investors on one side and NGOs and population on the other. Some of the most frequent environmental and social impacts of HPPs are summarized in Table 2.1.

Table 2.1 Most common impacts of large HPPs

Impact	Environmental (E) and/or Social (S)
Direct	

⁵ Multi-Criteria Assessment (MCA) of prospective hydropower projects, EIHP, WBIF-IPF3, 2016

Flooding of Natural Habitats	E
Downstream Hydrological Changes (Including disruption of sediment transportation and deposition and subsequent changes in downstream riverbeds and coastal erosion).	E
Loss of Cultural Property	S
Resettlement	S
Loss of Aquatic and Terrestrial Species and Habitats	E
Changes of the ecological flow regime	E
Water changes and temperature changes	E
Displacement and disturbance of species	E
Impact on Fish and Other Aquatic Life	E
Indirect	
Deterioration of Water Quality	E
Water-related Diseases	S
Impact on Fish and Other Aquatic Life	E
Rapid Growth of Floating Aquatic Vegetation	E
Reservoir Sedimentation	E
Emission of Greenhouse Gases from Reservoirs	E
Potential Dam Breach	E & S
Change of Landscape Visual Value	S
Impacts of Associated Civil Works	
Access Roads	E & S
Power Transmission Lines	E
Quarries and Borrow Pits	E
Impacts of Induced Development	
Follow-on Development Projects	S

The change from a flowing river to a reservoir with still waters (in storage HPPs) represents a crucial change of the living environment for a certain number of species. This and similar effects and impacts are identified as a factor which is used in the selection of priority HPP development schemes. Since it is not possible within the scope of this study to conduct full SEAVEIA procedures, which are expected to follow from this study, fish fauna has been selected as a representative indicator of the most adverse negative effects on nature (wild life).

Recent findings show that the majority of the above-mentioned impacts can also refer to small HPPs, and at the same time their contribution to overall energy production is negligible, especially when a number of infrastructures are constructed in one river basin without assessing the cumulative impacts, both negative (environment) and positive (energy production).

2.2 Fish Fauna

Fish play a specific role as an indicator since a broad spectrum of abiotic variables of different spatio – temporal scales are linked to the habitat requirements of particular species and their ontogenetic stages (Jungwirth et al., 2000). A first indication of the ecological integrity of the river is the structure of the assemblage, the presence or absence of individual species of fish, and their state of endangeredness ((Scheimer, 2000)).

Most of the published data on fish fauna for WB6 countries or river systems, used in this study, were found in handbooks or scientific articles. The number and the scale of surveys differ a lot between countries and regions as does the number of published data. Furthermore, published literature becomes outdated very fast. This can be illustrated by the fact that between years 2000 and 2007, 51 species new to science were determined in Europe, which is considered to be one of the most investigated regions in the world. Fish fauna of The Balkans is far less known than central European fish fauna and one has to be aware of the fact that in the near future many more

species will be recognized and new data on their distribution will be published for the region. Bearing this in mind and being aware of the limited available data, we prepared, for the purpose of this study, a list of selected species for the region with their threat status and used them as bioindicators, since fish fauna is a critical sensor of the ecological integrity of rivers and thus a good monitoring tool especially with regard to river engineering.

A list of species for each country in the WB6 region was composed from data obtained from www.fishbase.org – Global Information System on Fishes (Froese at al., 2016) and some published literature. Threatened fish fauna was then analysed and presented by river drainages and river basins.

The threat status was assigned to fish according to categories from the IUCN Red list of threatened species, the system for classifying species at high risk of global extinction (IUCN, 2016). Some species are not (yet) included in The Catalogue of Life (the global index of species) and are thus not yet categorised by IUCN.

Table 2.2 IUCN Red list categories and their abbreviations, used to categorise fish species

IUCN Red list category	Abbreviation
extinct	EX
extinct in the wild	EW
critically endangered	CR
endangered	EN
vulnerable	VU
near threatened	NZ
least concern	LC
data deficient	DD
not evaluated	NE

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases, great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

The selected species belong to the IUCN Red list categories from vulnerable (VU) upwards (Table 2.2).

The impact evaluation of planned HPP on fish assemblages was based on the distribution of selected species in each drainage basin and river basin in the WB6 region and on the types of the HPP being planned. The distribution areas of selected species represent assemblages and their freshwater habitats that are the most sensitive to the changes in the waterbody which are result of HPP development, while their threat status reflects their risk of global extinction.

Sensitivity to the changes in the habitat that result from planned HPP development is estimated based on the species' ecological requirements, which are mainly requirements for open migratory corridors, habitat and spawning requirements and sensitivity to invasive species.

All data on the distribution of selected species, that we gathered through the literature review, was introduced and processed in the geographic information system (GIS) developed for the purpose of the Study (for detail, see Annex 2 of BR-7). A special layer was developed for each species which showed its distribution as precisely as possible based on literature sources. Layers of all selected species were then overlapped with layers showing locations of planned and existing HPP. Each HPP included in the Multi-Criteria Assessment (MCA) was then analysed based on the presence of the threatened species. The following criteria was used for the indicator “**target species/migratory/threatened species**”, taking into account different levels of vulnerability of sites.

Table 2.3 Scoring system for indicator “target species/migratory/threatened species”

Description	Score
HPP inside the areas of special importance for fish	1
HPP inside the present and historical distribution area of long distance migratory species and other threatened species, not inhabiting the areas of special importance for fish	3
HPP in the area, where according to present knowledge there are no threatened species	5

The type of planned HPP was considered as well. Each HPP included in the Multi-Criteria Assessment (MCA) was analysed based on the type of HPP. The following criteria were used for the indicator “**threatened species/type of HPP**”, considering impacts from different types of HPP on fish fauna.

Table 2.4 Scoring system for indicator “threatened species/type of HPP”

Description	Score
Cascade HPP	1
Individual HPP (derivation type, storage type, pump storage)	3
Individual run-off-the-river HPP	5

The term “**mitigation measures**” used in this report refers to the measures that are applied to eliminate or minimise the identified (existing HPP) or potential (greenfield HPP) negative impacts. Mitigation measures, with the emphasis on functional fishpasses and **ecologically acceptable flows** are proposed for existing and planned HPPs along with recommendations, taking into account two documents:

- Measures for ensuring fish migration at transversal structures, Technical paper, ICPDR, 2013;
- Ecological flows in the implementation of the Water Framework Directive, Guidance Document No. 31, Technical report – 2015 – 086, European Commission, 2015.

2.3 Relevant EU directives and policies

Birds and Habitats Directives

The “Birds”³⁸ and the “Habitats”³⁹ Directives (BHD) together form the backbone of the EU’s biodiversity policy as they protect Europe’s most valuable species and habitats. The ultimate objective of the Habitats Directive is to protect, maintain or restore a favourable conservation status of selected species and habitats of Community importance. The Habitats directive also seeks to establish and develop a coherent network of special areas of conservation (Natura 2000 sites). In addition, species (e.g. priority fish and other river species) outside a protected area are covered by the BHD; a particular focus of establishing a coherent network of protected areas is also developing habitat connectivity outside of the protected areas. Both the WFD and the Birds and Habitats Directives aim at ensuring healthy aquatic ecosystems while at the same time ensuring a balance between water/nature protection and the sustainable use of nature’s natural resources.

The implementation of measures under the WFD generally benefit the objectives of the nature Directives. Relevant linkages between the WFD and the Birds and Habitats Directives can be summarised as follows: Any Natura 2000 site with Annex I aquatic habitat types or Annex II aquatic species under the Habitats Directive or with water-dependent bird species of Annex I of the Birds Directive, and, where the presence of these species or habitats has been the reason for the designation of that protected area, has to be considered for the register of protected areas under Article 6 of the WFD. These areas are summarised as “water-dependent Natura 2000 sites”. For these Natura 2000 sites, the objectives of BHD and WFD apply. The objectives of the Directives are closely related and special attention and coordination is needed where these Directives are implemented in the same areas. The measures serving the BHD and WFD objectives need to be included in the River Basin Management Plans required under Article 13 WFD and could also be included in the management plans of the Natura 2000 sites.

An appropriate assessment⁶ (AA) as required by article 6.3 of the Habitats Directive, needs to be conducted for every plan or project that is likely to have a significant effect on one or more Natura 2000 sites. The initial step is the screening process which determines whether the plan or project has to undergo an AA or not. If it is impossible to exclude the possibility that the plan or project either alone or in combination with other projects or plans is likely to have a significant effect on any Natura 2000 site, then an AA is required. Once decided that an AA is required, a detailed analysis must be undertaken on the potential impacts on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site’s structure and function and its conservation objectives. The final step concerns the decision-making. In case that the AA concludes that there will be no adverse effects to the integrity of the site, the project can be approved. On the contrary, in case where the AA is unable to conclude with certainty that there are no adverse effects on

⁶ Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission, Environment DG, 2001

the integrity of the site and that these adverse effects can be mitigated then the competent authorities need to refuse the plan or project.

In exceptional circumstances, a plan or project may still be allowed to go ahead, in spite of a negative assessment, provided there are no alternative solutions and the plan or project is considered to be justified for imperative reasons of overriding public interest. In such cases the Member State must take appropriate compensatory measures to ensure that the overall coherence of the N2000 Network is protected. (Article 6.4).

Environmental Assessment Directives (EIA Directive and SEA Directive)⁷

The common principle of both the EIA and SEA Directives is to ensure that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to a decision on their approval, authorisation or rejection. Consultation with the public is a key feature of all environmental assessment procedures.

In this respect, public participation and access to information is required by the WFD, Espoo, Berne and Aarhus Conventions. The participation of the public and civil society is essential and must start as early as possible in the planning process. It is expected that by following this approach, the planning and implementation of new and appropriate hydropower projects can be significantly improved in terms of costs, timing and acceptance by different interest groups. All WB6 countries are signatories of Espoo Convention, except Kosovo, and parties in the Aarhus convention as a part of the EU accession process. Albania, Bosnia and Herzegovina, Montenegro and Serbia have ratified the Aarhus convention.

The Directives on Environmental Assessment aim to provide a high level of protection of the environment and contribute to the integration of environmental considerations into the preparation of projects, plans and programmes with a view to reducing their environmental and social impacts. They ensure public participation in decision-making and thereby strengthen the quality of decisions. The projects and programmes co-financed by the EU (notably Cohesion, Agricultural and Fisheries Policies) must comply with the EIA and SEA Directives to receive approval for financial assistance. Hence the Directives on Environmental Assessment are crucial tools for sustainable development.

Conclusion: WB6 Countries are not part yet of the European Union but are committed to transpose, implement and enforce the EU environmental Acquis.

There are four WB6 countries that have been granted candidate country status: Albania, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. In two of them, Montenegro and Serbia, the accession negotiations have already started. Due to the different status and progress of EU-accession of the 6 WB-countries, the current state of applicable acquis related with natural / water resources is considerably different between the countries. Without aiming at prejudicing any dynamics of the WB6 countries in the accession process, it is obvious that the Study is confronted with different existing legal-regulatory frameworks in the WB6 countries as well as differences in the speed of adoption, implementation and enforcement. However, the applied methodologies are practically the same and are intended to be replicated throughout the region. It is quite likely that such discrepancies could continue well beyond 2020. Nevertheless, it is clear that EU legislation, once fully transposed and implemented, will uniformly bind all WB6 countries in respect of future HPP development which means that none of the proposed greenfield projects can be supported by IFIs unless developed in compliance with relevant environmental directives.

2.4 Hydropower Sustainability Assessment Protocol

The Hydropower Sustainability Assessment Protocol is a tool for assessing projects across a range of social, environmental, technical and economic topics. It provides an international common language on how these considerations can be addressed at all stages of a project's lifespan: planning, preparation, implementation and operation. The protocol was developed through 30 months (2007–10) of cross-sector engagement, and a review of IHA's previous sustainability tools, the World Commission on Dams Recommendations, the Equator Principles, the World Bank Safe Guard Policies and the IFC Performance Standards.⁸

⁷ http://ec.europa.eu/environment/eia/index_en.htm

⁸ <https://www.hydropower.org/topics/featured/hydropower-sustainability-assessment-protocol>

2.5 Western Balkan Sustainability Charter⁹

The Western Balkan 6's energy sector cannot be entirely focused on power generation. To improve prosperity, health and jobs (especially in small and medium enterprises), cleaner environment and transition towards low-carbon and climate-resilient development, the Western Balkan 6 countries agree to tap into their high potential for energy savings and renewable energy generation.

EU funding will be directed with priority towards the best performing countries, in terms of legal and regulatory framework implementation, sufficient administrative capacity of their administration, and an enabling environment regarding energy efficiency investments.

Each WB6 country will continue working towards the implementation of robust domestic greenhouse gas emissions monitoring and reporting systems in line with EU legislation and improve transparency in sustainable energy markets by:

- Reviewing the national greenhouse gas emissions monitoring and reporting systems with a view to align with the Regulation (EU) No 525/2013;
- Identifying gaps between current practices in monitoring, reporting and planning on climate and energy policies domestically and meeting the international reporting obligations;
- Establishing national indicative roadmaps for implementing measures required to increase investor confidence in sustainable energy markets;
- Strengthening the capacity of national administrative authorities to oversee and govern the national and regional sustainable energy markets in an independent, proactive and transparent manner.

The above-mentioned goal can be achieved by developing an energy mix containing different renewable energy sources.

2.6 Conclusion

Building a sustainable energy sector in accordance with the relevant environmental and climate change conditions and guidelines mentioned above, means that fossil fuels can partially be replaced by renewable energy, including hydropower, and countries will enjoy a lower dependence on external energy sources. In this context, sustainable hydropower development along with other renewable energy sources can help in future adaptation to climate change, if done properly, and will assist in mitigating climate change as one of the biggest threats to economic development.

The requirements of EU environmental legislation and applicable international conventions shall remain the reference for hydropower projects in WB6 countries, the implementation of which should be supported through the Energy Community Treaty. The most important to fully consider in the HPP development process is the Water Framework Directive, the Floods Directive and the Birds and Habitats Directives as well as the Environmental Impact Assessment Directives (EIA and SEA). These directives are interlinked and should therefore be implemented in a coordinated way to ensure that they operate in an integrated manner.

⁹ <https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/policy-highlights/regional-cooperation/20160713-03.western-balkan-sustainable-charter>

3 Environmental data and Environmental Analysis

In the following sections, the data used for the Environmental Analyses is presented, together with an overview of HPP locations used for an **initial environmental and social screening**. The SEA and EIA procedures in each country and officially proclaimed protected areas are presented. The analysis for HPP locations was made per river basin. Since the analysis concerned the locations of HPPs with more than 10 MW of installed capacity, other planned HPP locations need to be considered and their impact must be assessed through the Cumulative Impact Assessment process (see Section 6 - Cumulative effects and impacts on rivers with reservoirs). When impact on protected areas was analysed, HPPs were evaluated according to their distance from the river course (2,5 and 10 km) and if the location is placed upstream or downstream from protected area(s). All determined possible impacts were used in the MCA and have their corresponding scores¹⁰.

3.1 Data collected

3.1.1 Overview of HPP locations

The HPP locations for site-specific environmental analyses were chosen based on the results of the MCA process. As it is explained in the MCA report (BR-8), this assessment was made at 2 levels, Level 1 and Level 2, followed by a final expert assessment. Available environmental and social data was used to assess 138 HPP greenfield locations for detailed inspection and investigation for implementation. Relevant HPP locations (from MCA Level 2) together with their river basins in the area are presented in Figure 3.1.

¹⁰ Br. 8: Multi-Criteria Assessment (MCA) of prospective HPP projects.

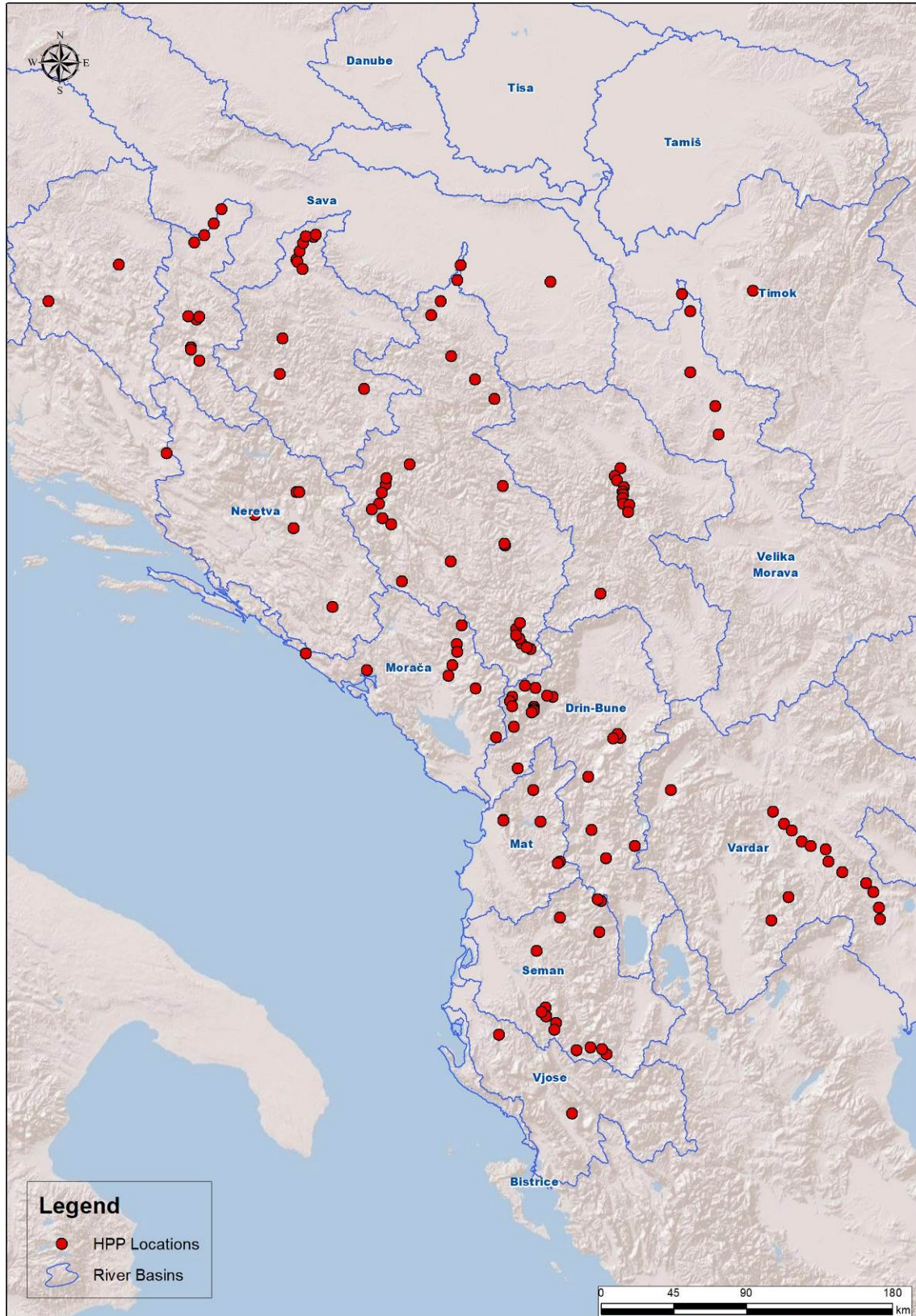


Figure 3.1 HPP locations and river basins overview

3.1.2 Overview of available data

The sources of data used in the environmental and social analyses comprised of the following:

- Biodiversity data and Protected areas (Ramsar, Emerald network, national parks and parks of nature, strict reserves ...) – both vector and raster data were collected through the relevant official authority in each country. Raster data was vectorised within the GIS to conduct spatial analyses.
- Coordination of Information on the Environment (Corine) landcover 2012 – data was downloaded from European Environmental Agency (EEA) site (this dataset includes 44 land cover and land use classes).
- Infrastructure and settlements data - roads, railroads, landfills, factories, WWTP, powerlines etc. - data was obtained from open source services.
- River basins – European Catchments and Rivers Network System (Ecrins) – data was downloaded from the European Environmental Agency (EEA) site and adjusted for project purposes.
- Potentially flooded areas – defined and designated according to technical data acquired and based on a digital elevation model.
- Google Earth, ESRI base maps and High Resolution 30cm Imagery were used as a basis or as additional tool for analyses.

If no digital data was available, other sources were used and an additional database was established to catalogue those sources. Data was used for spatial analyses; All other relevant data was collected in existing forms (plain text, tables, diagrams, etc.) from competent authorities to assess and evaluate the present state, draw conclusions and propose recommendations.

3.1.3 Short description of national SEA/EIA legal procedures in WB6 countries

Detailed descriptions of national SEA/EIA legal procedures in WB6 countries are contained in **Annex 1** of this report. In this section, a brief summary of the procedures and requirements governing SEA and EIA in each of the WB6 countries are presented. Wherever they exist, specific references to hydropower development in the SEA / EIA are highlighted.

3.1.3.1 Albania

SEA - Strategic Environmental Assessment

The SEA procedure in Albania was first enacted in 2013, when the Albanian government approved the law on Strategic Environmental Assessment (Law¹¹ no.91, date 28.02.2013). Some SEA's were completed prior to 2013, but all these followed the existing EIA procedures.

After the new law entered into force, other by-laws that are required to fulfil the requirements of the SEA legislation came into force, mainly in 2015 and 2016 (DCM no. 219, 2015¹²; DCM no. 507, 2015; DCM no. 620, 2015¹³; Common guideline of the Minister of Environment and the Minister of Finance, no.5, 2016).

The aim of the SEA law is to ensure high environmental protection and sustainable development, through assessing environmental issues during the drafting, approval, review, changes and modification of the plans and programmes that have a potential to negatively impact the environment. The law defines the institutions, their roles and responsibilities and the procedures to be followed in developing the Strategic Environmental Assessment. The Energy sector is one of 19 sectors defined in the SEA Law that is mandated to go through the SEA process. Under the SEA law, all plans and programmes dealing with energy should undergo the SEA

¹¹The law transposes completely Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

¹²This decision transposes partly the Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

¹³This decision transposes completely the Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

process, which is further defined in DCM no. 507 where Annex 1, point 2, states that Strategies, Plans, Programmes, and other planning documents that are subject to the legislation into force for energy sources should undergo the SEA process.

EIA – Environmental Impact Assessment

The first law on EIA in Albania (2003) was not in line with the EU EIA Directive. In 2011, the Government of Albania approved a new law on EIA, in line with the EU Directive. That law was followed, during the subsequent years, by a number of bylaws that are required to meet the law's requirements.

The Albanian EIA law aims to ensure a high level of environmental protection, through preventing, reducing and compensating environmental damage from proposed projects. The Legal framework is intended to guarantee an open process of decision-making, during the identification, description and assessment of the impacts of a project on the environment, properly and timely, and aims to include all interested parties.

During the subsequent years, the law of 2011 was amended. Currently, the legal framework in force relating to EIA is composed of the Law no. 10440, (2011)¹⁴, amended with Law no.12 (2015), Law no.11/2015 together with accompanying by-laws (DCM no. 598¹⁵, 2015; DCM no. 686¹⁶, 2015 and DCM no.912, 2015).

3.1.3.2 Bosnia and Herzegovina

The Constitution of Bosnia and Herzegovina (BiH), in an annex to the General Framework Agreement for Peace in Bosnia and Herzegovina (the Dayton Agreement) adopted in 1995, defines BiH as a sovereign state with a decentralised political and administrative structure, and several levels of political governance:

- Government at the level of the state of BiH,
- The two Entities: the Federation of BiH (FBiH) which is further decentralised into 10 Cantons with their own governments and the Republika Srpska (RS),
- The Brčko District (BD) is a self-governing administrative unit, under the sovereignty of BiH and formally a part of both Entities.

Environmental protection issues are not one of the ten items defined in the Constitution as being competencies of State institutions, therefore they fall under the following provision: "All governmental functions and powers not expressly assigned in this Constitution to the institutions of BiH shall be those of the Entities" (Article III, Paragraph 3).

The constitutional organisation of BiH defines the environmental protection policy-making, but on the other hand there are several levels of responsibilities and bodies that regulate them:

¹⁴The law transposes completely EU Directive 85/337/EC of the European Parliament and the Council, date 27th of June 1985 "On the assessment of public and private project effects on the environment"

¹⁵This decision aims to fully transpose the EU Directive 2011/92/EU of the European Parliament and the Council, date 13 December 2011 "On the assessment of environmental impacts from public and private projects"

¹⁶This decision aims to fully transpose the EU Directive 2011/92/EU of the European Parliament and the Council, date 13 December 2011 "On the assessment of environmental impacts from public and private projects"

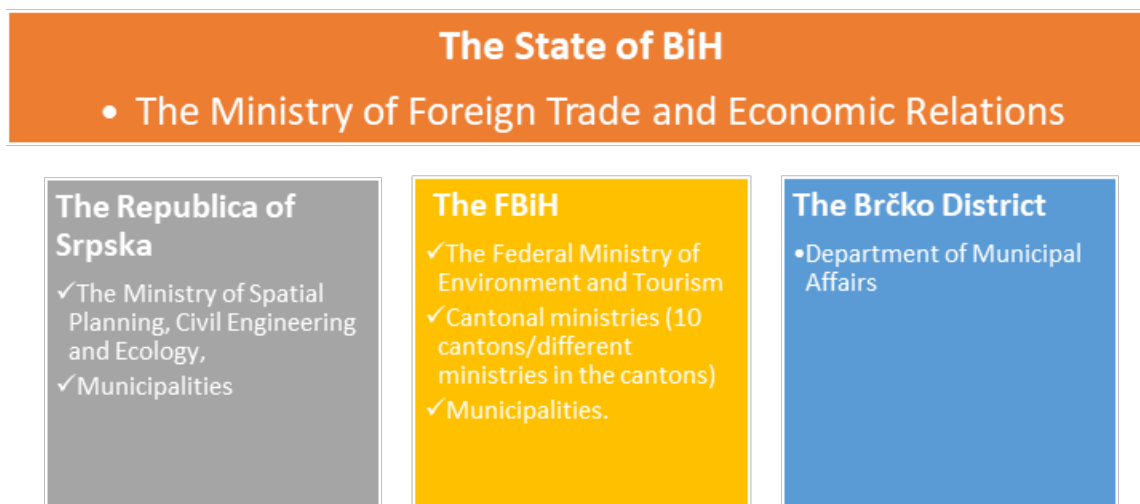


Figure 3.2 Levels of responsibilities and governmental bodies

Due to its very complex administrative structure, BiH has also a very complex legal framework since entities (FBiH and RS) as well as BD adopt their own laws, as do the cantons in FBiH.

Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) has been regulated by the entity and BD Laws on environmental protection as follows:

- Environmental protection law of FBiH (OG FBiH, no. 33/03 and 38/09);
- Environmental protection law of RS (OG RS, no. 71/12 and 79/15);
- Environmental protection law of BD (OG BD, no. 24/04, 19/07, 01/05 and 09/09).

These laws regulate that the SEA should be implemented on plans and programmes in the field of spatial and physical planning or land use, agriculture, forestry, fishery, hunting, energetics, industry, traffic, water management, waste management, tourism etc. They also provide an outline framework for the procedure to be followed. SEAs developed for plans and programmes at different governance levels (i.e. entity, municipal) must be mutually harmonised as well as being harmonised with EIA's at project level and environmental protection plans and programmes.

The draft of the new Environmental protection law of FBiH is in the preparation phase and it will very precisely define the procedure for SEA in accordance with the 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

Environmental Impact Assessment (EIA)

The requirements of the EIA Directive 2011/92/EU are transposed through entity Laws (and BD's Law) on environmental protection (OG FBiH, no. 33/03, 38/09; OG RS, no. 71/12, 79/15; OG BD, no. 24/04, 1/05, 19/07, 9/09) and have developed specific rulebooks that provide lists of installations that are subject to EIA:

- Rulebook on installations for which EIA is mandatory and installations that can be put in use only if they obtained an environmental permit (OG FBiH, no. 19/04);
- Rulebook on installations which can be constructed and put in use only if they have obtained an environmental permit (OG RS, no. 124/12);
- Rulebook on projects for which an environmental impact assessment must be performed and criteria for the determination of obligation and scope of the environmental impact assessment (OG RS, no. 124/12);
- Rulebook on installations for which EIA is mandatory and installations that can be put in use only if they obtained the environmental permit (OG BD, no. 30/06).

According to these rulebooks, the EIA is obligatory for hydropower plants over 5 MW for single plants, or over 2 MW for several plants in cascade over a distance of less than 2 km. For plants with a capacity of less than 5 MW and greater than 1 MW, a decision on if EIA is required will be taken by the competent authority. In this case, a decision is made in line with the Criteria set out in the Rulebook. If the decision is in favour of EIA, the EIA Study is to be prepared, which should identify impacts and propose measures to be adopted in the phases of project document preparation, construction, use and demolition. Among other criteria, the decision will require an EIA if the project is located in a protected area. The EIA process is completed by issuing the environmental permit in line with the requirements from the respective Law on environmental protection. In the case where an EIA is not required, the relevant entity ministry/BD department will directly proceed with issuing the environmental permit which will also identify environmental protection measures. Both the EIA Study and the Request for environmental permit are required to be prepared by companies licensed by entity ministries.

It needs to be stressed that issuing an "environmental permit" within the framework of the EIA procedure is not a common practice in other WB6 countries and EU countries and this process is usually part of separate permitting in implementation phase (for detail on environmental permitting in WB6 countries, see BR-4).

3.1.3.3 Kosovo

SEA – Strategic Environmental Assessment

The only legislation in the Republic of Kosovo regarding SEA process is the Law on SEA approved in 2011. This law aims to ensure a high degree of environmental protection and human health through the development of strategic environmental assessment in respect of development plans and programmes. The law defines the conditions, methods and proceedings covering environmental impact assessment of specific plans and programmes by integrating principles of environmental protection in the process of drafting, approving and implementing those plans and programmes, to promote sustainable development.

The law clearly states that if a SEA is not developed for all the plans or programmes being developed or refurbished, that require an SEA according to the Law, then those plans will not be adopted or submitted through the legislative procedure for adoption.

The law has three annexes on: i) Criteria for determination of the likely significance of effects on environment ii) The information to be provided in SEA reports; iii) Criteria for assessment of SEA reports.

EIA – Environmental Impact Assessment

The Government of Kosovo approved the law no. 03/L-214 "On Environmental Impact Assessment" in 2011. After the law was approved the government of the Republic of Kosovo developed and approved two other pieces of legislation (administrative instructions) regarding environmental impact assessment:

1. **Administrative Instruction MESP – No.18/2015** "On Information Public Participation and Interested Parties in the Proceedings of Environmental Impact Assessment"
2. **Administrative Instruction MESP – No.08/2015** "On determine the tariff value of services related to the process of environmental impact assessment"

The law aims to prevent or mitigate the adverse impacts of proposed public and private projects and thereby contribute to the safeguarding and improvement of the environment, the protection of human health, and improving of the quality of life. The law defines regulation of procedures for the identification, assessment and reporting of environmental impacts of certain proposed projects and all the administrative procedures to be followed during the decision-making process by the Ministry of Environment and Spatial Planning for issuing the Environmental Consent.

The law states that all activities that are listed under Annex I are obliged to undergo an EIA, and no construction permit or any other permit should be granted to the developer until an Environmental Consent is granted by the Ministry of Environment and Spatial Planning. All activities listed under Annex II of the law should be examined case-by-case and in accordance with the criteria set out in Annex III of the law, to determine whether they must undergo EIA.

3.1.3.4 The former Yugoslav Republic of Macedonia

Strategic Environment Assessment (SEA)

The Law on the Environment¹⁷⁾ (LoE) of the former Yugoslav Republic of Macedonia stipulates the conditions, methods and procedures for undertaking Strategic Environmental Assessment (SEA) of certain plans or programmes through the integration of environmental protection principles into the procedures of preparation, adoption and implementation of plans or programmes that are likely to have a significant impact on the environment.

The implementation of the SEA procedure starts after determining the need to conduct a SEA through a screening procedure, where (based on prescribed criteria and documents) it is determined whether a planning document could have a significant impact on the environment and/or human health. Following this decision, the authority that has drafted the planning document shall decide whether or not to implement a strategic environmental assessment, providing a rationale of the reasons for implementing or not implementing it, in accordance with the criteria set out in the regulation.

Environmental Impact Assessment (EIA)

Environmental Impact Assessment (EIA) of certain projects is required to be carried out in the former Yugoslav Republic of Macedonia in accordance with the Law on the Environment¹⁸⁾ (LoE). This law and the associated secondary legislation sets out the requirements for undertaking environmental assessments of public and private projects which are likely to have a significant impact on the environment before the development consent / construction permit is granted in the form of approval for project implementation. Hence, it is required that before development consent is granted for certain types of projects, an EIA should be carried out.

The Ministry for Environment and Physical Planning (MEPP) is the national competent authority for the EIA procedure.

The types of projects that require an EIA are determined in the “Decree for determining projects for which and criteria based on which the screening for an environmental impact assessment shall be carried out” (the EIA Decree).

Depending in their type and scale, hydro power projects are listed in the both Annexes of the EIA Decree.

3.1.3.5 Montenegro

Strategic Environmental Assessment (SEA)

The provisions of the EU Directive on Strategic Environmental Assessment and the UNECE Protocol have been transposed in Montenegro, in the Law on Strategic Environmental Assessment (Law on SEA) (“Official Gazette of the Government of Montenegro” No. 80/05, 73/10, 40/11, 59/11 and 52/16), which entered into force in 2008.

The Law establishes the obligation to prepare a SEA for plans and programmes, and other strategic documents essential to the effective environmental protection and implementation of sustainable development principles during project/plan development and approval processes.

It is further stated that a SEA for plans and programmes co-financed by the European Union, must be done in accordance with the Law on SEA and the regulations of the European Union, which means in accordance with the Directive on Strategic Environmental Assessment.

In the case of a potential significant impact on an area in a neighbouring country or if the neighbouring country has a reasonable interest in the impacts to environment of the proposed planning solutions, then the process of transboundary/cross-border consultation must be initiated.

¹⁷⁾ Law on the Environment (Official Gazette no. 53/2005; 81/2005; 24/2007; 159/2008; 83/2009; 48/2010; 124/2010; 51/2011; 123/2012; 93/2013; 187/2013, 42/2014 and 44/2015)

¹⁸⁾ Law on the Environment (Official Gazette no. 53/2005; 81/2005; 24/2007; 159/2008; 83/2009; 48/2010; 124/2010; 51/2011; 123/2012; 93/2013; 187/2013, 42/2014 and 44/2015)

Environmental Impact Assessment (EIA)

The Law on Environment "Official Gazette of the Government of Montenegro", No. 52/16 defines the basic principles and instruments to be used to protect the environment, including relating to environmental protection, sustainable development and public participation on environmental matters. The environmental legal framework within Montenegro also contains laws (and secondary legislation) covering the areas summarised below, some of which are aligned with the European Directives and regulations (as indicated):

- Law on EIA ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 40/10, 73/10, 40/11, 27/13 and 52/16) - harmonised with the EIA Directive 85/337/EEC (amended by Directive 97/11/EC and 2003/35/EC)
- Law on Strategic Environmental Assessment (SEA) ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 59/11 and 52/16) - harmonised with the SEA Directive (2001/42/EC)
- Law on Nature Protection ("Official Gazette of the Government of Montenegro", No. 54/16)
- Law on National Parks ("Official Gazette of the Government of Montenegro", No. 28/14)
- Law on Integrated Pollution Control & Prevention ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 54/09, 42/15 and 54/16) - complies with IPPC Directive 96/61/EC (Integrated Pollution Prevention & Control (IPPC) as amended
- Law on Water ("Official Gazette of the Government of Montenegro", No. 27/07, 32/11, 48/15 and 52/16) - an effort was made in the drafting of the law to harmonise with the EU Water Framework Directive
- Law on Waste Management ("Official Gazette of the Government of Montenegro", No. 64/11 and 39/16)
- Law on Air Protection ("Official Gazette of the Government of Montenegro", No. 25/10, 40/11, and 43/15) - framework law that regulates air quality management in line with the Directive 96/62/EC
- Law on Protection from Noise in the Environment ("Official Gazette of the Government of Montenegro", No. 28/11 and 1/14)

According to the Law on Environmental Impact Assessment, the competent authority responsible for conducting the impact assessment process is the Environmental Protection Agency (EPA), the state administration body responsible for environmental protection - for projects where approvals, permits and licenses are issued by other state administration bodies. Prior to the establishment of the EPA the Ministry responsible for environment has been the state administrative body deciding upon and issuing the EIA permit. For projects for which approvals, permits and licenses are issued by local government, the local government authority relevant department is responsible for environmental protection.

Nature assessments (Appropriate assessment under Habitats Directive)

The Environmental Protection Agency is responsible for nature assessments. An appropriate assessment is part of the environmental impact assessment. According to the Law of nature protection (OG of GOM No. 54/16) the screening stage will provide the main criteria to determine if a project is likely to have significant effects on Natura 2000 network. Mitigation measures are foreseen in the Law. The Environmental Protection Agency decides on compensation measures. According to the Law, consultations with the public about the Nature Assessment is mandatory. The decision approving the Nature Assessment is an internal decision of the competent authority. The law foresees that the Environmental Protection Agency will establish committees consisting of experts who will be presenting their opinions.

3.1.3.6 Serbia

In Serbia, the SEA procedure applies to the process of preparation and adoption of plans and programmes at the local, provincial and national levels, aiming to ensure environmental protection and sustainable development.

The EIA procedure, or impact assessment, is carried out for projects that may have significant impacts on the environment. The types of projects requiring environmental impact assessment are projects that are planned and

implemented which include changes in technology, reconstruction, capacity expansion, cessation and removal of projects, that may have an important impact on the environment.

SEA and EIA procedures are designed to ensure the full participation of interested organisations and the public, include cross-border notification for projects that may have important effects on the environment adjacent states, supervision and monitoring requirements and other important factors for the evaluation of the impact of proposals on the environment.

The legislation which regulates the procedure for the assessments of environmental impact:

- Law on environmental protection ("Official Gazette of the Republic of Serbia", no. 135/2004, 36/2009, 36/2009 - other law, 72/2009 - other law, 43/2011 - Decision of the Constitutional Court and 14/2016)
- Law on Strategic Impact Assessment on the environment ("Official Gazette of RS", no. 135/2004 and 88/2010)
- Law on the environmental impact assessment ("Official Gazette of RS", no. 135/2004, 36/2009)

Sectoral laws of importance for the process of assessment of environmental impact:

- Law on Waters ("Official Gazette of RS", no. 30/2010, 93/2012, 101/2016)
- Law on nature protection ("Official Gazette of RS", no. 36/2009, 88/2010 and 91/2010 – corr. and 14/2016)
- Law on Forests ("Official Gazette of RS", no. 30/2010, 93/2012 i 89/2015)
- Law on Land Protection ("Official Gazette of RS", no. 112/2015)
- Law on National Parks ("Official Gazette of RS", no. 84/2015)
- Law on Agricultural Land („Official Gazette of RS", no. 62/2006, 65/2008, 41/2009 and 112/2015)

The covering law that defines the spatial management (procedure for building permit and implementation impact assessment procedure):

- The Law on Planning and Construction ("Official Gazette of RS", no. 72/2009, 81/2009 - corr., 64/2010 - decision of the US, 24/2011, 121/2012, 42/2013 - decision of the US, 50/2013 - making US, 98/2013 - decision, 132/2014 and 145/2014).

3.1.3.7 Conclusion

The "SEA directive" (2001/42/EC) helps co-ordination and integration between the different policies in assessing the environmental consequences of plans and programmes and in producing an environmental report including the consideration of reasonable alternatives.

A most important feature of the national legislative frameworks of the WB6 countries is the various stages of countries in transposing the EU legislation. With the future full transposition, implementation and enforcement of the SEA and EIA Directives into the national legislative frameworks of WB6 countries, the process of environmental assessment, both on strategic and project level, will be more efficient.

Currently, all WB6 countries have in place legislative tools to conduct SEA and EIA procedures for hydropower development. There are also legislative frameworks to implement transboundary consultations. The question is, however, how effective is the application of all the legislative tools in practice. Lack of institutional capacities and practical experience, particularly in conducting transboundary consultations, is a serious problem in WB6.

3.1.4 Short description of protected areas

Below is short description of protected areas of relevance for HPP development identified in WB6 countries.

RAMSAR

- The Ramsar Convention on Wetlands — signed in 1971 in the city of Ramsar, Iran — is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are currently 146 Contracting Parties to the Convention, with 1,458 wetland sites, totalling over 125.4 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.

- Member countries of the Ramsar treaty are obliged to: manage all wetlands in a sustainable manner, promoting the wise use of all wetlands within their territory; consult with other Parties about the implementation of the Convention, especially regarding trans-frontier wetlands, shared water systems, shared species, and development; and designate wetlands that meet the criteria for inclusion in the List of Wetlands of International Importance for conservation.

NATURA 2000 NETWORK FOR EU COUNTRIES

Natura 2000 (N2000) sites are site-scale areas that are important for the protection of European species and habitats. The criteria for their identification includes both high vulnerability and high irreplaceability of species in a European context, although identification is not restricted to these criteria. All targeted species (birds and others) in addition to habitat types are listed within the Annexes of the Birds and Habitats Directives, respectively. The Birds Directive requires the establishment of Special Protection Areas (SPAs) for those birds listed in Annex I as well as regularly occurring migratory species (Directive 79/409/EEC, adopted in April 1979, amended in 2009 - Directive 2009/147/EC). The Habitats Directive similarly requires Special Areas of Conservation (SACs) to be designated for those habitat types and species listed in the relevant annexes of the Habitats Directives (Council Directive 92/43/EEC adopted in May 1992.). Together, SPAs and SACs make up the Natura 2000 network.

The Natura 2000 sites are therefore considered as the contribution from the EU member states to the Emerald Network.

NATURA 2000 UNDER PREPARATION IN THE EU CANDIDATE COUNTRIES

Natura 2000 implementation projects are at the beginning of their implementation and none have yet been designated. For example, Natura 2000 sites are not officially selected / designated in the former Yugoslav Republic of Macedonia, but the legal background for introducing / adopting Natura 2000 is included in the Law on Nature Protection¹⁹⁾ enacted in 2004. According to Article 52 of the law - the Government of the former Yugoslav Republic of Macedonia determines the proposal for Natura 2000 sites as well as the conservation objectives, management manner, monitoring and all other relevant aspects for their protection. According to Article 53 of the law – the Natura 2000 sites, upon their evaluation and adoption by the European Commission, will become an integral part of the national ecological network of the former Yugoslav Republic of Macedonia, which, inter alia, includes the protected areas designated or proposed for designation by the legislation of the former Yugoslav Republic of Macedonia, the ecological corridors and the ecologically important areas.

The NATURA 2000 Network has not yet been established in Bosnia and Herzegovina. Both FBiH and RS environmental Ministries have a plan to proclaim certain Natura 2000 sites but all of the activities are not yet completed. The Federal Ministry of Environment and tourism started the NATURA 2000 project (<http://www.fmoit.gov.ba/ba/page/41/ekoloscaronka-mrea-natura-2000>) in 2012, but it has no results yet and not a single N2000 site has been proclaimed. It is expected that in the near future these sites will be identified and protected. Also, in 2011 the CESD (Centre for Environmentally Sustainable Development) finished the NATURA 2000 in Bosnia and Herzegovina project which defined all possible N2000 sites in Bosnia and Herzegovina. These results only defined the areas and the species which needed to be in the N2000 network, but the definitive list of sites and species will be determined in future projects. So far, there is no official legal protection of NATURA 2000 areas in the territory of Entities: RS, FBiH and BD. However, in the future, we expect progress in the terms of establishment of Natura 2000 sites, and that many of selected valuable areas will be legally protected by law. For that reason, in developing SEA/EIA for HPP projects, it is necessary to consider the possible (or in the meantime proclaimed) N2000 sites because they are expected to form part of the N2000 network during the life of the HPP plant.

In Serbia, the Institute for Nature Protection of the Republic of Serbia is the responsible institution in charge of preparing and defining areas to be included in the future Natura 2000 network in Serbia. None of these areas are as yet proposed for their inclusion in Natura 2000 network in Serbia, but some areas are expected to form an integral part of the network in the future. The rivers Danube, Sava, Ibar, Velika Morava, and Drina Lim belong to the ecological corridor of international importance in the Republic of Serbia. For all planned hydropower plants, it is mandatory to obtain the Terms of the Institute for Nature Conservation of Serbia. The Nature Protection Act

¹⁹⁾ Law on Nature Protection (Official Gazette of the Republic of Macedonia no. 67/2004, 14/2006; 84/2007; 35/10; 47/11; 148/11; 59/12; 13/13; 163/13 and 63/16)

("Off. Gazette", Nos. 36/2009, 88/2010, 91/2010-ispr. and 14/2016) is consistent with Natura 2000, and is in the process of making a regulation on the assessment of acceptability.

Albania is not part of the Natura 2000 network and no legal documents are in place in this regard. Under the IPA 2013 funded by the European Commission, the Italian Agency for Cooperation and Development, IUCN, Italian Botanical Society, Ministry of Environment, and National Agency of Protected Areas are implementing the project NaturAL "Nature 2000 and Protected areas". The aim of the project is to create protected areas and to start the process of establishment of Natura 2000 network.

The process of determining the Natura 2000 network areas in Kosovo has not started yet, However, a legal platform and policies which support its establishment are in place. The Strategy and Action Plan on Biodiversity 2011 - 2020 has identified the need for an inventory of protected areas in accordance with NATURA 2000 requirements, and one of the Priorities – Strategic Actions is the Annunciation of identified protected areas as area IBA (Important Bird Area) and Natura 2000. Also during the recent years some preliminary works have been done in this regard.

Accordingly, because of lack of data, the Natura 2000 aspect could not be assessed in the Study but must be included in future project and planning-level assessments before any decision on HPP construction is brought. In WB6 countries, by the proclamation of Natura 2000 areas, the EU legislation (Birds and Habitats Directive) will be fully transposed. All planned and proposed Natura 2000 areas should be properly mapped and maps revised after proclamation by each country.

IBA

Important Bird and Biodiversity Areas (IBAs) are key sites for the conservation of bird species, identified through the Bird Life International IBA programme. These sites are small enough to be conserved in their entirety, often form part of a protected-area network, and are, as far as possible, different in character or habitat or ornithological importance from the surrounding area²⁰ IBAs form part of Key Biodiversity Areas (KBAs), which is a wider integrated approach to the conservation and sustainable use of the natural environment²¹. In 2013 IBAs were renamed from "Important Bird Areas" to "Important Bird and Biodiversity Areas", to reflect their importance for other species.

Important Bird and Biodiversity Areas (IBAs) are²²:

- Places of international significance for the conservation of birds and other biodiversity
- Recognised world-wide as practical tools for conservation
- Distinct areas amenable to practical conservation action
- Identified using robust, standardised criteria
- Sites that together form part of a wider integrated approach to the conservation and sustainable use of the natural environment.

In Albania, there are 16 IBA areas, in Bosnia and Herzegovina - 4, in the former Yugoslav Republic of Macedonia - 22, in Montenegro - 5, and in Serbia - 42.

EMERALD ZONES

The Emerald Network is an ecological network made up of Areas of Special Conservation Interest. Its implementation was launched by the Council of Europe as part of its work under the Bern Convention, with the adoption of Recommendation No. 16 (1989) of the Standing Committee to the Bern Convention. This **objective** is the **long-term survival of the species and habitats of the Bern Convention requiring specific protection measures**. These habitats and species are listed respectively in Resolution No. 4 (1996) and Resolution No. 6 (1998) of the Standing Committee to the Bern Convention. Once the areas proposed are officially adopted as Emerald Network sites, they should be designated and managed at national level.

²⁰ <http://www.biodiversitya-z.org/content/important-bird-and-biodiversity-areas-iba#citation-1>

²¹ <http://www.biodiversitya-z.org/content/important-bird-and-biodiversity-areas-iba#citation-1>

²² <http://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas-ibas>

The Standing Committee to the Bern Convention regularly nominates officially as “Candidate Emerald sites”, sites proposed by all countries currently working on the establishment of the Emerald Network (7 countries from Eastern Europe and the South Caucasus, 5 countries from the West Balkans, Norway and Morocco). The official lists of candidate Emerald sites and adopted Emerald sites are therefore regularly updated, after each annual meeting of the Standing Committee to the Bern Convention.

Currently there are no Emerald sites officially adopted in the WB6 region, while 182 sites covering jointly 27,884.22 km² are proposed to be included in the network. Individual countries have proposed the following number of sites with respective joint area: Albania 25 / 5,224.30 km², Bosnia and Herzegovina 29 / 2,504.55 km², Montenegro 32 / 2,400.77 km², the former Yugoslav Republic of Macedonia 35 / 7,543.83 km², and Serbia 61 / 10,210.78 km².²³

WORLD HERITAGE SITES (UNESCO)

World Heritage sites are places on earth that are of Outstanding Universal Value (OUV) to humanity and therefore, have been inscribed on the World Heritage List to be protected for future generations. Places as diverse and unique as the Great Barrier Reef in Australia, Galapagos Islands in Ecuador and the Grand Canyon in the USA are examples of places inscribed on the World Heritage List. The World Heritage Convention¹, which has been ratified by 191 countries, was adopted by United Nations Educational, Scientific and Cultural Organisation's (UNESCO) General Conference in 1972, and came into force in 1975, for the identification, protection, conservation, presentation and transmission to future generations of the world cultural and natural heritage. Under this international legal instrument, sites are nominated for inclusion on the World Heritage List², either for their natural or cultural values, or a mixture of the two. The secretariat to the World Heritage Convention is the UNESCO World Heritage Centre, whilst three organisations: International Council on Monuments and Sites (ICOMOS), International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) and the International Union for Conservation of Nature (IUCN) act as its Advisory Bodies. The Advisory Body on natural heritage is IUCN.

In the WB6 region the situation is as follows: in Albania - 2 cultural sites are proclaimed, in Bosnia and Herzegovina - 3, in the former Yugoslav Republic of Macedonia - 1 natural and cultural site, in Montenegro - 2 cultural and 1 natural (Durmitor), in Kosovo - 1 (comprises of 4 Medieval Monuments which are inscribed on the List of World Heritage in Danger) and in Serbia - 4 cultural sites (Figure 3.3).

²³ Background Report No. 4, Transboundary Issues, Tomaž Lajovic & Zoran Stojič, September 2017.

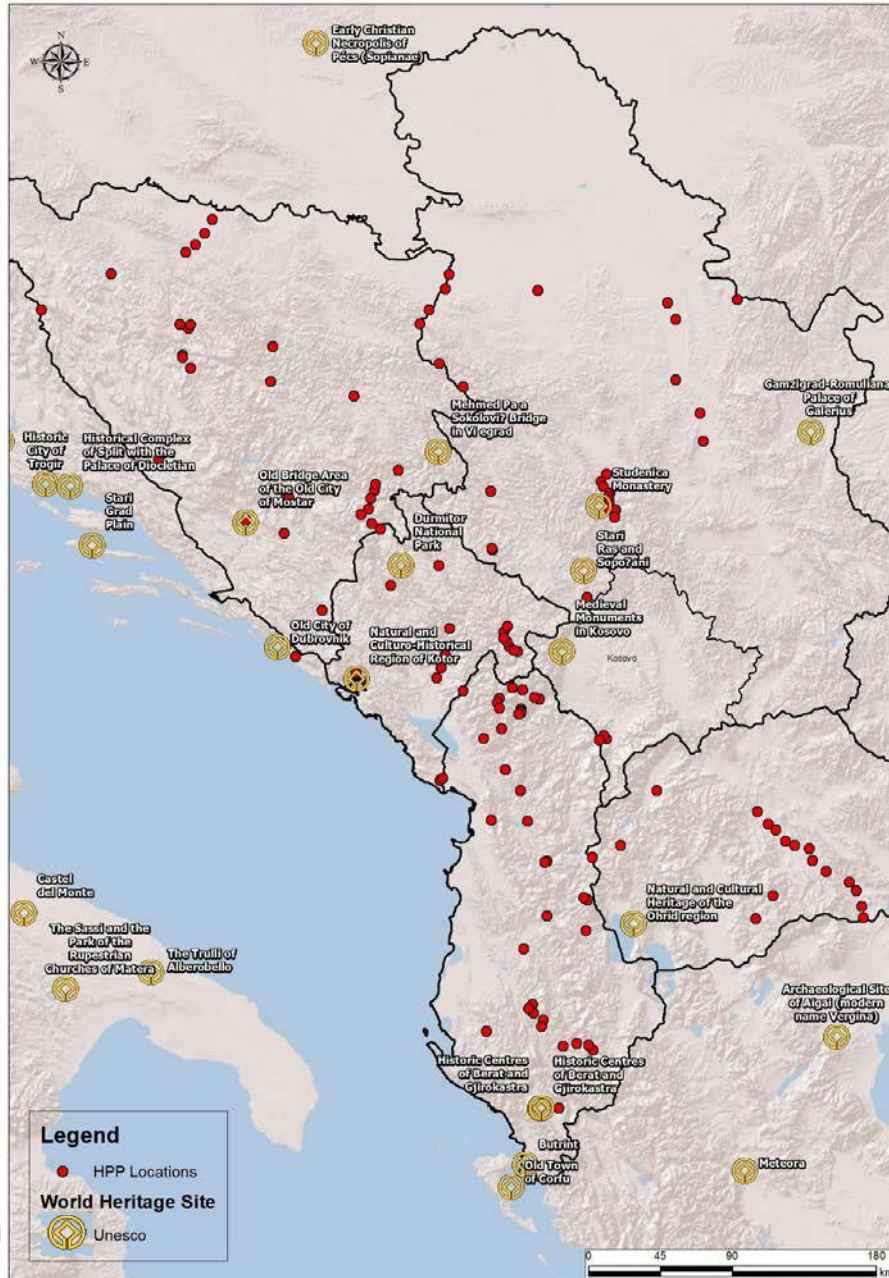


Figure 3.3 UNESCO world heritage sites

BIOSPHERE RESERVES

Biosphere reserves are recognised under UNESCO’s Man and the Biosphere (MAB) Programme. According to UNESCO²⁴, Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use. Biosphere reserves are ‘Science for Sustainability support sites’ – special places for testing interdisciplinary approaches aiming to understand and manage changes and interactions between social and ecological systems, including conflict prevention and the management of biodiversity. Biosphere reserves are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located. Their status is internationally recognised.

In WB6 countries, there are 3 biosphere reserves identified:

²⁴ <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>

- The transboundary biosphere reserve located between Albania and the former Yugoslav Republic of Macedonia – Ohrid – Prespa (2014);
- Tara River Basin in Montenegro (1976);
- Golija-Studenica in Serbia (2001, review 2012).

INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN) CATEGORIES

IUCN management categories are a voluntary classification for countries to apply to their protected areas, and are not currently being used by all countries. Many protected areas across the world do not have an assigned IUCN management category, however this does not imply that they lack protective measures or active management. Broadly speaking, areas in categories I-IV are subject to more restricted management and use, giving priority to biodiversity conservation, whereas those in categories V and VI are often under more flexible management regimes that allows multiple uses of their natural and cultural resources.

Table 3.1 IUCN categories

Category	Description
Ia - Strict Nature Reserve	IUCN Management Category Ia (Strict Nature Reserve) refers to those areas that receive the least amount of human impact. They are defined by IUCN as <i>“strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values”</i> . ¹ The primary objective of protected areas in this category is to conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact. Other objectives include to secure undisturbed examples of the natural environment for scientific studies and to conserve cultural values associated with nature.
Ib - Wilderness Area	IUCN Management Category Ib (Wilderness Area) refers to those areas that remain largely unchanged by humans. They are defined by IUCN as <i>“large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition”</i> . ¹ The primary objective of protected areas in this category is to protect the long-term ecological integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes predominate, so that current and future generations have the opportunity to experience such areas. Other objectives include to enable indigenous communities to maintain their traditional lifestyles, to protect their cultural and spiritual values and to allow for low-impact research activities.
II - National Park	IUCN Management Category II (National Park) refers to the large protected areas that play a role in the connectivity of the landscape/seascape. They are defined by IUCN as <i>“large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities”</i> . ¹ The primary objective of protected areas in this category is to protect natural biodiversity, its underlying ecological structure and supporting environmental processes, and to promote education and recreation. Other objectives include to manage the area in order to perpetuate in as natural a state as possible representative examples of nature, to maintain viable and ecologically functional populations of native species and to contribute to local economies through tourism.
III - Natural Monument or Feature	IUCN Management Category III (Natural Monument or Feature) refers to small-sites that focus on one or more prominent natural features and the associated ecology, rather than on a broader ecosystem. They are defined by IUCN as <i>“areas set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove They are generally quite small protected areas and often have high visitor value”</i> . ¹ The primary objective of protected areas in this category is to protect specific outstanding natural features and their associated biodiversity and habitats. Other objectives include to provide biodiversity

Category	Description
	protection in landscapes or seascapes that have otherwise undergone major changes and to conserve traditional spiritual and cultural values of the site.
IV - Habitat / Species Management Area	IUCN Management Category IV (Habitat/Species Management Area) refers to areas that are managed to protect particular species or habitats. They are defined by IUCN as <i>“protected areas aiming to protect particular species or habitats and management reflect this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.”</i> ¹ The primary objective of protected areas in this category is to maintain, conserve and restore species and habitats. Other objectives include to protect vegetation patterns through traditional management approaches and to provide a means by which urban residents may obtain regular contact with nature.
V - Protected Landscape / Seascape	IUCN Management Category V (Protected Landscape/Seascape) are defined by IUCN as <i>“areas where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values”.</i> ¹ The primary objective of protected areas in this category is to protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices. Other objectives include to provide natural products and environmental services, to contribute to broad-scale conservation and to act as models of sustainability.
VI - Protected Area with Sustainable Use of Natural Resources	Category VI (Protected area with sustainable use of natural resources) refers to areas defined by IUCN as <i>“generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area”.</i> ¹ The primary objective of protected areas in this category is to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial. Other objectives include the promotion of social and economic benefits to local communities and to facilitate inter-generational security for local communities' livelihoods.

The IUCN issued a resolution in 2016 which: *“CALLS ON governments to prohibit environmentally damaging industrial activities and infrastructure development in all IUCN categories of protected area, and to take measures to ensure that all activities are compatible with the conservation objectives of these areas, through appropriate, transparent and rigorous pre-emptive appraisal processes, such as international best practice environmental and social impact assessments, strategic environmental assessments, and appropriate regulation;”*

NATIONAL PARKS BASED ON NATIONAL AND INTERNATIONAL ACTS OR CONVENTIONS OF PROTECTION

National Parks are strictly protected areas in the Western Balkans countries and areas which are mainly comprised of smaller areas (nature reserves) but also of “nature parks” formerly designated by the former Republic of Yugoslavia (FRY) in Bosnia and Herzegovina, Republic of Serbia, Montenegro, Kosovo and former Yugoslav Republic of Macedonia and recently proclaimed areas.

Figure 3.4 shows national park / protected areas within the WB6 study area, followed by a detailed description of such areas by WB6 country in Sub-sections 3.1.4.1-3.1.4.6.

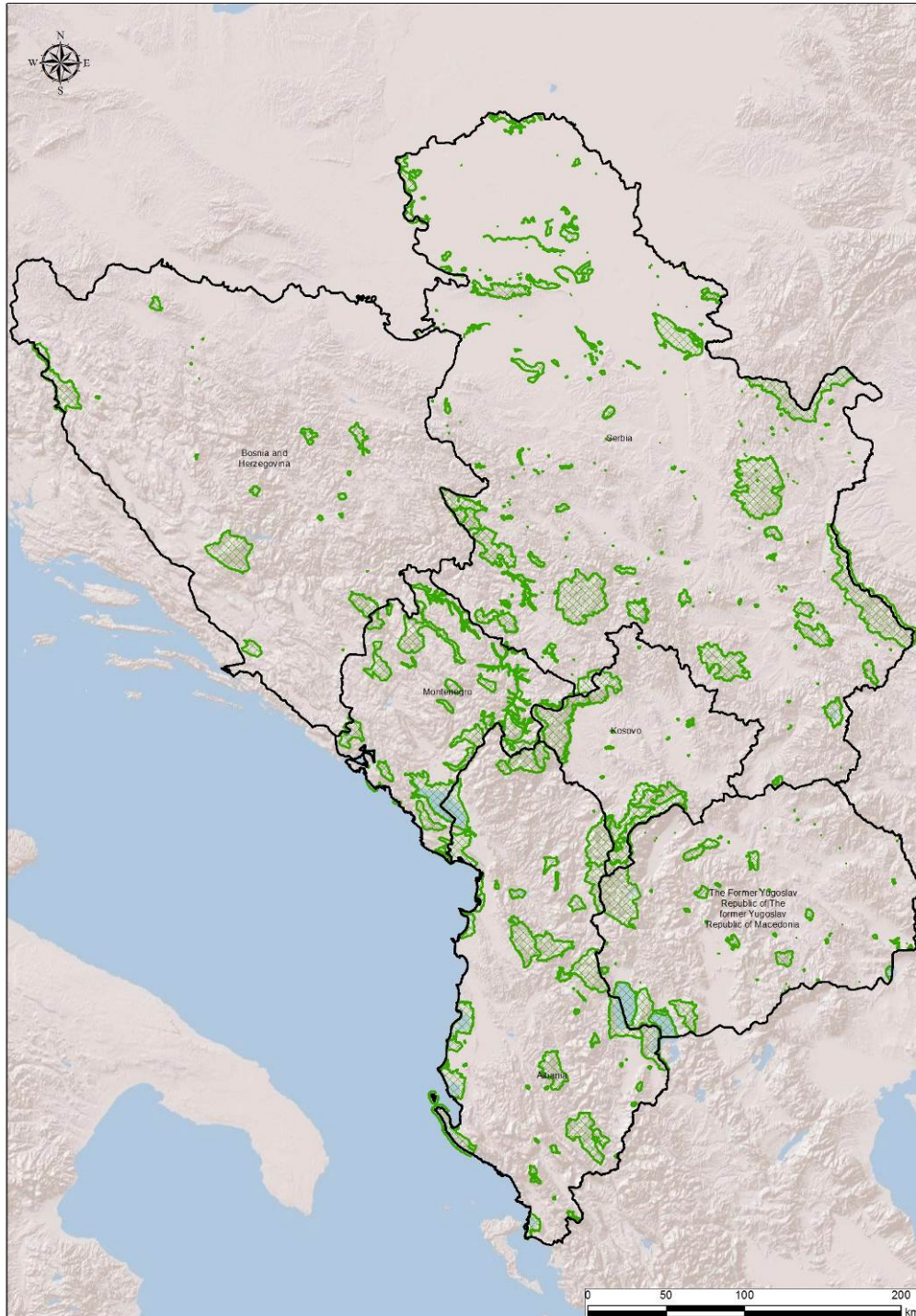


Figure 3.4 Protected areas within the WB6 study area

3.1.4.1 Albania

The Ministry of Environment is the institution in charge of drafting policies, strategies and laws for protected areas in the Republic of Albania. Under its jurisdiction is the Agency on Protected Areas, established almost two years ago, which oversees managing, protecting, development, expansion and functioning of the protected areas in the country, and which account for 16% of the whole territory. The Agency manages the network of protected areas and other natural networks including future Natura 2000 according to approved management plans. Also, the Agency monitors and inventories flora and fauna in these areas.

The legal framework in Albania regarding protected areas is based on the main Law no. 8906, date 6.6.2002 “On Protected Areas”, amended with law no. 9869, date 4.2.2008 and followed by other main important laws, as Law no. 9587 date 20.07.2006, amended with law 68/2014 “On Biodiversity Protection”, law no 10006, date 23.10.2008 “On protection of wild fauna”, law no. 8905, date 6.6.2002 “On protection of marine environment from pollution and deterioration”, and law no.9103, date 10.07.2003 “On protection of cross-border lakes”. Also, several bylaws and proclaiming specific ones are in place, followed by management plans of these areas. During 2016, the National Agency on Protected Areas and other stakeholders began working on drafting a new Law on Protected Areas in line with respective EU Directives.

Based on the existing law and on the new draft law, which is in the process of approval, all protected areas in the country are part of the National System of Protected Areas, where a categorisation and status description of these areas is made by the National Authorities²⁵ using the IUCN criteria previously described.

According to their national or international interest, protected areas are classified as below, and each of the classified areas has its own categories of protected areas:

- I. **Protected Areas with national interest** – are classified based on 6 main categories:
 - a. *Category I:* Strict Nature Reservoir/ Science reservoir
 - b. *Category II:* National Park
 - c. *Category III:* Nature Monument
 - d. *Category IV:* Managed Natural Reservoir/ Natural Park
 - e. *Category V:* Protected Landscape
 - f. *Category VI:* Protected area with managed use of resources or a protected area with multiple usage
- II. **Protected Areas with international interest:**
 - a. Ramsar Areas;
 - b. Areas with interest for European Community (SACs), where specific areas exist for habitat and bird conservation (SCI and SPAs);
 - c. Areas with particular protection interest (Emerald Areas);
 - d. Biosphere reserve areas;
 - e. Natural and Cultural Heritage Areas of UNESCO

3.1.4.1 Protected areas with national interest

All protected areas in Albania are national assets and they are either state or private property. Each of the six categories of protected area with a national interest have their own characteristics and a list of activities allowed to be conducted in these areas, as described below:

Category I: Strict Nature Reservoir/Science reservoir are proclaimed for relatively small territories or areas that have special ecosystems, of flora and fauna, appropriate for research science or monitoring and are not at all disturbed by humans. It is delineated with a buffer area of up to 100m wide. Under this category there are two subcategories:

- i. Subcategory **1a** – protected area mainly for scientific purposes or Science Reservoir, which is protected and managed purely for science purposes and overall protection of the living world.
- ii. Subcategory **1b** – Protected area mainly managed for protection of wildlife nature as Strict Natural Reservoir, which is protected and managed to preserve their natural status.

In a strict natural reservoir, the highest protection level is applied, where any kind of physical intervention from human activities is not permitted, to ensure biodiversity protection, the minimisation of any kind of external disturbance, to avoid as much as possible public visits and to avoid the use of motorised vehicles that might cause any physical disturbance to the natural habitat.

More specifically activities **that are not allowed** under this category are:

²⁵ National Agency on Protected Areas, under the Ministry of Environment

- i. Any cutting of trees and bushes;
- ii. Usage of chemicals and fertilisers for the plants;
- iii. Any kind of construction;
- iv. Mineral extraction and turf;
- v. Hunting and fishing;
- vi. Light fires;
- vii. Pasture, path for animals and construction of places for animal shelter;
- viii. Construction of recreation and sport facilities;
- ix. Passage through paths, except for the owners of the area or land;
- x. Movement of motorised vehicles, except for the one of the administration in charge to manage the area and the fireman vehicle;
- xi. Sailing boats and canoe and other vessels;
- xii. Intensive reproduction (i.e. breeding) of animals.

Category II: National Parks are proclaimed for wider territories, mainly not less than 1,000ha, that represent unique national and international conservation values, which are managed to protect ecosystems and certain types of species. These parks are available for recreation and education, and do exclude use and occupation by human intensive activities. Area-wide protection is applied to the national park, aiming to conserve the territory in respect of its natural status, conservation of biotic communities, genetic resources and other species to ensure ecological stability and diversity.

These measures **do exclude** the following activities:

- i. Any exploitation or occupation of the area with intensive human activities;
- ii. Technological exploitation of the land that would change radically its biodiversity and ecosystem functions;
- iii. Breeding of alien animals or plants that might cause biodiversity changes;
- iv. Construction of any kind of linear urban works (highways, railways, network grid lines and oil and gas industries);
- v. Any changes of natural status of water reservoirs, water resources, lakes and wetlands;
- vi. Non-site origin waste disposal;
- vii. Washing and sprinkling of roads with chemicals;
- viii. Light fires in non-defined areas;
- ix. Movement of transport vehicles in and out of the determined areas;
- x. Hunting with poisoned food;
- xi. Mineral extraction and turf, except for sand and stones to maintain the areas;
- xii. Large sports and touristic activities, outside of prescribed areas;
- xiii. Organisation of vehicle races.

In these areas, activities may be implemented which create scientific, educational and recreational potential for visitors, according to environmental and cultural requirements, after they obtain an authorisation from the state institutions responsible. The National Agency of Protected Area **can approve a well-argued proposal for the following interventions in the National Park:**

- i. Pasture, path for animals and construction of places for animal shelter;
- ii. Placement of stands, commercial billboards, signals and posters;
- iii. Sailing boats and canoe and other vessels (but not vehicles);
- iv. Non-military flights with helicopters, balloons, small aircraft;
- v. Movement and parking of cars outside defined roads and places;
- vi. Alpine climbing, skiing, camping and light of fires outside defined points;

- vii. Planting of plants, fruits, mushrooms;
- viii. Seasonal touristic activities that do not require defined settlement in the area.

Category III: Nature Monuments are proclaimed as a natural formation with an area up to 50ha including: specific biological elements, specific geological and geomorphologic formations, a mineral storage or a habitat of a rare and threatened species or with a high scientific and aesthetic value. The level of protection applied to the nature monument is the same as for a Strict Reservoir, to protect and manage the specific natural, cultural, historical and archaeological characteristics that defined it as a nature monument. Two of the main sub-categories under this category are the **caves and canyons**.

Caves are considered a hollow or underground area with a length of more than 5m, which is created by natural conditions, under non-organic factors. A canyon is a geomorphological phenomenon at a deep gorge shape with steep slopes, created by physical-natural processes, which are mainly flowing surface waters. Based on their importance, even waterfalls can be categorised as Nature Monuments by a Ministerial Order. For both caves and canyons, the highest protection level is implemented, wherein controlled touristic visits are allowed.

Category IV: Managed Natural Reservoir/Natural Park are proclaimed for medium size territories, which represent areas where human activities take place to manage habitat species, in order to guarantee the preservation of habitats and to fulfil specific requirements for species that have a regional and local importance, and also areas that are used for studying, educational and cultural purposes.

At a Natural Park the protection level that is applied has a main purpose of: i) to prevent any changes of nature and surface water resources; ii) ensuring protection of different species, biotic communities and physical characteristics of the environment; iii) facilitate science research and environmental monitoring as primarily activities for sustainable management of natural resources; iv) limited areas for environmental education; v) prevention of activities that go against protection purposes; vi) provide economical profits for the local communities.

Without permission from the administration of the protected area, **the following activities cannot be undertaken:**

- i. Movement and parking of cars outside the public roads and in the parking places;
- ii. Collection of plants, minerals, palaeontological discoveries and stones;
- iii. Establishment of military and defence purposes installations;
- iv. Placement of stands, commercial billboards, signals and posters, except for the ones that explain the protection objectives of the reservoir;
- v. Alpine climbing, skiing, camping and lighting of fires outside the defined points.

Category V: Protected Landscapes are proclaimed territories bigger than 1,000 ha, representing a harmonious landscape, with a characteristic developed relief, diversity ecosystems, marine and ground base areas, inside which there could be dwelling areas for agricultural activities, arboriculture, forestry and fishing. The level of protection applied to this category aims to protect the landscape values of the area, biological diversity, and relaxing and recreation.

The following activities, that change land usage, can only be implemented within these territories, if the developer receives an environmental permit:

- i. Construction of buildings;
- ii. Waste water treatment in farms;
- iii. Interventions in areas bigger than 2ha;
- iv. Construction of highways;
- v. Flood channels etc.

For the following activities to take place in the areas under this category, it is necessary only to receive an approval from the administration of the protected areas:

- i. Usage of chemicals and fertilisers for agricultural land;

- ii. Lighting of fires outside designated areas or points;
- iii. Distribution of alien animals and plants;
- iv. Movement of transport vehicles outside defined roads and places, except for those of the administration;
- v. Organisation of races with cars, motors and bicycles;
- vi. the practice of unique or traditional usage of land and social organisations that are expressed in human settlements, local customs and religious beliefs.

Category VI: Protected areas of managed resources or protected area with multiple usage are proclaimed territories that include larger territories, relatively isolated, uninhabited, which are hard to reach, or territories sparsely populated and that are under continuous pressure to be populated used at larger scales. In the protected area, the level of protection applied aims to protect biological diversity, contribute to regional and national development, enhance sustainable development practices, to protect genetic resources and fruit trees with natural characteristics and to protect basic natural resources from a usage of land which might deteriorate the biological diversity of the area. Two of the main subcategories under this category are Marine Protected Areas and Municipal Protected Parks.

Marine Protected Areas are proclaimed areas of marine, coastal and underwater areas, seabed and islands together with water, flora, fauna and landscape habitats and which represent historical, cultural and archaeological characteristics. In these areas are not allowed all the activities that:

- i. Use, alter or modify habitats and living species of marine and coastal areas;
- ii. Extract or collect marine coral, bivalves, and other real natural biological and non-biological underwater properties;
- iii. Deteriorate caves and underwater habitats;
- iv. Take any marine samples, mining and paleontological discoveries, clearing territories or taking rocks and sand from the seabed for purposes other than scientific, research or inventory / recording;
- v. Building on sub-surface aquatic plants and the development of fisheries;
- vi. Disposal of inert waste, releasing untreated sewage, chemicals and hydrocarbons;
- vii. People removing objects with a historical and archaeological value, in order to exchange or trade these items;
- viii. Destruction of territory, habitat or landscape through the permanent construction and mining and oil activities.

Municipal Natural Parks are territories proclaimed by a Decision of Council of Municipality, which is a protected area inside the territory of the Municipality.

Protected areas with international interest

Areas Specifically Protected as Aquatic Bird Habitat are proclaimed areas of wetlands, swamps, water surfaces natural freshwater, brackish or salt, permanent or temporary, representing bio-centres and bio-corridors of regional and national importance, for their biological, economic, social and natural heritage assets, especially as habitat of aquatic species of birds included in the list of wetlands of international importance.

Requests for the protection of habitats of threatened and endemic species, migration routes and breeding conditions, are carried out in accordance with the provisions of the law "On the protection of biodiversity" and the law "On the protection of wild fauna". In wetland areas, as natural heritage ecosystems, the only activities that are allowed to be developed are traditional agriculture, fishing, forestry and environmental tourism.

In areas that are specifically protected as aquatic bird habitats the following activities are not allowed:

- i. Any construction, except with wooden materials or other environmental friendly materials, at a distance of 200 m from the water line;
- ii. Activities that might cause any disturbance to different types of wild animals and birds and fishes that shelter permanently, temporarily or in the migratory bird and fishes crossing routes.

Biosphere Reserves are proclaimed areas on a relatively large scale with terrestrial, coastal and marine ecosystems, which through appropriate land management, conservation of ecosystems and biodiversity, combine the sustainable usage of natural resources for local communities' profits. These areas are based on rules and

principles of the Program “The man and the biosphere” of the UNESCO convention. Biosphere reservoirs are based on three main components of the terrestrial division: i) Strictly restricted protected areas; ii) Buffer areas that surround or continue after the restrictive area, where only appropriate conservation activities are allowed; iii) a middle flexible area, where sustainable breeding practices of fauna are developed.

Natura 2000 Ecological Network sites of community interest.

- i. Special protected areas are proclaimed areas, where conservation of natural habitats is of interest to the European Community. These areas are part of the national ecological network and may include protected areas within the representative networks of protected areas and ecosystems, habitats and landscapes.
- ii. Areas, bio-geographic regions or types, that significantly affect the maintenance or restoration of the type of natural habitat, with an expressed interest from the European Community, or with a favourable conservation status, within the region or biogeographical areas in question are proclaimed as areas of special conservation, in order to establish the protective measures necessary to maintain or restore a favourable conservation status of natural habitats or populations of species for which the area is defined. These areas may be part of the ecological network or within the protected areas linking corridors between protected areas.
- iii. In the network of areas of interest to the European Community there are included specific areas for conservation of types of habitats and birds

The protected areas in Albania are presented in Figure 3.5.

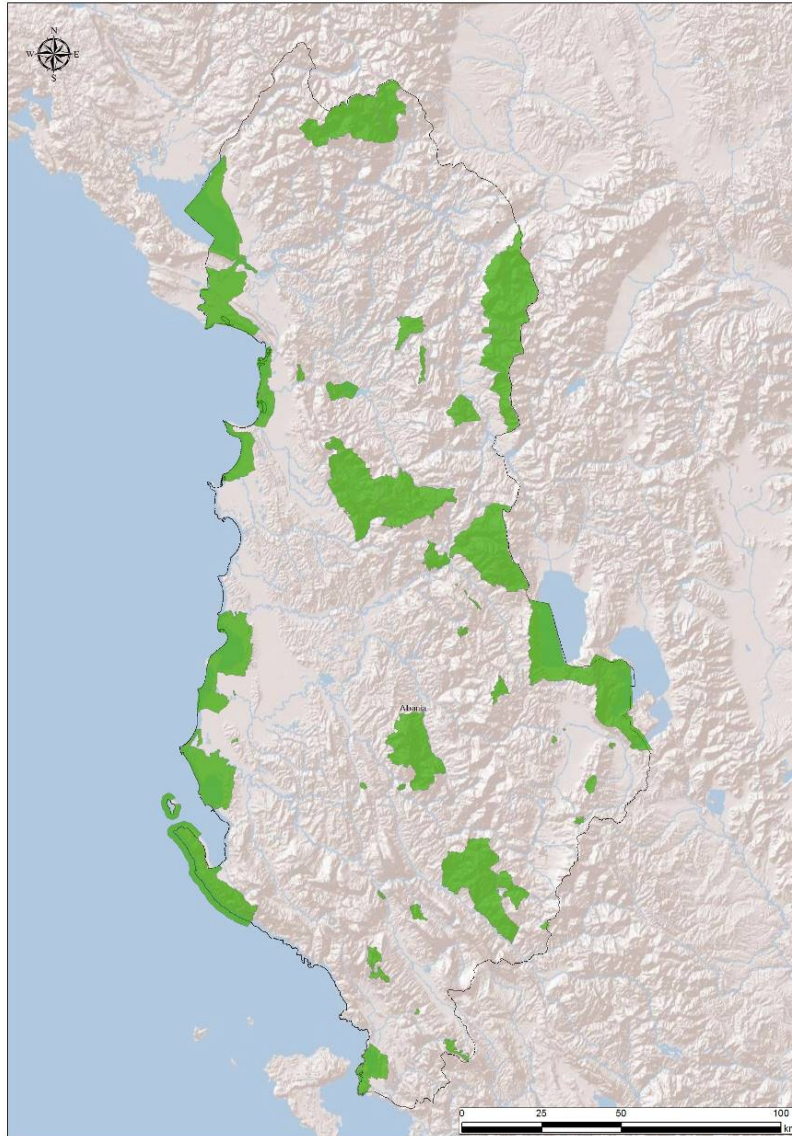


Figure 3.5 Protected areas in Albania

3.1.4.2 Bosnia and Herzegovina

Environmental protection issues are not one of the ten items defined in the Constitution as competencies of State institutions, therefore they fall under the following provision: “All governmental functions and powers not expressly assigned in this Constitution to the institutions of BiH shall be those of the Entities” (Article III, Paragraph 3).

The constitutional organisation of BiH defines the environmental protection policy-making, but on the other hand there are several levels of responsibilities and bodies that regulate them:

- The State of BiH (the Ministry of Foreign Trade and Economic Relations)
- The entities:
 - The Republika Srpska (RS):
 - The Ministry of Spatial Planning, Civil Engineering and Ecology
 - Municipalities
 - The Federation of Bosnia and Herzegovina (FBiH):
 - The Federation Ministry of Environment and Tourism

- Cantonal ministries (10 cantons/different ministries in the cantons)
 - Municipalities
- BD (Department of Municipal Affairs).

Due to the very complex administrative structure, BiH has also a very complex legal framework since the entities (FBiH and RS) as well as BD adopt their own laws, as do the cantons in FBiH.

The legal framework for the nature protection in BiH is provided in Table 3.2 and Table 3.3 below.

Table 3.2 Legal framework for nature protection in Bosnia and Herzegovina

Name of the entity/district	Full name of the law	Official Gazette No.
FBiH	Law on Nature Protection	Official Gazette of FBiH No. 66/13
RS	Law on Nature Protection	Official Gazette of RS No. 20/14
BD	Law on Nature Protection	Official Gazette of BD No. 24/04
	Law on Amendments and Supplements to the Law on Nature Protection	Official Gazette of BD No. 1/05
	Law on Amendments and Supplements to the Law on Nature Protection	Official Gazette of BD No. 19/07
	Law on Amendments and Supplements to the Law on Nature Protection	Official Gazette of BD No. 9/09

Table 3.3 Protected areas in Bosnia and Herzegovina

Protected areas in Federation of Bosnia and Herzegovina		
Categories of protected areas in FBiH	Protection measures	Allowed activities
<p>(1) Category Ia: Strict Nature Reserve</p> <p>Category Ia is strictly protected area, set aside for the protection of biodiversity and possible geological / geomorphological features, where the visits, use and impacts are strictly controlled and limited with purpose to ensure the protection of natural values. Such protected areas are indispensable referent areas for scientific research and monitoring.</p>	<ul style="list-style-type: none"> - Construction of infrastructure objects; - Construction of new transit, communal, energy, telecommunication and transport objects; - Excavation and backfilling of the terrain; - Excavation or removal of rocks, minerals and fossils; - Waste disposal and waste water discharge; - Changing the water regime; - Transportation of driftwood; - Economical use of natural resources; - Construction of hydromelioration structures; - Removal of hedges and other components of nature; - Planting of monocultures; - Gathering of mushrooms and plants and their parts - Harassment, killing or capturing animals; - Hunting; - Fishing; - Traffic; - Recreation activities; - Placement of advertising and other markings; - Visiting and touring; - And other activities that may endanger protected natural value, except in the public interest for the conservation and protection of natural values. - Performing of military exercises or any other military activities likely to endanger natural or other values is not allowed in the protected areas. - If visiting and touring of protected areas and other protected natural values could endanger their preservation, visiting and sightseeing of protected 	<ul style="list-style-type: none"> - In a protected area and other protected natural values are allowed those activities and actions that do not cause damage or modification of distinctive characteristics for which is being protected. - Protected natural areas and other protected natural values may be visited and toured in a manner that does not compromise their values, or the implementation of protection.
<p>Category Ib: Wilderness area</p> <p>Category Ib is a protected area that is completely unchanged or slightly changed, which has kept its natural character and impacts, where there are no permanent or significant human settlements, and which is managed in order to protect and preserve its natural conditions.</p>		
<p>(2) Category II: National park</p> <p>Protected Areas Category II are large natural or almost natural areas set aside for protection of broader rank ecological processes and relevant species and ecosystems characteristic for the area, which represents the basis for spiritual, scientific, educational, recreational and touristic potential, compatible with the protection of cultural and natural heritage.</p>		
<p>(3) Category III: Monument of nature and natural features</p> <p>The protected area of Category III has been set aside for protection of specific natural features, such as special forms of land appearance, reefs, underwater caves, geological formations as caves or even life forms such as rainforests. In general, they are less protected areas, often with a high tourist potential.</p>		

<p>(4) Category IV: Management areas of habitats/species</p> <p>The protected area category IV is set aside in order to protect individual species or habitats, which is a priority in the management. Many protected areas of this category need a regular active intervention in order to meet the ecological requirements of individual species or to maintain habitats, but this does not fall under the terms of declaring a protected area.</p>	<p>areas and other protected natural values, or parts thereof may be prohibited or restricted.</p>	
<p>(5) Category V: Protected landscapes:</p> <ul style="list-style-type: none"> - Land landscape - Seascape - Nature Park <p>Category V is protected area created through the interaction of people and nature over time, and is characterised by significant environmental, biological, cultural and aesthetic values. Preserving the interaction of people and nature is vital to the protection and sustainability of the areas, with the associated natural and other values.</p>		
<p>(6) Category VI: Protected areas with sustainable usage of natural resources</p> <p>The protected area category VI will preserve ecosystems and habitats, together with associated cultural values and traditional systems of natural resource management. Generally, these are broad areas, with most of the territory under natural conditions, parts of which are under sustainable management. Sustainable use of natural resources of non-industrial type is one of the main objectives of management.</p>		

Protected areas in Republika Srpska		
Categories of protected areas in RS	Protection measures	Allowed activities
<p>(1) Category: Strict Nature Reserve</p> <p>Strict Nature Reserve is an area of unaltered natural characteristics with representative natural ecosystems, designed exclusively for the preservation of the original nature, genetic resources, ecological balance, monitoring of natural phenomena and processes, scientific research which are not damaging natural features, value, phenomena and processes.</p>	<p>In the protected area, the zones are allocated where following types of protection are implemented:</p> <ul style="list-style-type: none"> a. Ia degree- strict protection b. Ib degree - strict protection with the ability of management c. II degree - active protection d. III degree - active protection and the possibility of sustainable use <ul style="list-style-type: none"> - Protection regime of Ia degree of protection is performed on a part of the protected area with the original, unchanged or slightly changed ecosystems of exceptional scientific and practical importance which allows only natural succession. - -Protection regime of Ia degree excludes all forms of space usage and activities, except scientific researches, controlled education and intervention activities in accidental situations - Protection regime Ib degree is carried out on part of the protected area with the original, unchanged or slightly changed ecosystems great scientific and practical importance. - Protection regime of II degree is conducted on the part of the protected area with partially changed ecosystems of great scientific and practical importance. - Protection regime of III degree is conducted on the part of the protected area with partially changed or changed ecosystems of great scientific and practical importance. - In the protected area are prohibited works and activities, carrying out projects which damage, distort and alter the features and values for which the area is protected. 	<ul style="list-style-type: none"> - In the zones with Ia degree of protection regime, scientific researches, controlled education and intervention activities in accidental situations are allowed - Protection regime Ib degree allows only scientific research, controlled education and activities aimed at maintaining and improving the existing state of the ecosystem (controlled grazing, mowing, dredging, regulation of water regime, etc.). - Protection regime II degree allows management interventions for restoration, rehabilitation and overall improvement of natural resource without affecting the primary value of its natural habitats, populations and ecosystems, as well as controlled traditional activities which during its unfolding haven't endanger primary values of the area. - Protection regime III degree allows selective and limited use of natural resources, management interventions for restoration, rehabilitation and overall improvement of the natural resource, sustainable use, development and improvement of rural households, the arrangement of objects of cultural and historical heritage and traditional architecture, preserving the traditional activities of the local population, the development of infrastructure in line with the values, potentials and capacities of protected area intended for the development of ecological, rural, health, sports and recreation and other vision forms of tourism in accordance with the principles of sustainable development
<p>(2) Category II: National park</p> <p>The national park is an area with a large number of diverse natural ecosystems, prominent landscape features and cultural heritage in which man lives in line with the nature, intended for the preservation of existing natural values and resources, the overall landscape, geological and biological diversity, as well as meeting the scientific, educational, spiritual, aesthetic, cultural, touristic, health and recreational needs and other activities in accordance with the principles of protection and sustainable development</p>		
<p>(3) Category III: Monument of nature</p> <p>Natural Monument is a smaller, unchanged or partially changed, natural spatial unit, object or phenomenon, physically clear, recognisable and unique, with representative geomorphological, geological, hydrological, botanical and other characteristics, as well as human labour formed botanical value of scientific, aesthetic, cultural or educational significance</p>		
<p>(4) Category IV: Protected areas of habitats</p> <p>The protected area category IV is set aside in order to protect individual species or habitats, which is a priority in the management. Many protected areas of this category need a regular active intervention in order to meet the ecological requirements of individual species or to maintain habitats, but this does not fall under the terms of declaring a protected area.</p>		
<p>Protected landscapes are:</p>		

<ul style="list-style-type: none"> a. Protected natural landscape, b. Protected cultural landscape and c. Nature park. <p>The protected landscape are areas with significant natural, bio-ecological, aesthetic, cultural and historical values, which have been developed over time as a result of interaction of nature, natural potentials of the area and traditional way of life of local population.</p>	<ul style="list-style-type: none"> - For the works and activities, and implementation of the projects in the protected area, the procedure of environmental impact assessment is performed in accordance with the Law on Environmental Protection. - For the works and activities, i.e. projects for which no environmental impact assessment is performed, and that require obtaining the appropriate permits, as well as for work, activities, and implementation of a project for which under a special regulation the building permit, license or other authorisation is not necessary, and which may affect the value and characteristics of the protected area, contractor or project owner is obliged to obtain from the Institute expert opinion on the conditions and measures for nature protection - Application of plant protection products in accordance with the Law on plant protection products is prohibited in protected areas 	
<p>(6) Category VI: Protected areas with sustainable usage of natural resources are:</p> <ul style="list-style-type: none"> a. Forest park b. Objects shaped by nature <p>Protected areas with sustainable usage of natural resources is area intended for preservation of ecosystems and habitats, and parallel cultural values and traditional ways of natural resources management.</p>		
Protected areas in Brčko District		
Categories of protected areas in BD	Protection measures	Allowed activities
<p>(1) Category I: Natural-protected areas established for scientific purposes, or to tamper wildlife</p> <ul style="list-style-type: none"> - An area of land with extraordinary or representative ecosystems, geological or physiological characteristics and types, and are used primarily for scientific purposes and monitoring of the life-environment, - Unchanged or slightly changed area of the land of a large surface which has preserved its natural characteristics and impact, without permanent or significant habitat, designated for preservation of natural conditions, - An area of land exposed to the active intervention with the purpose of ensuring a sustainability of the habitat and fulfilling of the requirement of the specific species. 	<p>No protection measures defined within the law. According to Article 35, paragraph 3, the Authorised department proposes adoption of a bylaw on the preparation, content, establishment of the necessary measures to authorised body to conduct or control of specific management measures.</p> <p>Article 36, paragraph 1 defines that Act on proclamation of protected area contains prohibitions and restrictions in order to meet goals of management</p>	<p>Same as for the Protection measures</p>
<p>2) Category II: National parks established for the purpose of the</p>		

<p>protection of the ecosystems and recreation</p> <p>National park is a natural area of the land proclaimed for:</p> <ol style="list-style-type: none"> a. protection of the ecological integrity of one or more ecosystems for present and future generations; b. excluding of the exploitation and visits which might cause changes or damage the nature; b) ensuring the basis for spiritual, scientific, educational, recreational and visiting purposes which must be harmonised with the principles of life environment protection 		
<p>3) Category III: Monuments of nature established for the purpose of preservation of specific natural characteristics</p> <p>Monument of nature has one or more specific natural/cultural characteristics of extraordinary and unique value due to its rarity, natural, representative or aesthetic characteristics or cultural importance</p>		
<p>4) Category IV: Protected landscapes established for the purpose of preservation of landscapes, coastal areas and recreation</p> <p>Landscape is the area of the land set by an interaction of the nature and human with extraordinary aesthetic, ecological or cultural values and very often with great biological diversity.</p>		

The management of protected areas is carried out based on the established management plan. It defines development guidelines, methods of protection, use and protected area management, including detailed guidelines for the protection and conservation of natural values of protected areas, respecting the needs of the local population. The legal and natural persons engaged in activities within the protected area must comply with the management plan.

In FBiH, natural protected areas are proclaimed by law by the Federal Parliament or Cantonal assembly depending of type of protected area. If the natural value is in the area of both entities, a proposal for the protection of the Federal Ministry and the competent ministry of the RS is made in accordance with the inter- entity programme of environmental protection.

In RS, natural protected areas are proclaimed by a law by a National Assembly, or Government on proposal of the Ministry of Spatial Planning, Civil Engineering and Ecology of RS or Municipal Assembly, depending on the type of protected area.

In BD, protected areas are proclaimed by law or by-law by Government or Assembly of BD on the proposal by the relevant department of BD Government, responsible for environmental protection. Protective measures may prohibit or restrict implementation of certain activities in the area.

The management plan defines the manner of implementing the protection, use and management of protected area, guidelines and priorities for the protection and conservation of natural values of the protected area, as well as the development guidelines, taking into account the needs of local communities. The management plan is adopted for each protected area for a period of ten years. In the Law on nature protection of BD, the period for which the management plan for the protected area is adopted is not defined.

Legal entities, entrepreneurs and individuals are obliged to operate in a protected area in accordance with the management plan.

Protected areas in BiH are presented in Figure 3.6.

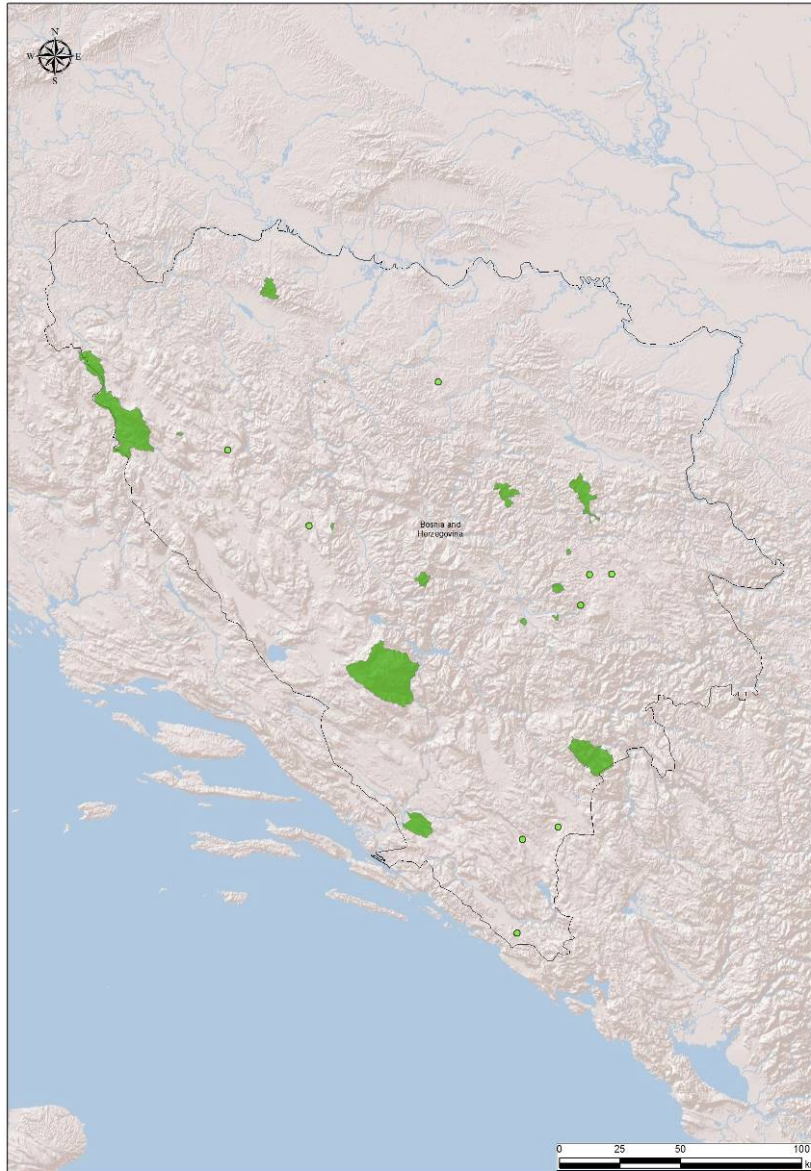


Figure 3.6 Protected areas in Bosnia and Herzegovina

3.1.4.3 Kosovo

The Ministry of Environment and Spatial Planning is the main institution in charge of drafting policies, strategies and laws for protected areas in the Kosovo. Under its jurisdiction there is the Agency for the Environmental Protection of Kosovo, where the Institution under its jurisdiction, “Institution of Kosovo for Nature Protection”, is in charge for nature conservation and monitoring natural protected assets.

The legal framework in Kosovo regarding protected areas is based on the main Law 03/L-233 “On Nature Protection” and law no. 03/L-039 “On special protected areas”.

According to law on nature protection, which regulates the system for protection and general conservation of nature and its values, the conservation of nature is divided and described below:

Protected areas categories:

- a. **Strict Nature Reserve** – A strict nature reserve is an area of land and/or water unchanged or little changed and is dedicated exclusively to the preservation of nature, and scientific research of biological diversity, monitoring the state of nature and education. In this area, economic and other activities are strictly prohibited.

- b. **National Park** - The national park is an extended area of land and/or water, with extraordinary and natural diverse characteristics, including one or more natural ecosystems in preserved or slightly changed status and it is mainly dedicated to the preservation of that natural resource. In the national park areas activities are not allowed that put the natural resources in danger. In these areas, hotel and touristic activities to facilitate tourists' visits, education, recreation, extensive traditional agriculture and fishing are all allowed, if they do not risk the conservation values.
- c. **Special Protected Area** – A special protected area is the area of land and/or water of particular importance because it is unique, rare, or is the habitat of a wild species and is especially important for scientific research. A special area can be: plant, forest vegetation, zoological - ornithological, geological, paleontological, hydrogeological and hydrological etc. In these areas interventions, works and activities which may disturb its features are not permitted – such as the collection and destruction of plants, harassment, capture and killing of animals, the introduction of new types of biological elements, commercial activities and other similar uses. Only activities that help the conditions important for the preservation of the features for which the area was declared are allowed to be developed.
- d. **Nature Park** - The nature park represents a larger natural area of partially developed ground, water or ecological features of national and international importance with significant landscape diversity, educational, cultural, historical and recreation values. In a Nature Park, economic activity and other activities that do not endanger the role and its important characteristics are allowed. The method of performing economic activities and exploitation of natural resources in the nature park are established within the conditions for the protection of nature.
- e. **Nature Monument** - The monument is considered as part, or the whole, of a region of unchanged nature which has ecological, scientific, cultural, aesthetic or historical and/or tourist value. A nature monument can be of geological - paleontological, mineralogical, hydrological, geological structure, sediment, etc., geomorphologic origins, or a cave, deep, rocky walls, hydrologic - fountains, water flows, waterfall, lakes, or a botanic site where rare exemplars or important flora for a locality can be found. In a Nature Monument and in its direct vicinity, which is part of the protected area, activities that endanger its characteristics and values are not permitted.
- f. **Protected Landscape** – A protected landscape is a natural or artificial area of great landscape value and biological diversity or cultural-historical value, or a landscape with unique characteristic features reserved for rest and recreation. In the protected landscape area interventions and works that may impact the features due to which it is declared protected, are not allowed.
- g. **Archaeological Monument of the Park** - An Archaeological Monument of the Park is created artificially – for example a botanical garden, arboretum, city park, tree rankings, as well as other forms of gardens and parks, or single trees or group of trees that have great aesthetic, cultural, historical, ecological or scientific value requiring conservation. In the Archaeological Monument of the Park protected landscape area interventions and works that may change or disrupt the values for which it is declared protected are not allowed

The law no. 03/L-039 “**On special protected areas**” ensures protection of Serbian Orthodox Monastery, Churches, other religious places, and other important historical and cultural places of the Serbian Community and other communities.

Activities that **are prohibited to be developed** in the Special Protected Areas are:

- i. Industrial construction like the exploitation of minerals, construct of dams, electric stations or grid networks, heavy industrial factories, and transit roads in rural areas;
- ii. Construction or developments that result in deforestation or environmental pollution.

Limited activities allowed inside the Special Protected Areas, where an agreement should be reached in the first place by the Serbian Orthodox Church, and a decision from the Commission of Protected Areas, are:

- i. Commercial construction or development such as structures or edifices taller than the monastery/church/cultural monument to be protected; road construction; construction of warehouses, workshops, shops, restaurants, bars, cafes, hotels/motels, food stalls and, gas stations and repair of vehicles, super-markets, nightclubs, or any other construction of a larger scale in the rural area;
- ii. Gathering, recreation and entertainment; and

- iii. Urbanisation of agriculture land

Protected areas in Kosovo are presented in Figure 3.7.

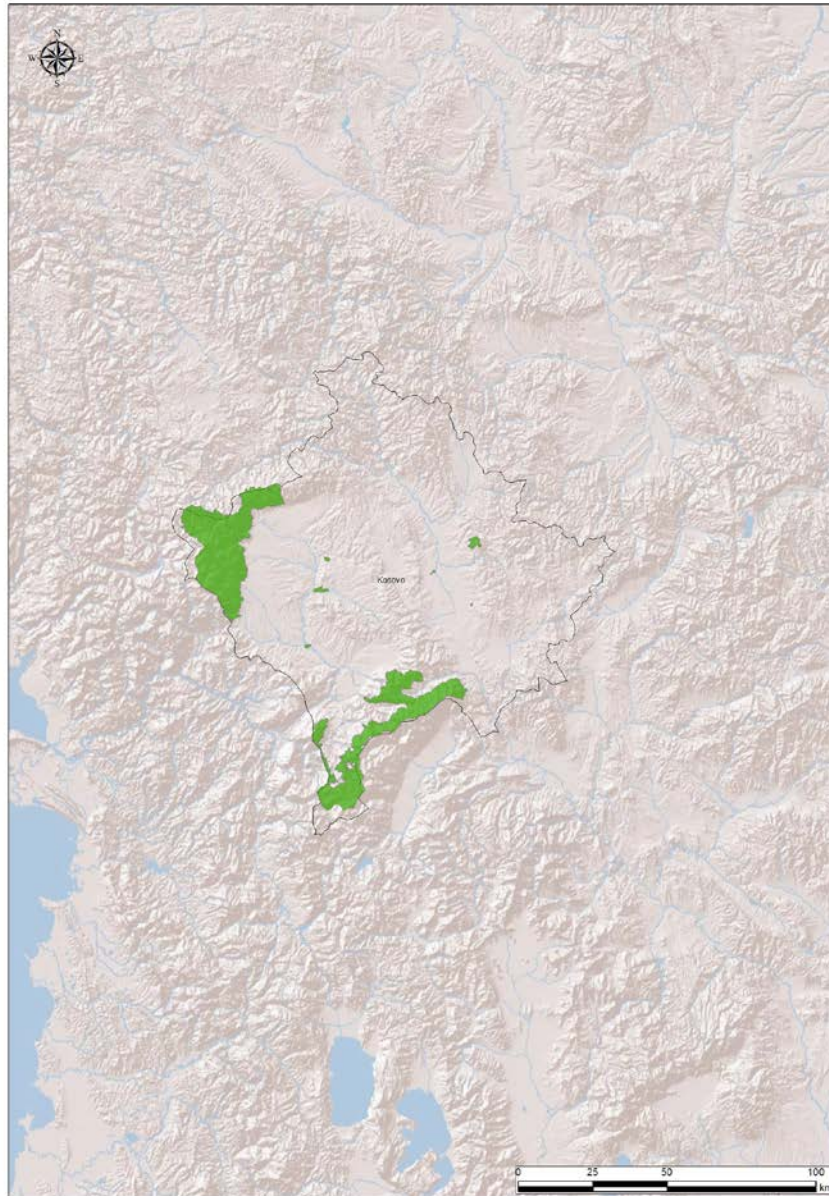


Figure 3.7 Protected areas in Kosovo

3.1.4.4 The former Yugoslav Republic of Macedonia

The current categorisation system of protected areas (PA) in the former Yugoslav Republic of Macedonia is established by the Law on Nature Protection²⁶⁾ enacted in 2004. This new categorisation classifies PAs according to their management objectives and complies with Protected Areas Categories System of the **International Union for Conservation of Nature (IUCN)**.

General Context

PA Categories

²⁶⁾ Law on Nature Protection (Official Gazette of the Republic of Macedonia no. 67/2004, 14/2006; 84/2007; 35/10; 47/11; 148/11; 59/12; 13/13; 163/13 and 63/16)

There are six categories of protected areas defined in the national legislation. These are:

- Category I - Strict Nature Reserve (SNR)
- Category II - National Park (NP)
- Category III - Natural Monument (NM)
- Category IV - Park of Nature (PN)
- Category V - Protected Landscape (PL)
- Category VI - Multi-Purpose Area (MPA)

Their compliance with corresponding categories of protected areas according to the IUCN is presented in Table 3.4 below.

Table 3.4 Compliance with IUCN categories of protected areas

Macedonia – PA categorisation (Law on Nature Protection)	Compliance with IUCN categories
I. Strict Nature Reserve (SNR)	I. Strict Nature Reserve
II. National Park (NP)	II. National Park
III. Natural Monument (NM)	III. Natural Monument
IV. Park of Nature (PN)	IV. Habitats/species management area III. Natural Monument
V. Protected Landscape (PL)	V. Protected Landscape / Seascape
VI. Multi-Purpose Area (MPA)	VI. Managed Resource Protected Area

Source: Project 00058373 - PIMS 3728 "Strengthening of ecological, institutional and financial sustainability of the system of protected areas in the Republic of Macedonia"; Report - Project Activity Ref. RFP 79/2009 "Development of representative protected areas network"; Macedonian Ecological Society, March 2011; supported by UNDP and the Ministry of Environment and Physical Planning of Macedonia

Proclamation of Protected Areas

Strict Nature Reserves, National Parks and Natural Monuments are proclaimed as protected areas by a separate law, enacted by the Parliament of the former Yugoslav Republic of Macedonia.

Parks of Nature, Protected Landscapes and Multi-Purpose Areas are proclaimed as protected areas by the Government of the former Yugoslav Republic of Macedonia.

Zoning of Protected Areas

The following zones may be established in the protected areas:

1. Zone of strict protection. This zone is part of the protected area of highest interest for protection, characterised by authentic, unchanged ecosystem characteristics, or slightly changed because of traditional management practices. Constant monitoring to maintain the characteristics of the strict protection zone is to be ensured.
2. Zone of active management. This is a zone of high interest for protection, in which some major management interventions are needed for restoration, revitalisation or rehabilitation of the habitats, ecosystems and other elements of the landscape, including manipulation with habitats and with species. Economic activities that have no adverse impact on the primary objective of the protection in the zone for active management, such as ecotourism or traditional extensive agriculture are to be allowed. The successful management of this zone, as well as the further permanent maintenance thereof, may lead to the zone acquiring characteristics of a strict protection zone.
3. Zone of sustainable use. This zone is a significant part of the protected area with no high values for protection, with infrastructure facilities, objects of cultural heritage, types of forest plantations that are not characteristic for the area, as well as settlements with the surrounding agriculture land. Long-term

undertaking of interventions and measures may lead to it acquiring the characteristics of a zone for active management.

4. Buffer zone. In principle, this is an area outside the natural heritage with a role to protect the above zones, with the purpose of protection against the threats emanating from outside of the natural heritage area.

The activities and actions that are prohibited within the zones established in a protected area should be stipulated by its act of proclamation and by its Management Plan (where applicable).

In addition, for the purposes of spatial planning and land use forms in the protected areas, a Spatial Plan is to be enacted, as deemed necessary. A spatial plan is mandatory for the national parks (Category II protected areas).

Categories of Protected Areas in the former Yugoslav Republic of Macedonia

The categories of protected areas in the former Yugoslav Republic of Macedonia are briefly described below.

I - Strict Nature Reserve (SNR)

Primary objective

The Strict Natural Reserve (Category I protected area) is an area, which, because of its significant or characteristic ecosystems, geological or physical and geographical features and/or species, as well as originally preserved wilderness, acquires the status of natural heritage, primarily for carrying out scientific surveys and monitoring of the protection. The conservation of the biological diversity in SNR is to be achieved through protection, with no human impact on the natural processes in the habitats or on the species populations.

The Strict Nature Reserve is a protected area that is strictly set aside to protect biodiversity and possibly geological / geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

Management

The management, supervision and protection of the Strict Nature Reserves are responsibility of the competent authority for nature protection (Ministry of Environment and Physical Planning - MEPP). However, it may decide to award the execution of the works of management and protection of the Strict Nature Reserve to other body, institution or organisation.

A Management Plan is to be prepared for the management of the Strict Nature Reserve, which is to be managed in a manner that shall provide:

Prohibited activities in Strict Natural Reserve

No human activities are allowed within Strict Nature Reserves except those related to scientific research and monitoring of their protection, i.e.:

- Activities for protection and control of the Strict Natural Reserve;
- Study visits for performing a scientific research;
- Movement of people on designated paths for educational purposes;
- Collection of seeds and seedling materials, wild plants, fungi and animals for the purpose of scientific research, as well as for the renewal of the populations in another area, in a manner and in a period that will not cause degradation of the ecosystem.

The execution of these activities within a Strict Nature Reserve is subject to an authorisation issued by the MEPP in a form of a respective license.

II - National Park (NP)

Primary objective

The National Park (Category II protected area) is a large, natural or near natural area of land or water with particular multiple natural values, which encompasses one or more, preserved or insignificantly changed

ecosystems, primarily designed for the conservation of the original natural, cultural and spiritual wealth. The National Park provides scientific, educational, recreational and visitor opportunities.

The National Park is a protected area that is set to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.

Management

The management and protection of a National Park is carried out by a public institution – ‘National Park’, established by the Government of Macedonia, in accordance with the relevant legislation. This public institution (‘National Park’) is responsible to develop and adopt a Management Plan for the National Park, upon a prior approval by the MEPP. Such plan prescribes specific measures and activities for the protection of the characteristic natural values and the original state thereof, owing to which it had acquired the status of protected natural heritage.

In addition, Spatial Plan for the purposes of spatial development in the National Park is to be prepared and enacted as mandatory legislative requirement for this category of natural heritage.

The National Park is to be managed throughout its whole territory in an integrated manner that shall provide the following:

- Protection of the natural areas of national and international importance for cultural, scientific, educational, tourist and recreational purposes;
- Stability of the environmental processes and diversity through sustainable conservation of the representative physical and geographical regions, biocoenosis, genetic resources and species in an authentic state;
- Creation of conditions for tourism development in accordance with the principle of sustainable development;
- Achievement of cultural, scientific, educational and recreational objectives, which at the same time maintains the natural state of the area.

Prohibited activities in National Park

In the general context, activities which endanger the authenticity of the nature in the National Park are prohibited within its territory.

Touristic and recreational activities are allowed in the National Parks, as well as extensive agricultural activities and fishery is to be performed in a way that does not endanger the survival of the species and their natural balance, in accordance with the provisions of the relevant legislation.

III - Natural Monument (NM)

Primary objective

Natural Monument (Category III protected area) is a part of nature with one or more natural characteristics and specific, threatened or rare features, characteristics or forms, and has special scientific, cultural, educational and spiritual, aesthetic and/or tourist value and function. Such areas include: lakes, rivers, gorges, waterfalls, springs, caves, rocks formations, geological profiles, minerals and crystals, fossils, rare or indigenous trees and bushes characterised by great age and specific habitual characteristics, as well as limited small areas of endemic and rare animal or plant communities significant for their scientific value.

The Natural Monument is a protected area that is set aside to protect specific outstanding natural features and their associated biodiversity and habitats as well as specific natural sites with spiritual and/or cultural values where these also have biodiversity values.

Management

A Management Plan is to be prepared for the management of the Natural Monument, which is to be operated in a manner that shall provide:

- Sustainable conservation and protection of the natural characteristics and the specific, endangered or rare features, characteristics or forms;

- Conditions for carrying out scientific surveys and educational activities related to their natural characteristics;
- Prevention of activities that have adverse impact on its natural characteristics.

Prohibited activities in Natural Monument

Undertaking activities in or near the Natural Monuments, which may endanger the natural features and values are not allowed.

IV - Park of Nature (PN)

Primary objective

Park of Nature (Category IV protected area) is an area that has one or more authentic, rare and characteristic components of nature (plant, fungi and animal species and communities, relief forms, hydrological values etc.). It may be a botanical, zoological, geological, geo-morphological and hydrological area, with a primary objective to maintain, conserve and restore species and habitats. In addition, such areas should provide the means by which the urban residents may be in regular contact with nature.

Management

A Management Plan is to be prepared for the management of the Park of Nature, which is to be managed in a manner that shall provide:

- Maintenance of the conditions needed for the protection of the significant species, populations and communities or of the physical-geographical characteristics;
- Facilitated implementation of scientific research and monitoring of conditions as primary activities connected with the sustainable use of resources;
- Designation of special zones within Parks of Nature for the purpose of carrying out educational activities on the characteristics of the area and management of wild species;
- Elimination and prevention of the exploitation and degradation of the nature in the area proclaimed a Park of Nature.

Prohibited activities in Park of Nature

Undertaking activities involving inappropriate land use in the Park of Nature, as well as activities of inappropriate character and intensity, which could interfere with the properties owing to which it has acquired its protection status of Park of Nature, are prohibited.

V – Protected Landscape (PL)

Primary objective

A Protected Landscape (Category V protected area) is an area where the interaction of the people with the nature has created over time a landscape of distinct character with particular characteristics and aesthetic, environmental, cultural and historical or ethnographical importance, characteristic for that area only, which at the same time has a significantly high biological diversity.

This protected area is established to protect and sustain important landscapes and the associated nature conservation and other values created by interactions with humans through traditional management practices. Therefore, the protection of the integrity of the traditional manner of land use and organising the populated areas, customs and beliefs is of a special significance for the protection, maintenance and evolution of the Protected Landscape.

Management

A Management Plan is to be prepared for the management of the Protected Landscape, which is to be managed in a way that provides:

- Maintenance of the harmonic interaction of nature and culture through protection of the landscape and continuation of the traditional way of land use, construction and social and cultural events;

- Support for lifestyles and economic activities which are harmonised with nature and for the protection of the social and cultural basis of the communities living on that area;
- Maintenance of the diversity of the landscapes and habitats, as well as of the species and ecosystems;
- Prevention of land use activities which are not appropriate for the protection by their scope, intensity or character;
- Organisation of public visits, tourist and recreational activities, as well as educational and scientific research activities in accordance with the degree of protection, and in relation to the existing characteristics of the area.

VI – Multi-Purpose Area (MA)

Primary objective

A Multi-Purpose Area (Category VI protected area) is an area, which is usually spreading over a relatively wide territory of land and/or water, rich in waters, forests or meadows, and may be used for hunting, fishing or tourism, or reproduction of wild animals.

This protected area is established to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial, as well as to promote sustainable use of natural resources, considering ecological, economic and social dimensions and to promote social and economic benefits to local communities. As such, it may be changed by anthropogenic activities, or include settlements as well. It does not need to cover environmentally significant areas or other values of national interest.

Management

A Management Plan is to be prepared for the purpose of management of the Multi-Purpose Area, which is to be managed in a manner that shall provide:

- Integration of social and economic as well as cultural approaches to nature conservation goals;
- Security and sustainability for local communities' livelihoods;
- Contribution for developing a more balanced relationship between humans and the rest of nature;
- Facilitation of recreation and appropriate small-scale tourism.

Protected areas in the former Yugoslav Republic of Macedonia are presented in Figure 3.8.

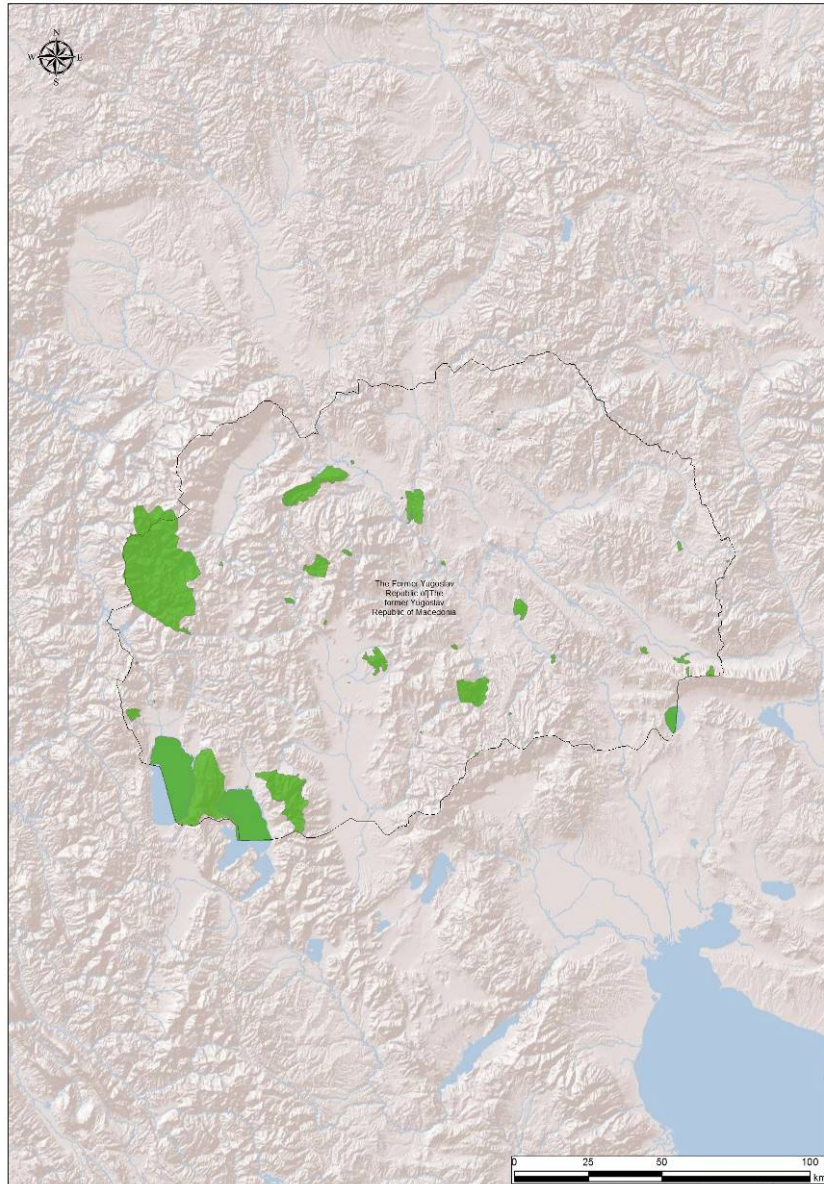


Figure 3.8 Protected areas in the former Yugoslav Republic of Macedonia

3.1.4.5 Montenegro

I. National categories of Protected Natural Assets – Protected Areas

According to the Law on Nature Protection (Official Gazette of Montenegro, no. 54/16) Protected Natural Assets encompass two groups of ecologically important / significant natural areas (article 20), as follows:

- (i) Protected Areas (hereinafter PAs) that include following (national) categories: strict nature reserve, national park, special nature reserve, nature park, monument of the nature and areas of exceptional (natural) values
- (ii) Ecological Network (Natura 2000) sites (not established, so far)

Protected areas are classified (article 30) into the following (IUCN compatible) categories:

- PA Category 1a which includes strictly protected areas designated to protect biodiversity and possible geological and geomorphological features, where visiting, use and other impacts are strictly controlled and limited to ensure protection of PA values;

- PA Category Ib, which includes largely unchanged or little changed PAs that have retained their natural character and influence, with no significant / permanent human settlements and they are managed in a manner that fully preserves their original state;
- PA Category II which includes larger natural areas designated to protect larger ecological processes, along with all wild plant, animal and fungi species as well as with ecosystems that are characteristic to the (natural) area and which provide basis for environmental and cultural acceptable spiritual, scientific, educational, recreational activities and visitors;
- PA Category III which includes monuments of nature or parts of nature that can be relief features, sea cliffs or caves, beaches, geological features like speleological objects, groups of old trees;
- PA Category IV which includes areas where protected plant, animal and fungi species and their habitats and managed for their protection;
- PA Category V which includes areas where a long-term interaction between man and nature resulted in an area with distinctive and significant ecological, biological, cultural and aesthetic values and where preserving the integrity of these relationships is necessary to protect and maintain these areas and natural values;
- PA Category VI which includes areas for the conservation of ecosystems and habitats, as well as associated cultural values and traditional ways of managing natural resources in sustainable way.

Article 31 of the Nature Protection Law Article regulate regimes of restrictions, i.e. activities that are prohibited or allowed in the protection zones (I-III) of PAs, as follows:

- Protection regime / zone of first degree - strict protection is carried out in a protected natural asset with exceptional ecological significance or a part of it with slightly altered characteristics, by which natural biological processes, preservation of the integrity of habitats and living communities and extremely valuable cultural assets are enabled. In a protection zone of first degree (strict protection regime) the following activities are prohibited (not allowed): use of natural resources and construction of facilities. In this zone, the following activities can be carried out: scientific research and monitoring of natural processes (monitoring) to a limited extent; visits for educational purposes to a limited extent; and to implement protective, rehabilitation / restauration and other necessary measures in case of fire, natural disasters and accidents, occurrence of plant and animal diseases and over reproduction of pests.
- Protection regime / zone of second degree - the active protection is carried out in a protected natural asset with partially altered properties of natural habitats, but not to levels that threaten their functional and ecological significance, including valuable lands. In the protection zone of second degree, the following activities can be carried out: interventions for the restoration, rehabilitation and overall improvement of the PA site; controlled use of natural resources, without affecting the primary values of their natural habitats, populations, ecosystems, landscape features and geo-heritage.
- Protection regime / zone of third degree - sustainable use is carried out in a protected natural asset or part of it with partially modified and/or altered habitat characteristics that enable a functioning ecological connectivity and integrity of protected natural resource. In a protection zone of third degree, the following activities can be carried out: interventions for the restoration, rehabilitation and overall improvement of the site; development of the settlements and related infrastructure to the extent that wouldn't cause destruction of the basic values of the PA; refurbishment of the objects of cultural and historical heritage and traditional building; maintain traditional activities of the local population; selective and limited use of natural resources.

II. Permitting system for HPP and PAs

a) Conditions and nature protection measures for plans and projects

Restrictions in planning and developing Hydro Power Plants (HPP) in PAs are mainly regulated in the Law on Nature Protection (Official Gazette of Montenegro, no. 54/16) but also in the Law on Strategic Environmental Assessment (Official Gazette of the Republic of Montenegro, no 80/05, Official Gazette of Montenegro, no. 73/10, 40/11, 59/11, 52/16) and Law on the Environmental Impact Assessment (Official Gazette of the Republic of Montenegro, no. 80/05 and Official Gazette of Montenegro, no 40/10, 73/10, 40/11, 27/13, 52/16).

The first stage of these restrictions is provided in the process of issuing an *Act on nature protection conditions* (Law on Nature Protection, article 18) for preparing planning and project documentation for HPPs. In the Act, conditions under which the activities, actions and operations related to HPPs can be implemented shall be prescribed, considering the spatial position of all facilities / installations of HPPs and the restrictions required by Protected Natural Assets (Protected Areas and Ecological Network sites) by protection zones, respectively.

In the case of watercourses Lim, Tara, Morača, Piva, Cehotina and Ibar, of significance are the spatial positions of planned HPPs and all their facilities / installations regarding both the existing and planned Protected Natural Assets / PAs, as follows:

- *Lim river* between Plavsko Lake and Gostun (MNE – SER border): (i) EMERALD site ME000000H "Lim River" and (ii) Important Plan Area - IPA site no 6. "Dolina rijeke Lim". River Peročica is left tributary of Zlorečica and Lim River. Upper parts of Peročica, i.e. its main tributary *Mojanska River* (above Ogorela glava) belong to the Nature Park (Regional Park) Komovi within the territory of Municipality Andrijevica.
- *Tara river*: (i) Biosphere reserve "Tara River Basin" (UNESCO – M&B), (ii) UNESCO World Natural Heritage site "NP Durmitor with Tara River Canyon", (iii) NP Durmitor – part of Tara River Canyon is in the zone of second (II) degree of protection in the National Park, (iv) EMERALD site ME0000002 "Durmitor mountain with Tara River Canyon" and (v) IPA site no 7. "Durmitor i Kanjon Tare"
- *Morača river* and its tributaries: Potential PA "Morača River Basin" (Re: National Sustainable Development Strategy, National Biodiversity Strategy). The process of establishing PA "*Cijevna river canyon*" (from MNE – Al border near to Dinosa) in the category of Monument of the Nature is ongoing (Re: Municipality Podgorica, Municipality Tuzi).
- *Piva river*: (i) Nature Park "Piva" (managed by Municipality Pluzine) including the downstream part of Piva river, from Mratinje Dam to its mouth joining with Tara River at Scepan Polje (ii) EMERALD site ME000000N "Ostatak kanjona Pive ispod Hidroelektrane" and (iii) IPA site no 13. "Kanjon rijeke Pive". Upstream part of Piva river, named as *Komarnica* is EMERALD site ME000000P "Komarnica". It is also in the bordering area or could be within the territory of Nature Park "Komarnica i Dragišnica", depending upon the option that will be determined in the ongoing process of establishing this Nature Park (Re: Municipality Savnik).
- *Čehotina river*: EMERALD site ME000000I "Valley of Cehotina river"
- *Ibar river*: upper parts of its tributaries belong to EMERALD site ME000000U "Hajla" that is also IPA site no 8. "Hajla" and potential Nature Park "Hajla" (Re: National Sustainable Development Strategy, National Biodiversity Strategy)
- *Boka Kotorska Bay*: (i) UNESCO World Natural and Cultural site "Kotor Risan Bay" that is also under national protection (Decree of protection, Municipality Kotor), 1979, (ii) EMERALD site ME000000Q "Kotorsko risanski bay".

Restrictions provided in the *Act on nature protection conditions* for HPPs do not include the assessment of the negative impacts on nature / biodiversity and the risks of drying out and alteration of the natural flows of watercourses.

b) Permits for operations and activities in PAs

Restrictions related to the risks and impacts of HPPs on PAs are subject of assessment provided in the process of issuing *Permit for the operations and activities in PAs* (Article 40 of the Law on the Protection of Nature). This assessment relies on the spatial position of HPPs inside / outside of Protected Natural Assets (PAs and Ecological Network sites).

In the process of issuing this Permit, HPPs are specifically assessed for: (i) negative impacts / effects and risks of drying out and alteration of natural flow of concerned watercourses (ii) spatial position of HPPs in the protection zones (I-III) of PAs and (iii) significant impacts that cause damage of the PA.

c) SEA and EIA consent - permit

SEA – Considerations of potential locations - sites for HPPs must have been established in adequate spatial planning documents (physical plans) which also include an assessment of environmental impacts, in compliance

with the Law on Strategic Environmental Assessment (Official Gazette of the Republic of Montenegro, no. 80/05, Official Gazette of Montenegro, no. 73/10, 40/11, 59/11 and 52/16). The Report on Strategic Environmental Assessment (SEA) considers the previously issued conditions under which the activities, actions and operations related to HPPs can be implemented (Act on nature protection conditions)

EIA - Obtaining an (ecological) *Permit* following EIA elaboration is necessary for HPPs > 1 MW, according to the Law on the Environmental Impact Assessment ("Official Gazette of Montenegro", No. 80/05 and Official Gazette of Montenegro, no. 40/10, 73/10, 40/11, 27 / 13, 52/16) and the Regulation on projects that are subject of Environmental Impact Assessment (Official Gazette of Montenegro, no. 20/07 and Official Gazette of Montenegro, no.27/13, 53/14). Timelines for the processes of (i) determining need (scope and content) for EIA elaborate and (ii) issuing permit / approval on EIA elaborate are presented in the Annex I. of this document.

For HPPs < 1 MW that are not subject of EIA procedure, issuing of the *Permit for the operations and activities in PAs* is obligatory in the case where facilities and installations of HPPs are located in PAs.

Protected areas in Montenegro are presented in Figure 3.9.

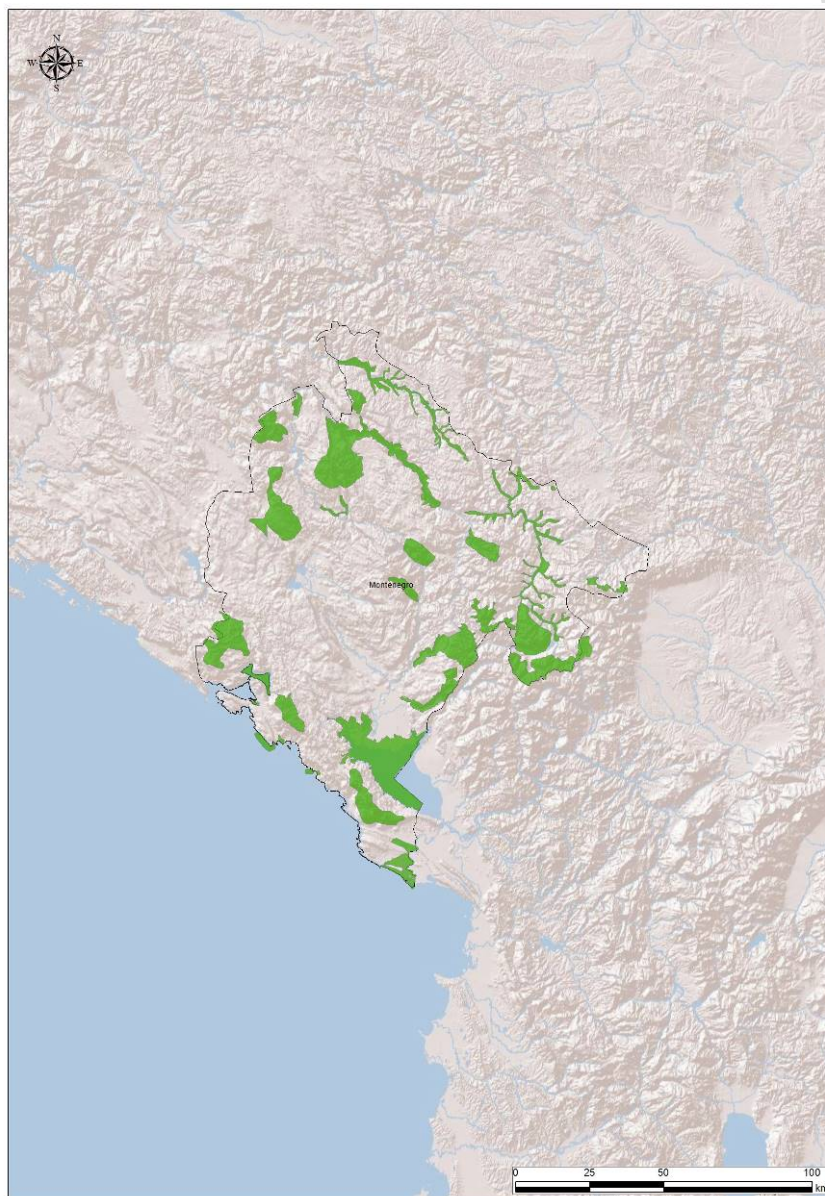


Figure 3.9 Protected areas in Montenegro

3.1.4.6 Serbia

The laws that regulate the field of nature conservation and protected areas in Serbia are:

- Law on nature protection ("Official Gazette of RS", no. 36/2009, 88/2010 and 91/2010 – corr. and 14/2016)
- Law on National Parks ("Official Gazette of RS", no. 84/2015)

These laws cover the planning, development and use of space, natural resources, protected areas and ecological networks, carry out based on spatial and urban plans, planning and projects documentation. They also deal with bases and programme management, use of natural resources for activities that may have an impact on nature in the accordance with the conditions of nature protection.

In the process of making plans, programmes, projects, works and activities, it is mandatory to obtain the conditions for nature protection issued by the competent Institute for nature protection.

Assessment of acceptability for ecological network is a procedure that assesses possible impact of the plan, project, works or activity on the conservation objectives and wholeness of the ecological network.

The study for the evaluation of the acceptability is a particular document which is attached to the Report on the strategic assessment of environmental impact, the Study on Impact Assessment of the project on the environment, or as a separate document.

Compensation rates are determined depending on anticipated or actual degradation of nature, namely: the establishment of a new site that has the same or similar characteristics as the damaged site; establishing other sites important for the conservation of biological and landscape diversity and protection of natural resources; monetary compensation in the amount of damage caused by the site, in the event it is not possible to carry out compensatory or mitigation measures.

Protected natural resources:

- **protected areas** (comprising of: strict nature reserve, special nature reserve, national park, natural monument, protected habitat, region of exceptional characteristics, nature park);
- **protected species** (comprising of: strictly protected wild species, protected wild species);

The organisation, use, spatial planning and construction of buildings in a protected area shall be based on the spatial plan for special purposes or urban plan.

The protection regimes define different allowed activities in the protected area, and are the following:

- **1st degree protection regime - strict protection**
- **2nd degree protection regime - active protection.**
- **3rd degree protection regime - proactive protection.**

The Institute for Nature Conservation of Serbia is in charge for the professional activities for protection of nature and natural resources; determining the conditions and rates for protection of nature and natural resources in the process of drafting and implementation of spatial and urban plans, project documentation, in all sectors that affect nature; in the process of making the assessment of eligibility for works and activities in nature, preparation and implementation of projects and programmes in the protected area; database management in the field of nature protection as a part of Unique information system of the Agency for Environmental Protection.

Protected areas in Serbia are presented in Figure 3.10.

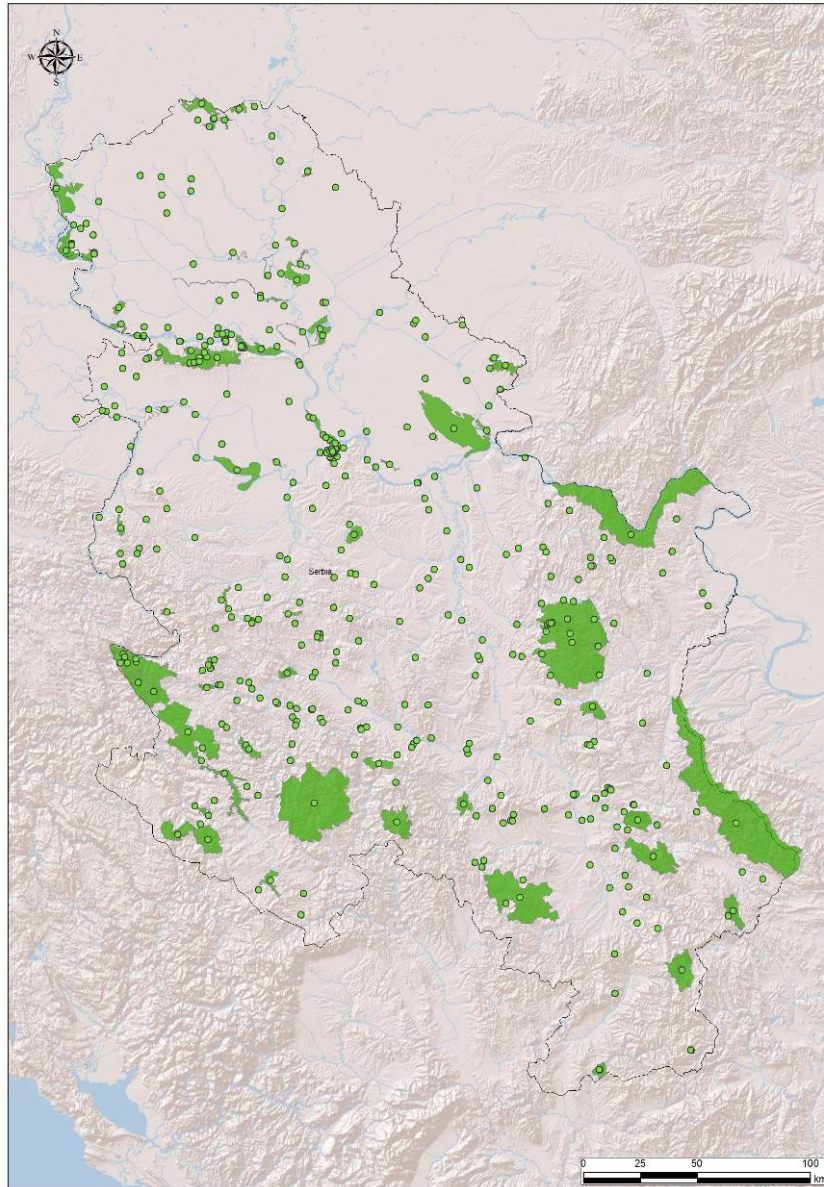


Figure 3.10 Protected areas in Serbia

3.1.5 Protected areas by river basin

In order to follow river basin approach, protected areas by river basin were identified. Below is analysis of areas which are fully inside river basin borders, or just partially. Number per river basin / sub-river basin is as follows:

- In Sava river basin there are 91 protected areas or locations. In Una sub-river basin there are 3 protected areas/locations. In Vrbas river basin there is one monument of nature (Prokoško jezero) and 5 locations protected under national law. In Bosna sub-river basin there are 7 protected areas. In Drina sub-river basin 42 protected areas/locations can be found.
- In Velika Morava river basin there are 91 protected areas/locations.
- In Timok river basin 58 protected areas/locations can be found.
- In Temišnica (Nišava) river basin there are 10 protected areas/locations.
- In Neretva river basin there are 6 protected areas/locations.
- In Morača river basin there are 22 protected areas/locations.

- In Drin – Bune river basin there are 20 protected areas/locations.
- In Mat river basin there are 11 protected areas/locations.
- In Seman river basin there are 4 protected areas/locations.
- In Vjose river basin there are 3 protected areas/locations.
- In Vardar river basin there are 56 protected areas/locations.
- In Bistrice river basin there is 1 protected area.

Conclusion: If a HPP is planned inside a protected area (or area proposed for protection), then additional assurances are needed that construction will not negatively affect habitat and species in the area. According to EU environmental legislation (Section 2.3 Relevant EU directives and policies): **construction in protected area is possible only under a very limited set of circumstances** (e.g. Birds and Habitats Directives – Analysis of the impacts through development of Appropriate assessment, According to article 4(7) of WFD),

To avoid irreversible damage to the nature, we recommend that all WB6 countries define areas in the specific river basin for further HPP development and areas in which HPP development should be limited or completely avoided (“no-go” zones).

3.2 Environmental Analysis for HPP projects in Black Sea drainage basin

Environmental Analysis in the Black Sea Drainage Basin was conducted for 4 river basins (RB) and 60 proposed HPP locations in total (based on consultants' assessment; see Sub-section 3.1.1 - Overview of HPP locations). The river basins assessed were the following: Sava including sub-river basins – SRBs (Una, Vrbas, Bosna and Drina), Velika Morava, Timok and Temišćica (Figure 3.11). After spatial analyses, it was concluded that in the Temišćica river basin there are no HPP objects for evaluation.

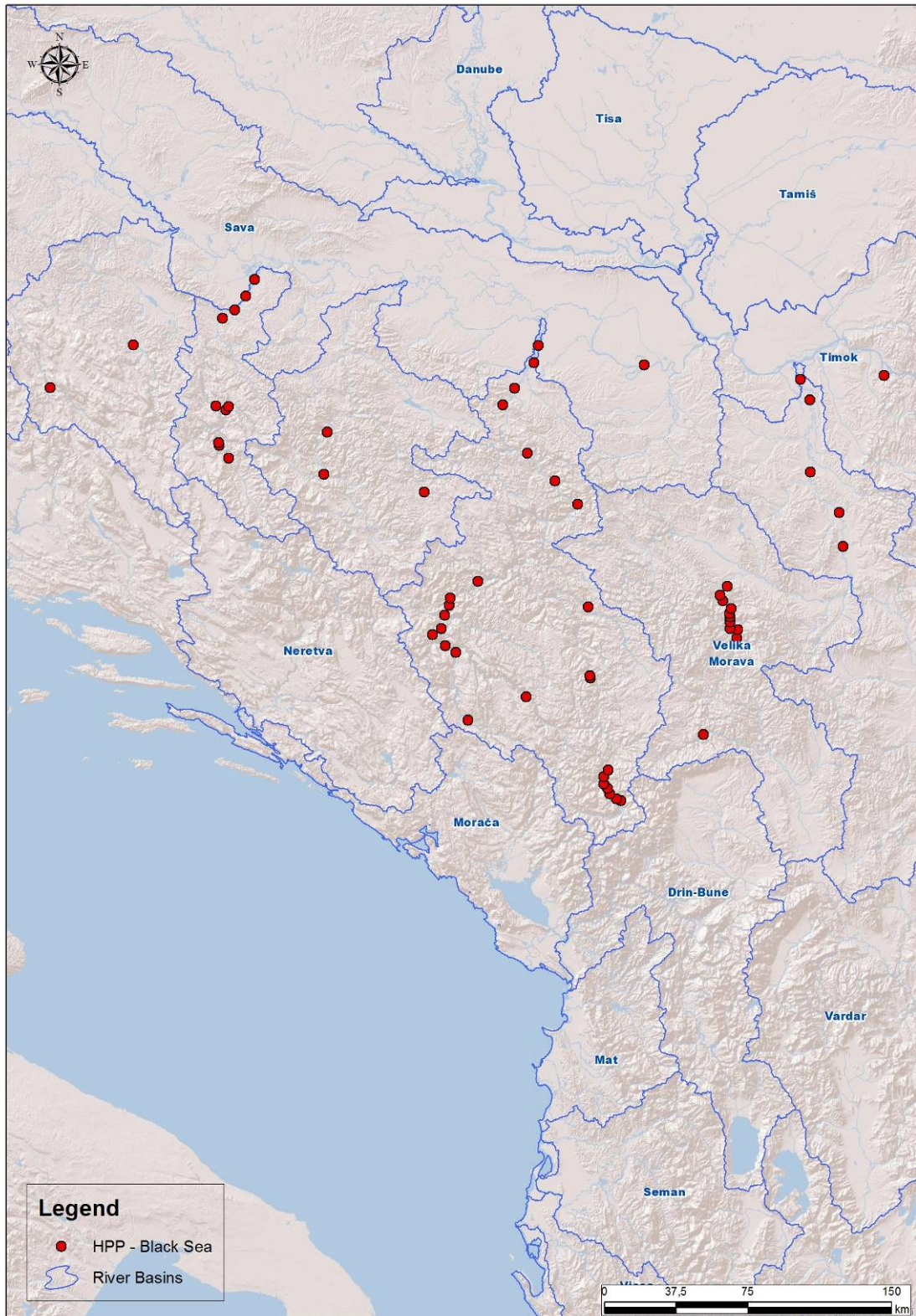


Figure 3.11 HPP Locations in Black Sea drainage basin

3.2.1 RB Sava: Sub RB: Una, Vrbas, Bosna, Drina

The Sava RB has area of 97,713 km² and it is a major drainage basin of South Eastern Europe. The Sava RB, with 12% of area it represents one of the most significant SRBs of the Danube river basin.

According to the Sava River Management plan, the Sava RB hosts the largest complex of alluvial wetlands in the Danube Basin (Posavina - Central Sava Basin) and large lowland forest complexes. The Sava River is a unique example of a river with some of the floodplains still intact, thus supporting flood alleviation and biodiversity. The basin area is shared between six countries: Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and Albania. Excluding Serbia and Albania, its watershed covers 45 to 70% of the surface area of the other four countries. Its water resources represent nearly 80% of the total freshwater resources of those four countries.²⁷ The SRBs of Una, Vrbas, Bosna and Drina are all part of the Sava RB (Figure 3.12).

Una sub-river basin

The Una SRB has an area of 10,816 km², with river length of 214 km and is shared between Croatia and Bosnia and Herzegovina (129 km and 1,686 km² are in Croatia; 85 km and 9,130 km² in BiH) where it forms the border between the two states. The region has a continental climate with annual precipitation between 770 and 1,100 mm. For flood protection, several hydraulic structures were built in the Bosnian section. The Una springs in Croatia and after 12 km enters in the karst mountains in north western BiH. In the middle section, it flows through the Una Sana Canton of BiH. In the lower basin border stretch it flows between hills and mountains covered with mixed forest. The mouth into Sava river is in Croatia, near Jasenovac in the Pounje fertile alluvium area. The main tributaries are the Unac and Sana rivers. In Una SRB there are 3 protected areas: 2 national parks (Una and Kozara) and one strict reserve – reserve of virgin forest Prašuma Lom. The Una region in BiH is characterised by extensive agriculture and cattle breeding (pesticides, pig farms). Since the war, about 80% of people in BiH live in urban settlements; only about 50% are connected to the public water supply and 35% to sewerage systems. 90% of urban sewage is directly discharged into the watercourses. The Una flows through the following towns: Bihać (60,000 inhabitants), Bosanska Krupa, Bosanski Novi, and Dubica. The main pollution problems are sewage and untreated wastewater from the municipalities and high industrialisation.

Vrbas sub-river basin

The Vrbas SRB is a Sava River right tributary, with the mouth at the Sava river at 419 km. The catchment area is 6,386 km² and represents the smallest Sava River tributary in BiH. Vrbas River spring is in the Vranica mountain. Main left Vrbas River tributaries are: Pliva and Krupa River. Main right Vrbas River tributaries are: Bistrica, Ugar, Svrakava, Vrbanja, Turjanica and Povelčić. About 63% of the Vrbas River Basin (4,008 km²) belongs to RS and 37% (2,378 km²) is in FBiH.

Bosna sub-river basin

The Bosna SRB is a Sava River right tributary, with the mouth at the Sava River at 306 km in Šamac. The catchment area is 10,457 km² and Bosna River represents second biggest tributary of the Sava River in BiH. Approximately 3,043 km² (29%) is located on the RS territory and 7,414 km² (71%) in FBiH. The Bosna River spring is located in Sarajevsko polje, in Igman mountain. The main left tributaries of the Bosna River are: the Fojnica, Lašva and Usoran Rivers. The main right tributaries of the Bosna River are: the Tjeljeznica, Miljacka, Stavnja, Krivaja and Spreča Rivers.

Drina sub-river basin

The Drina SRB is the largest right tributary of the Sava River. The catchment area is 19,570 km², with the mouth into the Sava River at 345.9 km and is shared between 4 countries: Bosnia and Herzegovina - 37.1%, Serbia - 30.5%, Montenegro - 31.6% and Albania - 0.8%. The total length of Drina River is approx. 346 km and is created of two rivers: the Piva and Tara Rivers, which flow from Montenegro and form the mouth to the Drina at the location Bastasi (Šćepan Polje). Significant left Drina River tributaries are: the Janja, Drinjača, Tjepa, Prača, Bistrica, Sutjeska and Piva Rivers. Significant right Drina River tributaries are: the Jadar, Lim, Rzav, Čehotina and Tara Rivers. The Lim River is the most important Drina River tributary, with a river basin surface of 5,717 km² (29.2 % of the total river basin).

In the Sava RB, 50 HPP locations were analysed (Table 3.5, Figure 3.12). 11 HPP locations are in protected areas, in 2 national parks, 2 natural monuments and 7 emerald sites. In one location, flooding of a cultural heritage site will occur (Unas – Rmanj Manastir), and at 3 other locations, flooding of cultural site is likely to occur (Ustikolina, Brodarevo 1 and Brodarevo 2). At 22 HPP locations, resettlement may be needed and at 18 locations, HPP construction may negatively affect current land use.

²⁷ International Sava River Basin Commission, Sava River Basin Management Plan, 2014.

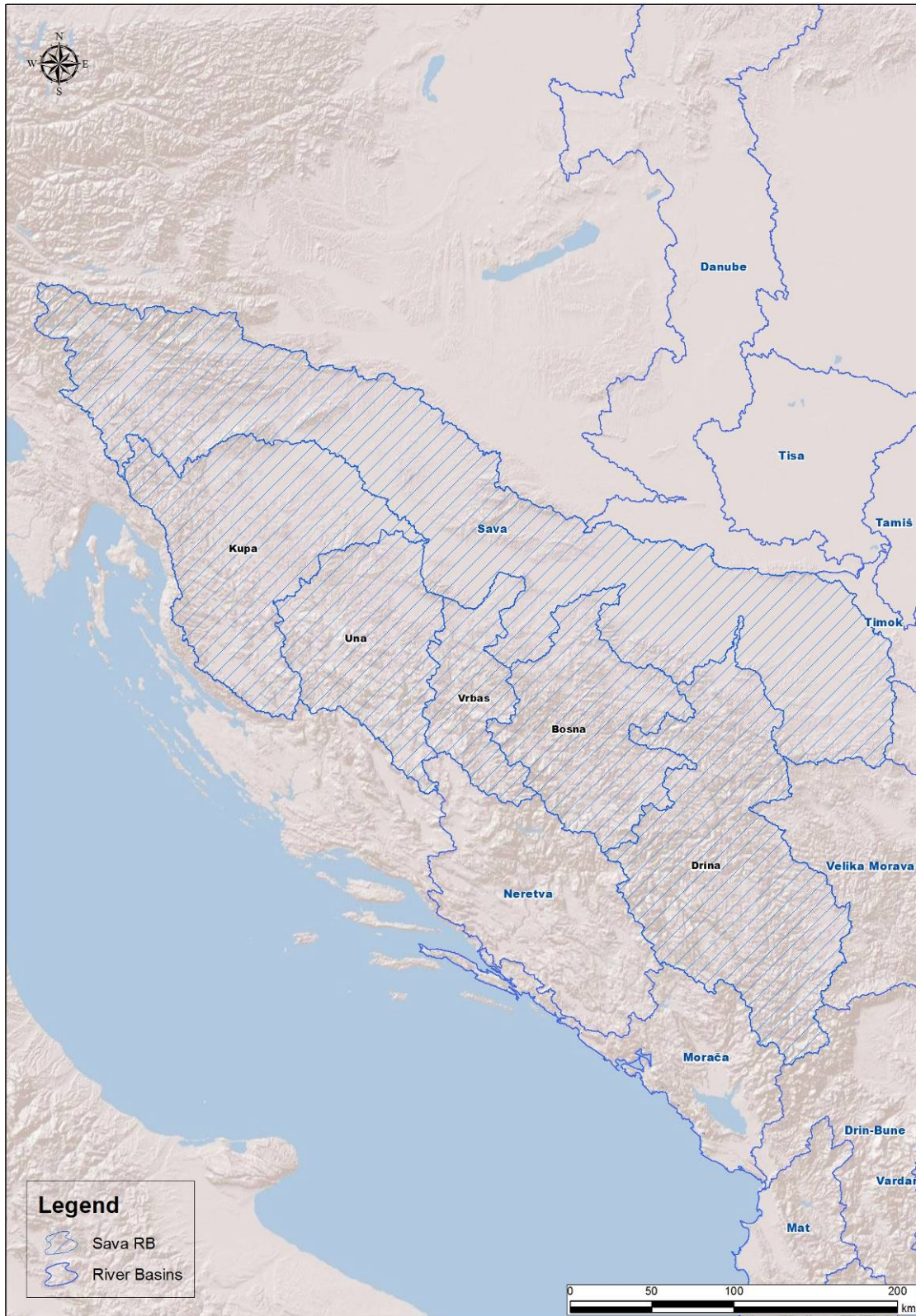


Figure 3.12 Sava river basin with sub-basins

Table 3.5 HPP locations in Sava river basin

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Drina	Gornja Drina / Sutjeska	BiH		Moderate impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Gornja Drina / RHE Buk Bijela	BiH		Low impact	<10%	historical distribution area of target species	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Gornja Drina / Buk Bijela	BiH		Low impact	30-50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Gornja Drina / Foca	BiH		Low impact	30-50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Gornja Drina / Paunci	BiH		No impact	20-30%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Ustikolina	BiH		No impact	20-30%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Drina	Gorazde	BiH		No impact	20-30%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Bosna	Krusevo	BiH		Low impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Janjici	BiH		No impact	10-20%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Vrbas	Babino selo	BiH		Low impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Vrbas	Han Skela	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vrbas	Vinac	BiH		No impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Bosna	Kovanici	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Vrbas	Vrletna kosa	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vrbas	Ugar-Usce	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Vrbas	Ivk	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Una	Unac (Rmanj Manastir/Monastir)	BiH	1-National park	Severe impact s	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	Flooding cultural heritage sites	Resettlement needed
Una	Čaplje	BiH		No impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Vrbas	Trn	BiH		Low impact	<10%	areas of special importance for fish	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage	Resettlement needed

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
						fauna			sites	
Vrbas	Laktasi	BiH		Low impact	<10%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Vrbas	Kosjerevo	BiH		No impact	<10%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vrbas	Razboj	BiH		No impact	<10%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Srednja Drina / Rogacica	BiH SER		No impact	30-50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Srednja Drina / Tegare	BiH SER		Moderate impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Srednja Drina / Dubravica	BiH SER		Low impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Donja Drina / Kozluk	BiH SER		No impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Donja Drina / Drina 1	BiH SER		Low impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Donja Drina / Drina 2	BiH SER		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Drina	Donja Drina / Drina 3	BiH SER		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Drina	Lim / Plav (var 2)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Murino (var 3)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Mostine (var 2)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Jagnjilo (var 2)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Sutjeska (var 2)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Tresnjevo (var 2)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Lim / Navotina (var 3)	MNE	3-Emerald	Severe impacts	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Piva / Komarnica (var 2)	MNE		High impacts	20-30%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Tara / Ljutica (var 1)	MNE	1-National park	Severe impacts	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Drina	Donje Krusevo	MNE BiH	2-Nature Monument	Severe impacts	>50%	areas of special importance for fish	Single HPP with reservoir/derivative or Run-of-river with dam	HPP will negatively affect current landuse	No impacts on cultural heritage	No resettlement

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
						fauna	height above 25 m		sites	needed
Drina	Brodarevo 1	SER		High impact	<10%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will negatively affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Drina	Brodarevo 2	SER		High impact	30-50%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will negatively affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Drina	RHE Bistrica	SER		Moderate impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Sava	Kupinovo	SER		Moderate impact	<10%	historical distribution area of target species	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Bosna	Cijevna 1	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Cijevna 2	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Cijevna 3	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Cijevna 4	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Cijevna 5	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed

Sub river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Bosna	Cijevna 6	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Bosna	Doboj	BIH		No impact	<10%	historical distribution area, all mitigation measures applied	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed

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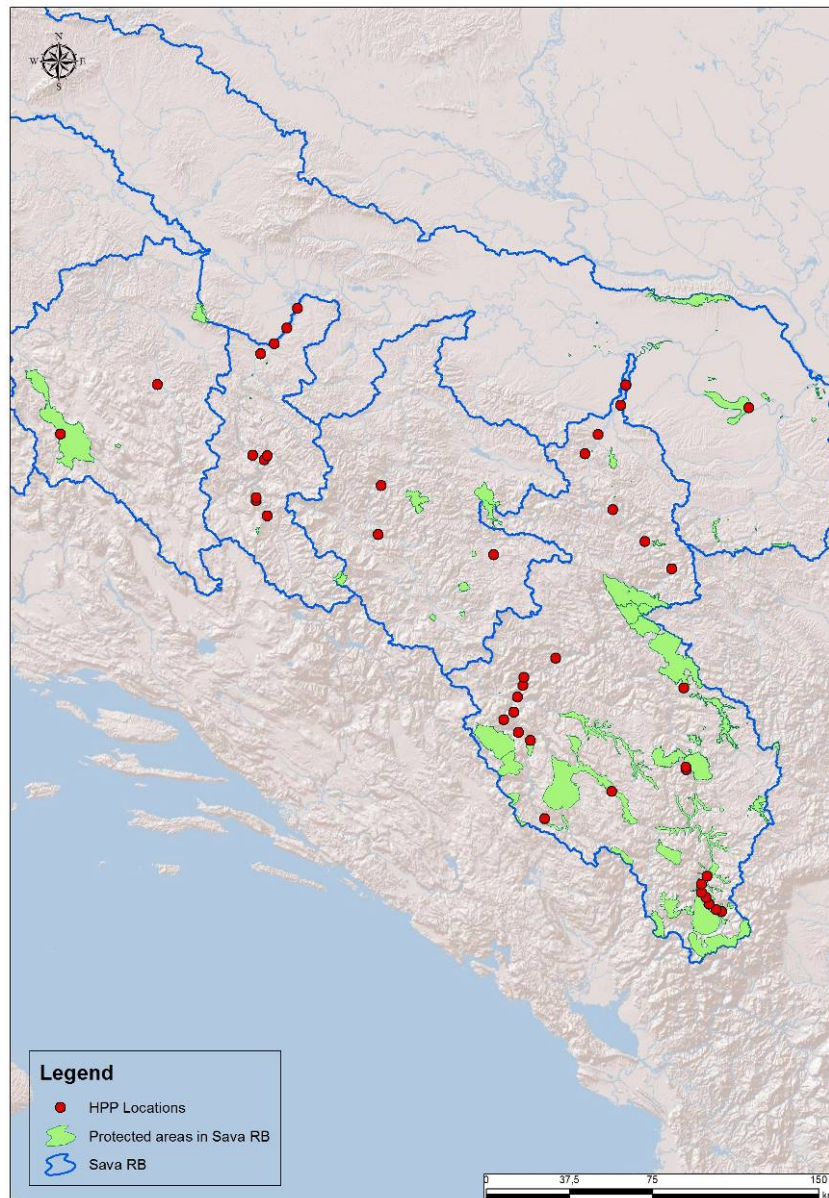


Figure 3.13 HPP locations in Sava river basin

3.2.2 RB Velika Morava

The Velika Morava RB has 6,126 km², and is part of the larger Morava system (37,444 km²) (1,237 km² in Bulgaria and 44 km² in the former Yugoslav Republic of Macedonia). The Velika Morava flows through the most fertile and densely populated area of Central Serbia (42,38% of Serbia), named the Morava river valley or Pomoravlje. Pomoravlje was formed in a fossil bay of the vast, ancient Pannonian Sea which dried out 200,000 years ago. Through about half of its length it passes through the beautiful Bagrdan gorge (Bagrdanska klisura). In past centuries, it was known for its seemingly endless forests, but there is almost nothing left today of those historic woods.

The tributaries of the Velika Morava are short, the longest being the Jasenica (79 km) and others rarely exceeding 50 km. Right tributaries are: the Jovanovačka reka, Crnica, Ravanica, Resava and Resavica (or Resavčina). Left tributaries are more numerous, including: the Kalenička reka, Lugomir, Belica River, Lepenica, Rača, and Jasenica. Many of them do not usually carry much water, but in rainy years, they are known for causing major floods, which has been a big problem for the entire Morava river system. Before it meets the Danube, the Velika Morava splits, creating a 47km-long arm called the Jezava, which flows into the Danube separately, in the town of Smederevo. It is joined by a longer (51 km) river, the Rajka, from the left.

Even though the Morava valley has always been the most populous part of Serbia, disastrous flooding has prevented people from settling on the river banks themselves. The only urban settlement on the river banks is Čuprija, but it often suffers from floods (including several times in the 1990s). Other urban settlements, built a little further away from the river itself, include: Paraćin, Jagodina, Batočina, Lapovo, Svilajnac, Velika Plana, Požarevac and Smederevo. Smaller places and villages include: Varvarin, Glogovac, Markovac, Veliko Orašje, Miloševac and Lozovik.

The Velika ("Great") Morava begins at the confluence of the South Morava and the West Morava, located near the small town of Stalać, a major railway junction in central Serbia. From there to its confluence with the Danube northeast of the city of Smederevo, the Velika Morava is 185 km long. With its longer branch, the West Morava, it is 493 km long. The South Morava, which represents the natural headwaters of the Morava, used to be longer than the West Morava, but due to the regulation of the river bed and melioration, it is shorter nowadays.

The most distant water source in the Morava watershed is the source of the Ibar River, the right and longest tributary of the Zapadna Morava, originating in Montenegro, which gives the Ibar - West Morava - Great Morava river system a length of 550 km, which makes it the longest waterway in the Balkan Peninsula.

In the Velika Morava river basin, 16 HPP locations (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.6, Figure 3.14). There are no locations in protected areas, no impact on cultural heritage sites. At 8 HPP locations resettlement may be needed and at 10 locations HPP construction may negatively affect current landuse.

Table 3.6 HPP locations in Velika Morava river basin

Sub-river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Zapadna Morava	Ribarice	SER		High impact	<10%	areas of special importance for fish fauna	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Zapadna Morava	Ibar / Bojanici	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Zapadna Morava	Ibar / Gokcanica	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Zapadna Morava	Ibar / Usce	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Zapadna Morava	Ibar / Glavica	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Zapadna Morava	Ibar / Cerje	SER		Moderate impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Zapadna Morava	Ibar / Gradina	SER		Moderate impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Zapadna Morava	Ibar / Bela Glava	SER		Moderate impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed

Sub-river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
							above 25 m			
Zapadna Morava	Ibar / Dobre Strane	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Zapadna Morava	Ibar / Maglic	SER		Low impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Zapadna Morava	Ibar / Lakat	SER		No impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Južna Morava	Velika Morava / Varvarin	SER		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Južna Morava	Velika Morava / Mijatovac	SER		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Južna Morava	Velika Morava / Svilajnac	SER		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Južna Morava	Velika Morava / Trnovce	SER		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Južna Morava	Velika Morava / Ljubicevo	SER		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river	HPP will positively affect current landuse	No impacts on cultural heritage sites	Resettlement needed

Sub-river basin	Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
							with dam height above 25 m			

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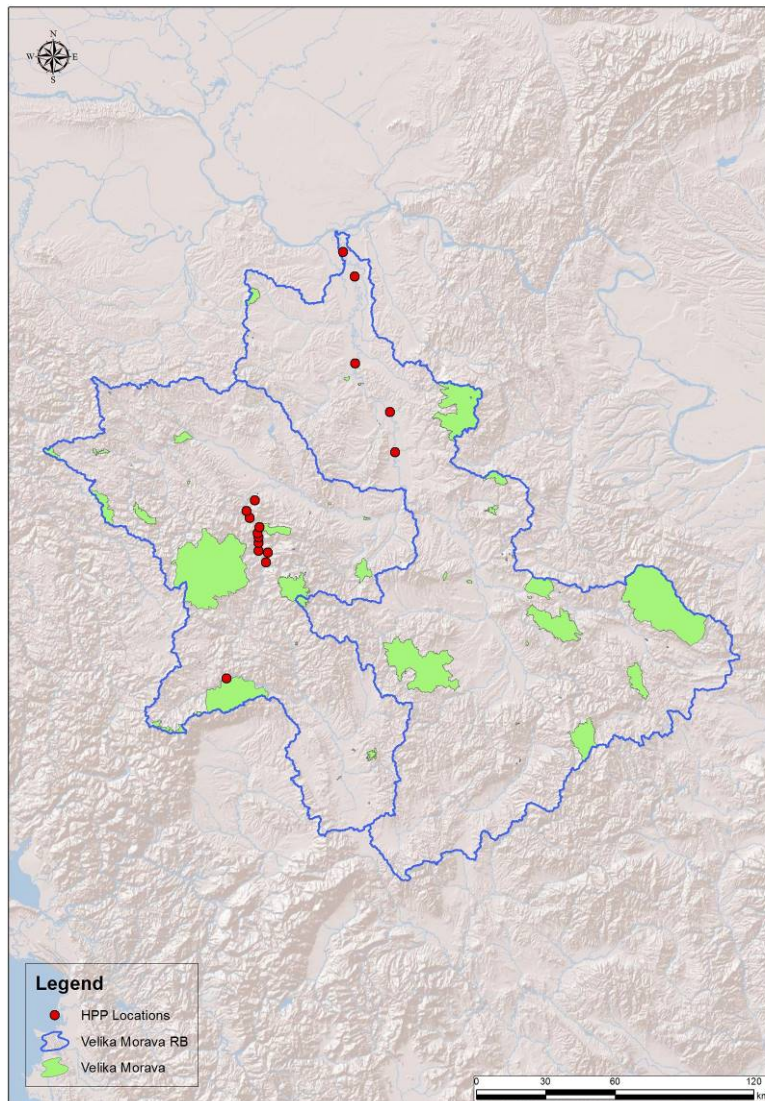


Figure 3.14 HPP locations in Velika Morava river basin

3.2.3 RB Timok

The Timok or Veliki Timok is a river in eastern Serbia and for its last 15 km it forms the border between eastern Serbia and western Bulgaria. The catchment area is 4,630 km². It is a very branchy system of many shorter rivers, a large number of them having the same name (Timok), only clarified with adjectives. From the farthest source in the system, that of the Svrliški Timok, until its confluence into the Danube (as Veliki Timok), the Timok is 203 km long.

Tributaries of the Timok are the Duboki Dol, Beslarica, Golami Dol, Kijevska, Bračevicka, Studena Voda, Pivnica and Eleshchev from the right, and the Lipovička River, Crna reka, Jelašnička reka, Salaška reka, Ogašu Tabu, Brusnički potok, Urovički potok, Plandište and Sikolska rivers from the left. The river has been greatly ecologically damaged in recent years by the mining and heavy metal industry in Bor and Krivelj and is consequently polluting the Danube with lead, copper and cadmium.

In the Timok river basin, 1 HPP location (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) was analysed (Table 3.7, Figure 3.15). The location is outside the protected area but moderate impact may be expected on a protected area nearby, no impact on cultural heritage is expected, and resettlement is not needed. Impact on landuse is not anticipated.

Table 3.7 HPP locations in Timok river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Djerdap 3 - Phase 2	SER	-	Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage	No resettlement need

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**flooded forest, wetlands and/or agricultural land

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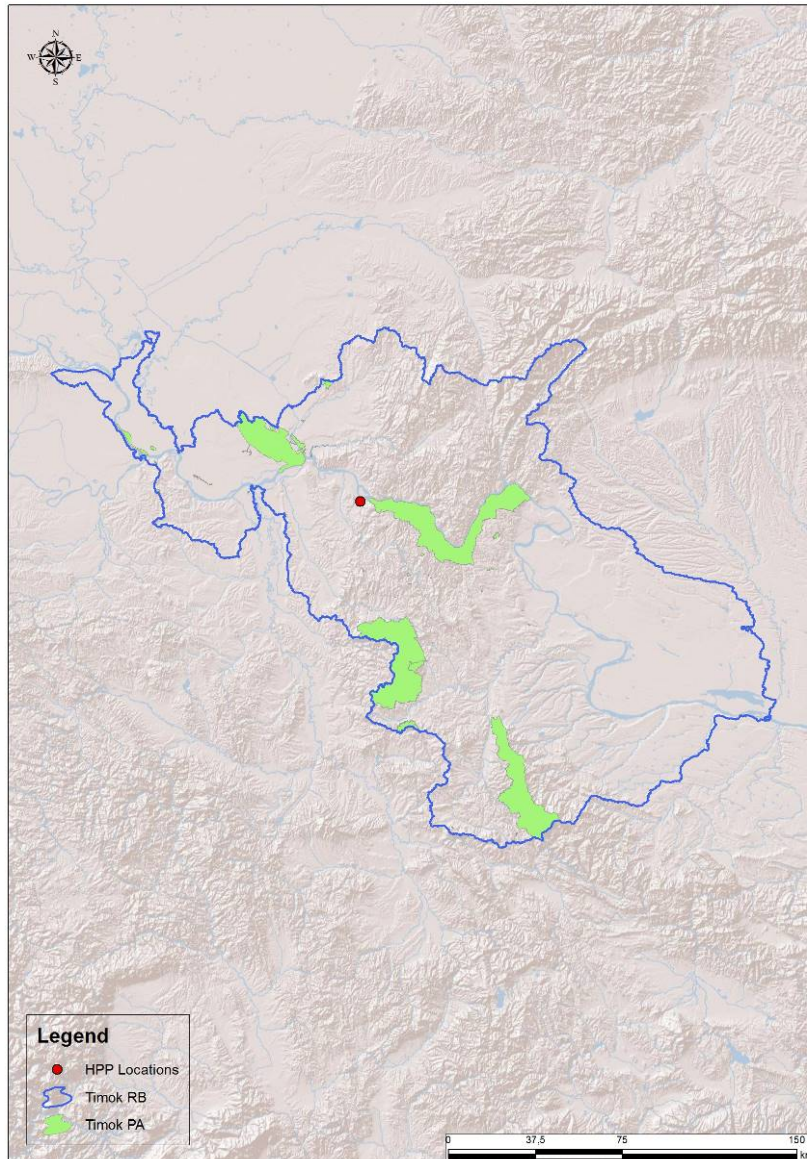


Figure 3.15 HPP locations in Timok river basin

3.2.4 RB Temišnica (Nišava)

In Temišnica river basin (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) there are no HPP locations for analysis and consequently environmental analysis was not conducted.

3.3 Environmental Analysis for HPP projects in Adriatic Sea drainage basin

Environmental Analysis in Adriatic Sea Drainage Basin was conducted for 9 river basins and 68 HPP locations in total (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations). The river basins assessed were the following: Neretva with Trebišnjica, Morača, Drin-Buna, Mat, Seman and Vjose (Figure 3.16).

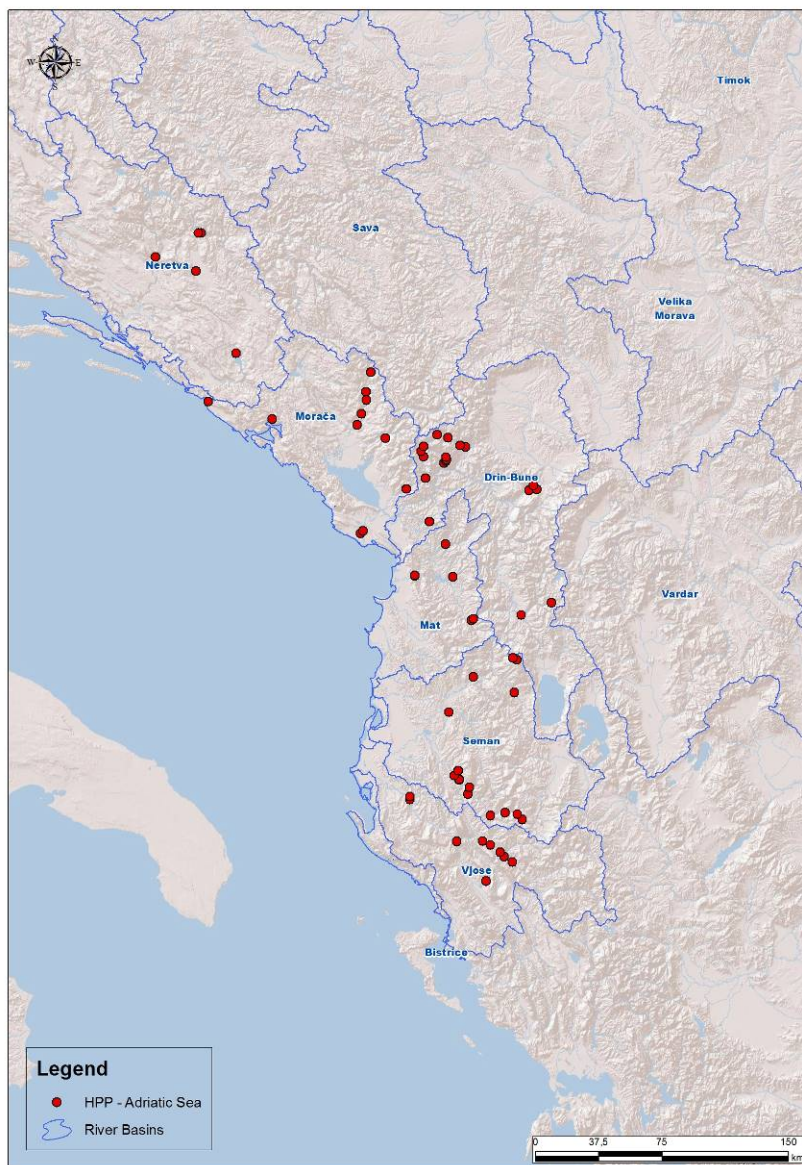


Figure 3.16 HPP Locations in Adriatic Sea drainage basin

3.3.1 RB Neretva (with Trebišnjica)

The Neretva river basin is 10,380 km² and is shared between: Bosnia and Herzegovina 10,110 km² with the addition of the Trebišnjica river watershed and Croatia, 280 km². The Neretva flows through Bosnia and Herzegovina and Croatia until reaching the Adriatic Sea. It is the largest karst river in the Dinaric Alps in the eastern part of the Adriatic basin/watershed. Its total length is 230 kilometres, of which 208 kilometres are in Bosnia and Herzegovina, while the final 22 kilometres are in the Dubrovnik-Neretva County of Croatia. The Neretva forms impressive canyons and gorges and on its way to the Adriatic Sea and creates a delta of rich wetlands such as Hutovo Blato (a nature park (IUCN category V) and Ramsar site) and Neretva delta (Ramsar

site and Natura 2000 site in Croatia). Towns and villages on the Neretva include Ulog, Glavatičevo, Konjic, Čelebići, Ostrožac, Jablanica, Grabovica, Drežnica, Bijelo polje, Vrapčići, Mostar, Buna village, the historical town of Blagaj, Žitomislići, the historical villages of Počitelj, Tasovčići, Čapljina, and Gabela in Bosnia and Herzegovina; and Metković, Opuzen, Komin, Rogotin, and Ploče in Croatia. The biggest town on the Neretva River is Mostar in Bosnia and Herzegovina.

The Neretva and Trebišnjica river basin accounts for almost 35% of freshwater in BiH. It hosts extremely valuable biodiversity and plays a crucial socio-economic role in the production of electricity, providing drinking water supply and agriculture. Industrial plants are mainly situated at bigger settlements (primarily food, aluminium, timber, construction material and light industry). Most settlements and industrial capacities have no wastewater treatment and discharge their wastewater directly into the river.

In the Neretva river basin 8 HPP locations ((based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.8, Figure 3.17) – 5 locations and one variant solution for Gornja Neretva / Bjelimici. There are no HPP locations in protected areas and there are potential impacts on 3 cultural heritage sites. Resettlement may be needed in all but one proposed locations but without drastic change in landuse.

Table 3.8 HPP locations in Neretva and Trebišnjica river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Gornji Horizonti / Bileca	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Gornji Horizonti / Nevesinje	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Skakala	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Dubrovnik 2	BiH HRV		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Risan-Boka (var 1)	MNE BiH		High impact	<10%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Gornja Neretva / Bjelimici	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Gornja Neretva / Bjelimici	BiH		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed
Gornja Neretva / Glavicevo	BiH		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed

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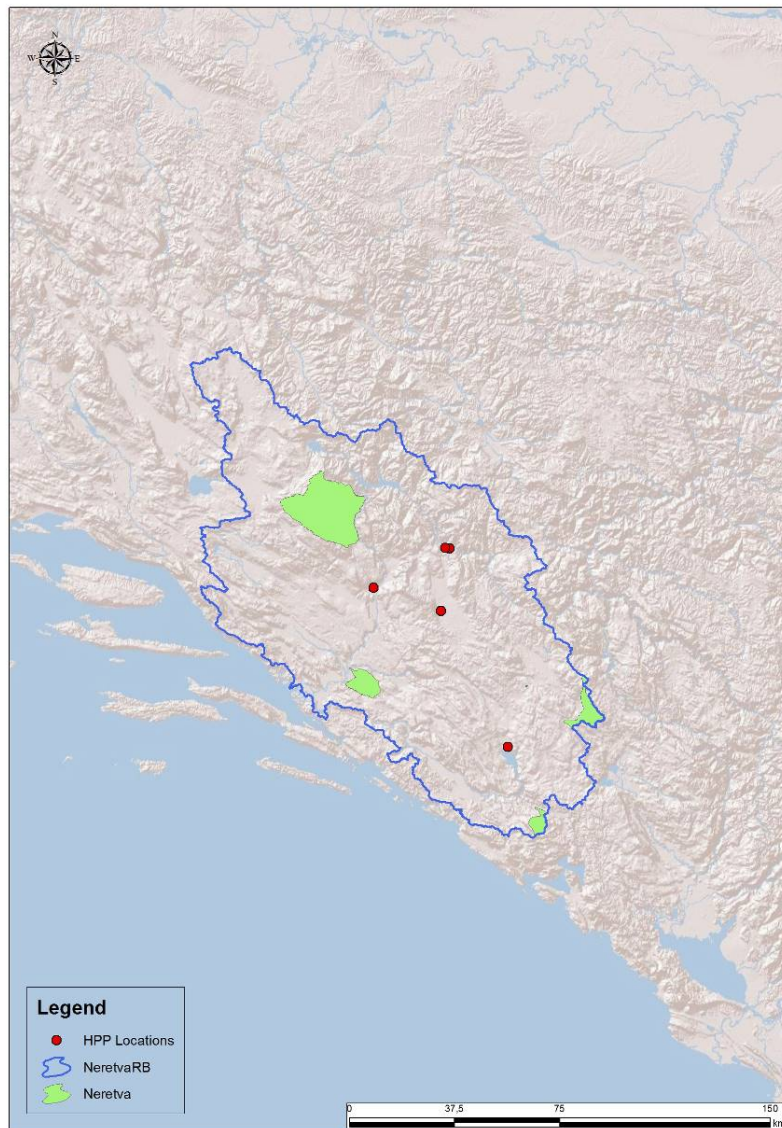


Figure 3.17 HPP Locations in Neretva river basin

3.3.2 RB Morača

Morača River originates in northern Montenegro, under the Rzača mountain, at a height of 975 meters. In the Kolašin region, the Morača's tributaries are the Koštanica, Sjevernica, Trnovačka Rijeka /River, Javorski Potok /Brook, and the Slatina, on the Mrtvica, Ibrištica, Ratnja, and the Slatina, on the left, and the Mrtvica, Ibrištica, Ratnja and the Požanjski Potok on the right. The Morača has one of most beautiful river canyons in Montenegro which separates the Moracke Planine mountain range from Sinjajevina mountain range. Apart from the Morača's Platije Canyon, its right-hand tributary the Mrtvica also flows, for the most part of its length, through a high canyon. The region of the Morača River Canyon features the steep slopes of the terrain intersected with deep gorges and canyons. The Morača River generally flows southwards some 113 km before emptying into Skadar Lake. In its northern part, the Morača River is a fast, mountainous river, and has cut a beautiful canyon north of Podgorica. After merging with its largest tributary, Zeta River, just north of Podgorica, the Morača River enters the Zeta plain and flows through this flat area of Montenegro until it empties into the Skadar Lake. The Morača River is the biggest tributary of Skadar Lake.

In the Morača river basin, 6 HPP ((based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) locations were analysed (Table 3.9, Figure 3.18). None of the HPP locations are in protected areas. At 4 locations, potential impacts on cultural heritage of local importance can occur. At 3 HPP locations, resettlement may be needed and at 3 locations, HPP construction may negatively affect current landuse.

Table 3.9 HPP locations in Morača river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Moraca / Zlatica (var 2)	MNE		Moderate impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Moraca / Milunovici (var 2)	MNE		Moderate impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Moraca / Raslovici (var 2)	MNE		Low impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	No resettlement needed
Moraca / Andrijevo (var 2)	MNE		Moderate impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Kostanica	MNE		High impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Cem / Tamare	ALB		High impact	<10%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed

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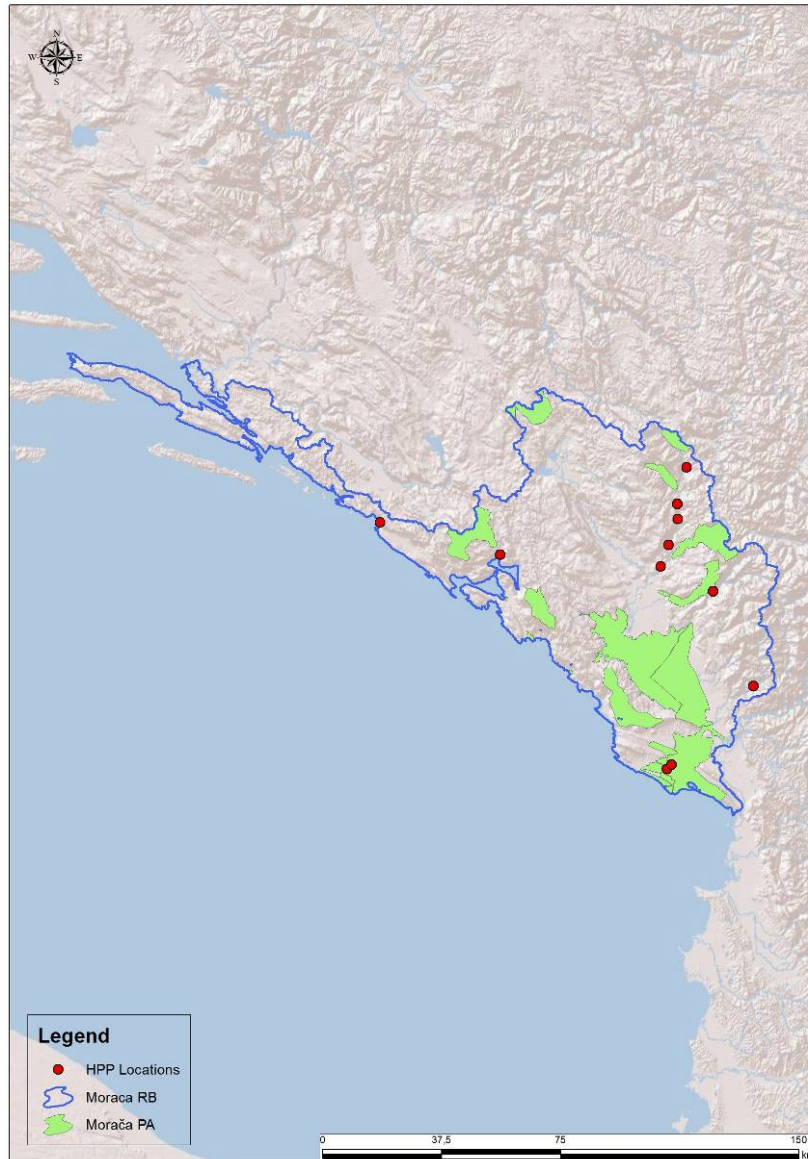


Figure 3.18 HPP Locations in Morača river basin

3.3.3 RB Drin-Bune

The Adriatic Drainage Basin in the former Yugoslav Republic of Macedonia is consisted by the valley of the Black Drim River and its main tributary – the Radika River. This hydrographic system is situated in the western and southwestern parts of the former Yugoslav Republic of Macedonia. The catchment areas of Ohrid Lake and Prespa Lake belong to this basin as well. The Black Drim River is a trans-boundary river that flows from its spring in the former Yugoslav Republic of Macedonia (upstream country) to Albania (downstream country), where, in the vicinity of the town of Kukës, it joins the White Drin (Drim) River. The total length of the river is 149 km, with 56 km being in the former Yugoslav Republic of Macedonia. Their confluence, the Drin (Drim) River, flows further westward and discharges into the Adriatic Sea. The Drin (Drim) River Basin is characterised by mountainous relief, with a mean elevation of 971 m a.s.l. (the highest peaks are over 2,500 m), and flat land in the coastal area in Albania.

The Black Drim River flows out of Ohrid Lake (a controlled outflow since 1962) in the town of Struga, at a height of 695 m a.s.l., to the north, passing through Struga Field, Drimkol Gorge and Debar Field towards its entrance into Albania in the vicinity of the town of Debar. Two major dams and associated reservoirs (Globochica (1965) and Shpilje (1969) with 42 MW and 84 MW installed capacity, respectively) have been constructed on the Black Drim River with a main purpose of hydroelectric power generation. The Shpilje reservoir (also known as Debar

Lake) was constructed at the confluence of the Black Drim and Radika rivers. Because of these hydro-power developments, the Black Drim River bed has been significantly modified.

The Black Drim basin (Figure 3.1) covers a territory of 3,350 km² and is the richest basin with water in the former Yugoslav Republic of Macedonia relative to its surface. It receives approx. 933 mm rainfall on annual basis. Its annual average flow is 52 m³/s. The total average annual discharge of the Black Drim River is approx. 1,640x10⁶ m³.

The Radika River is the most important tributary of the Black Drim River. It is formed by a number of small springs that join at a height from 2,000 to 2,050 meters in the area of Shara and Korab massifs, where the actual watercourse is formed. In this spring area, the watercourse is known as Crn Kamen. The total length of the Radika River is 64.7 km. The total drop of the river from its source to its confluence to Black Drim River (Debar Lake) is 1,773 meters, which is the largest drop among the prominent rivers in the country.

The catchment area of the Radika River covers a territory of approx. 880 km². The average annual flow of the Radika River is 29.7 m³/sec. Its main tributaries (longer than 10 km) are: the Mavrovska River, Ribnica and Mala Reka River.

The River Drin is not just the longest river in the country, but also in the West Balkans. The surface of the river basin is 14,173 km² with a length of 285 km. The river is formed by the union the Black Drin, which stems from the Ohrid Lake, with the river The White Drin, that stems from the mountains of the highland area of Zhbelit, as a karstic spring, and after gathering other small streams along the way (Toplugen, Bistricën of Prizrenit, Erenikun etc.) it flows into the Fierza Lake over a length of 136 km.

The River Buna flows from Shkodra lake and after 1.5 km, it joins the river Drini. The river Buna has a length of 44km, with a fall of only 1.2 m/km, and thus creating a number of obliquity large arches. The delta of the River Buna contains a lot of specific branches due to the presence of a number of isles such as: isle of Ada, Franc Jozefit, Isle without a Name etc. The River Buna, after joining with the river Drin, has a high average flow of around 680 m³/s, ranking it as one of the rivers with the highest and significant flow of the hydrographic watershed of the Mediterranean Sea.

The Old River of Drini flows near to the city of Lezha and it flows in the Adriatic Sea on the south of the village of Shengjin, creating a lot of picturesque lagoons: the lagoons of Kënellës, Merxhanit, Kune-Vain etc., which communicate with the sea through both natural and artificial canals. In the hydrographic system, the lake of Shkodra and the river Buna collect the waters of the watershed of River Drini Delta (Shkoder-Lezhe) with a surface of 5,221 km². The Lake of Shkodra, with a surface of around 365 km² and a depth of 7m, plays a significant natural regulatory role of the water flow of the river Buna, being a huge decant for all the feeds flowing into the lake. This fact helps the river Buna to be as clean as possible once it joins the river Drini. Although, the situation does not improve after the two rivers are joined, as the river Drini brings a lot of solid materials from the other streams that flow into it (Kir, Gjader), which end up flowing into the river Buna. For this reason, the river Buna has lost its ability to be a navigable river as its riverbed is lowered in depth, enhancing the possibility of floods.

In the Drin-Buna river basin, 21 HPP locations (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.10, Figure 3.19). 4 HPP locations are in protected areas, in national parks. In one location, flooding of cultural heritage site may occur (Boškov most). At 4 HPP locations, resettlement may be needed and HPP construction will not negatively affect current landuse.

Table 3.10 HPP locations in Drin - Bune river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (affects on current land use)	Cultural heritage	Resettlement
Gomsiqe / HPP 1	ALB		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Shala /Vajvisht	ALB		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Curraj /Curraj 4	ALB		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Curraj /Curraj 3	ALB		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Curraj /Curraj 2	ALB		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Curraj /Curraj 1	ALB		Low impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Shala /Lekaj	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Shala /Nderlyse	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (affects on current land use)	Cultural heritage	Resettlement
Shala /Grunas	ALB	1-National park	Severe impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Begaj	ALB		Moderate impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Valbona / 15	ALB		Moderate impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Valbona cascade/ Valbona2	ALB	1-National park	Moderate impacts	<10%	present or historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Valbona / 9A	ALB	1-National park	Severe impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
PSHP Vërmica	KOS		Moderate impact	<10%	historical distribution area of target species	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Zhur / Zhur 1	KOS		Moderate impact	<10%	historical distribution area of target species	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Zhur / Zhur 2	KOS		Moderate impact	<10%	historical distribution area of target species	Run-of-river HPP with dam height up to 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Shpilje 2 (Spilje 2)	MKD		Moderate impact	<10%	areas of special importance for fish fauna	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will positively affect current landuse	No impacts on cultural heritagesites	No resettlement needed

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (affects on current land use)	Cultural heritage	Resettlement
Boskov Most	MKD	1-National park	Severe impact	<10%	areas of special importance for fish fauna	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	Flooding cultural heritage sites	Resettlement needed
Skavica / Katundi i Ri	ALB		Severe impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Skavica / Skavica 385	ALB		Severe impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
HEC Kiri 1/CASCADE	ALB		No impact	<10%	historical distribution area of target species	SingleHPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed

*Impact on protected areas is a preliminary indication and it is very important to stress that only proper assessment (SEA, EIA) will conclude on the possible impacts of the project to the environment and nature - species and habitats of the protected area

**flooded forest, wetlands and/or agricultural land

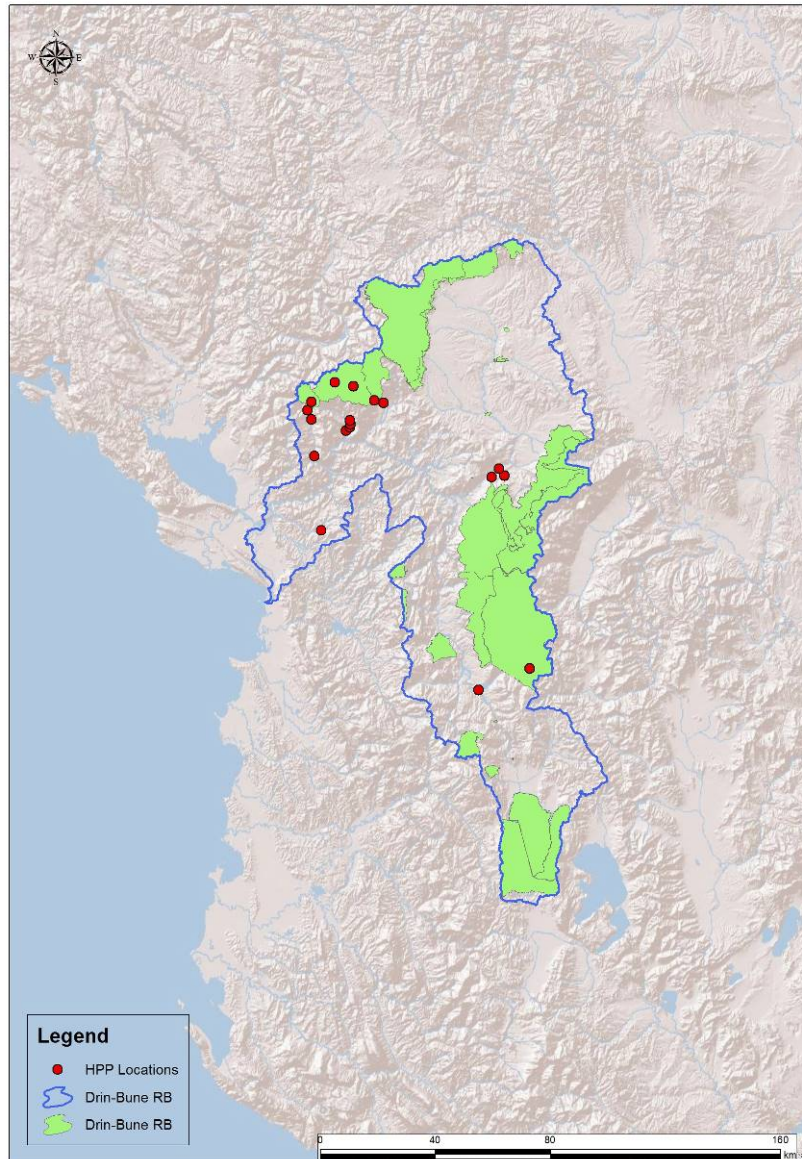


Figure 3.19 HPP Locations in Drin-Bune river basin

3.3.4 RB Mat

The Mat (Mati) is a river in northern Albania with catchment area of 2,441 km². Its source is near Martanesh, in Dibër County. It flows west towards the municipality of Mat, which takes its name from the river, and northwest through the towns of Klos and Burrel. About 10 km downstream from Burrel, it flows into a large reservoir (Liçeni i Ulzës – "Lake Ulzës"). After passing through a hydroelectric dam, it flows through another, smaller reservoir (Liçeni i Shkopetit – "Lake Shkopet") and forms a narrow gorge through the mountain range that separates Mat District from the coastal plains. It enters the plains between Milot and Zejmen.

After a total length of 115 km, the Mat flows into the Adriatic Sea near Fushë-Kuqë, between the towns of Lezhë and Laç.

In the Mat river basin, 6 HPP locations (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.11, Figure 3.20). There are no HPP locations in protected areas, but 4 locations may negatively affect a nearby protected area, and no impacts are foreseen on cultural heritage sites. HPP construction will not affect current landuse and resettlement is not anticipated.

Table 3.11 HPP locations in Mat river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
MATI 2/ Mati Cascade	ALB		High impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
MATI 1/ Mati Cascade	ALB		High impact	<10%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Seke	ALB		Low impact	<10%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Shkopet / Shkopet 3	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Shkopet / Shkopet 2	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Fani / Peshqesh	ALB		No impact	>50%	No target species in the area	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed

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**flooded forest, wetlands and/or agricultural land

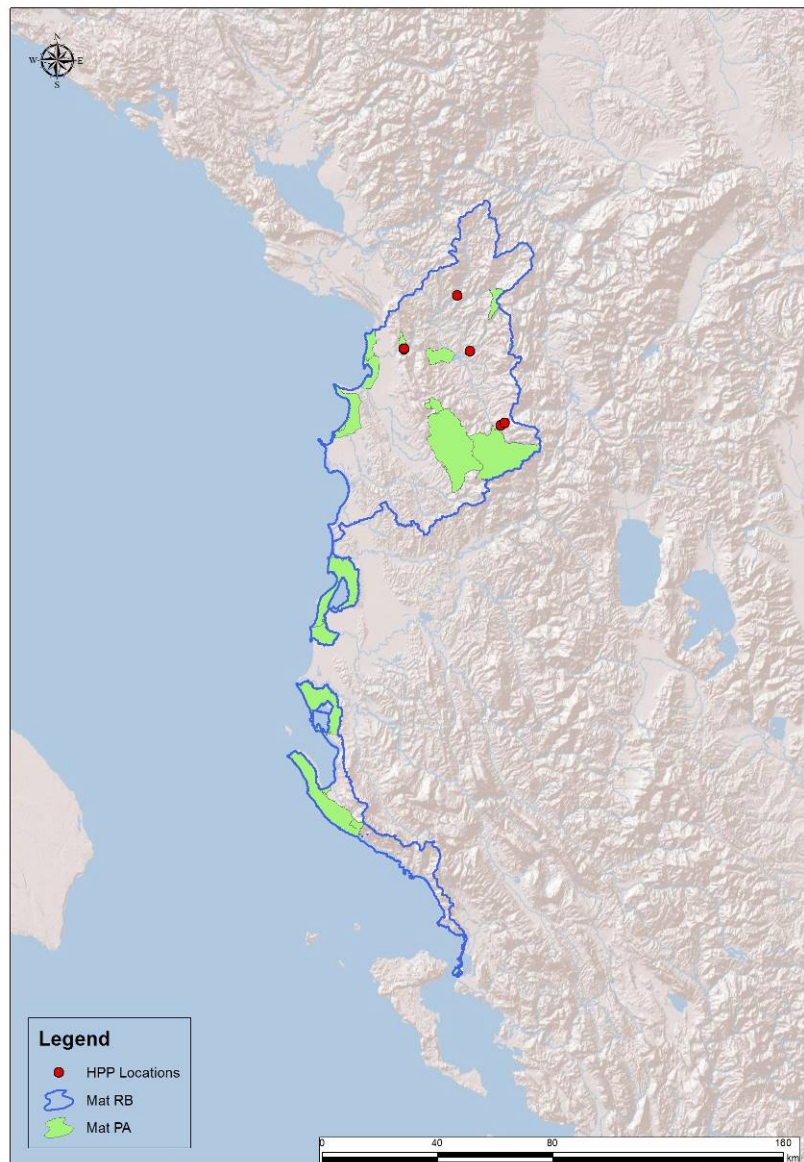


Figure 3.20 HPP locations in Mat river basin

3.3.5 RB Seman

The River Seman is the second longest river in Albania after the Drini River. The river is composed from the union of two rivers, the Osum and Devoll, in the county of Berat, nearby the village of Kozarë. Then it passes along the county of Fier, where the River Gjanica joins it, until it flows into the Adriatic Sea, south of the lagoon of Karavasta. The surface of the river basin is 5,649 km² with a length of 281 km, and the average altitude above sea level is 863 m. Before it flows into the Adriatic Sea, it unites with the river Gjanica. Based on the hydro-meteorological conditions of the basin of the Seman, it is one of the poorest in Albania regarding underground waters. Precipitation, as rainfall, is scarce, with a yearly average of 1,084 mm/year. Average flow is 95.7 m³/s, where 60% is provided by the basin of the Devoll. The amount of solid material being transported along the river stream is about 440 mg/l. The average temperature of the water average is from 6.8°C in January up to 25,5°C in August. The river Seman, together with its two branches, the Devoll and Osum, flow along all the tectonic areas of the country, that are characterised by a complicated structure with permeable soil of 21% of the general surface of the watershed basin, half permeable soil of 51% of the general surface of the watershed basin and permeable soil of 28% of the general surface of watershed basin.

Along the river basin of the Seman, there are 6 existing HPPs producing energy with a capacity of 1-10 MW. Under construction is 1 and there are 6 planned to be constructed, as shown in the Table 3.12 below:

Table 3.12 HPPs along the Seman river basin (>10 MW)

No.	Nomination of the HPP	Capacity	River branch
<i>Under construction</i>			
1.	Banja	> 50 MW	Devoll
<i>Plan to be constructed</i>			
2.	Velushe	10-50 MW	Osoje
3.	Skënderbegas	>50 MW	Tooricë
4.	Kukur 5	10-50 MW	Kukur
5.	Bratila 1	>50 MW	Devoll
6.	Moglica	>50 MW	Devoll

In Seman river basin, 11 HPP locations ((based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.13, Figure 3.21). Two HPP locations are in protected areas, in national parks. There are no impacts on cultural heritage sites. HPP construction will not affect current landuse and at 3 locations, resettlements may be needed.

Table 3.13 HPP locations in Seman river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Osumi / Lapanj	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Osumi / Radovice	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Osumi / Nikollare	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Osumi / Bogove	ALB		High impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Osumi / Polican	ALB		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Osumi / Peshtan	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Thane and Mollas / Mollas	ALB		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Qukes / hec-I Nr.5	ALB		Moderate impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Qukes / hec-I Nr.9	ALB		Moderate impact	<10%	present or historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	Resettlement needed
Zalli i Qarrishtes / HPP-2	ALB	1-National park	Severe impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed
Zalli i Qarrishtes / HPP-3	ALB	1-National park	Severe impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritagesites	No resettlement needed

*Impact on protected areas is a preliminary indication and it is very important to stress that only proper assessment (SEA, EIA) will conclude on the possible impacts of the project to the environment and nature - species and habitats of the protected area

**flooded forest, wetlands and/or agricultural land

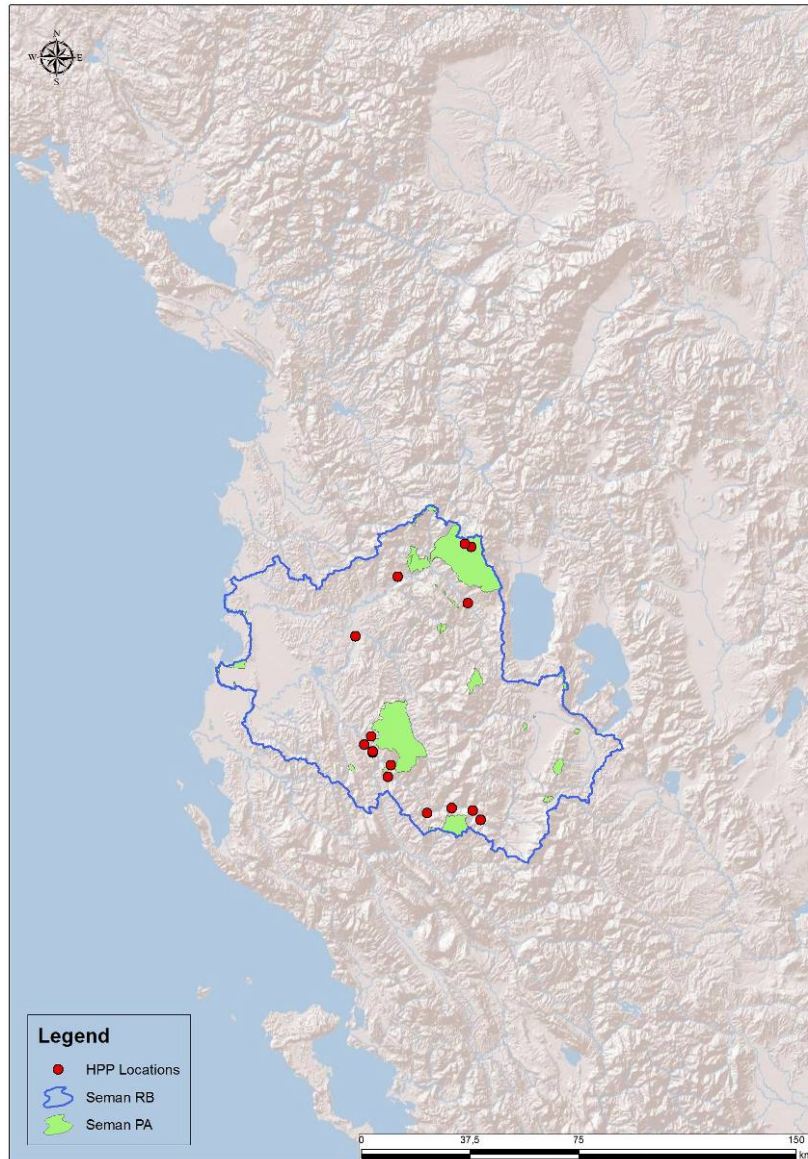


Figure 3.21 HPP locations in Seman river basin

3.3.6 RB Vjose

River Vjosa is one of the longest rivers in the south of Albania, with a length of 272 m, where 86 km flowing outside Albanian territory. The surface of the entire watershed is about 6,710 km². Through its life time, the river Vjosa has changed its bed several times, especially on the west side of the village of Mifol. Up to the villages of Çerven and Mifol it flows over the gravel beds, while on the west it flows over sub-clays. During most of the year, the river flow transports a certain amount of suspended materials, and the water is rarely pure. Based on the climatic factors, the river changes its flow during different months of the year. The lower flow occurs during the months of July-October, and at Mifol it goes up to 20 – 40 m³/s, meanwhile the higher flow occurs during the winter months of up to 400 m³/s. The highest flow measured in Mifol was 2,620 m³/s, and the lowest was 18 m³/s.

In the Vjose river basin, 2 HPP locations (based on consultants' assessment, see Sub-section 3.1.1 Overview of HPP locations) were analysed (Figure 3.22). There are no HPP locations in protected areas and no impacts on cultural heritage sites because the process of designation of protected areas has not yet been achieved. HPP construction will not affect current landuse and no resettlement is needed. However, it is important to mention that, in spite of lack of data, the Vjosa river represents one of the last wild river habitats in Europe and it is very likely that it will become a part of the protected areas network. This location was therefore disregarded / excluded

in the final expert assessment because of the two following two criteria: the presence of a key biodiversity feature and the existence of a judicial case. A robust and precautionary approach should be used accordingly and designation of "no-go areas "and protected areas should be considered.

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Table 3.14 HPP locations in Vjose river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Suha	ALB		No impact	<10%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vjosa / Poçem**	ALB		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	No impacts on cultural heritage sites	Resettlement needed

*Impact on protected areas is a preliminary indication and it is very important to stress that only proper assessment (SEA, EIA) will conclude on the possible impacts of the project to the environment and nature - species and habitats of the protected area

**flooded forest, wetlands and/or agricultural land

*** Decision against the construction of the projected hydropower plant “Poçem” - 2nd May, 2017: Albanian Administrative Court in Tirana announced their decision against the construction of the projected hydropower plant “Poçem” and dam construction has been prohibited. The basis of the construction license, EIA and public participation process, has been inadequate and unsatisfactory according to court rule. This Decision is taken into account in BR 8, when forming a final list of HPP projects which are most promising to be further developed and have potential to be implemented in the future.

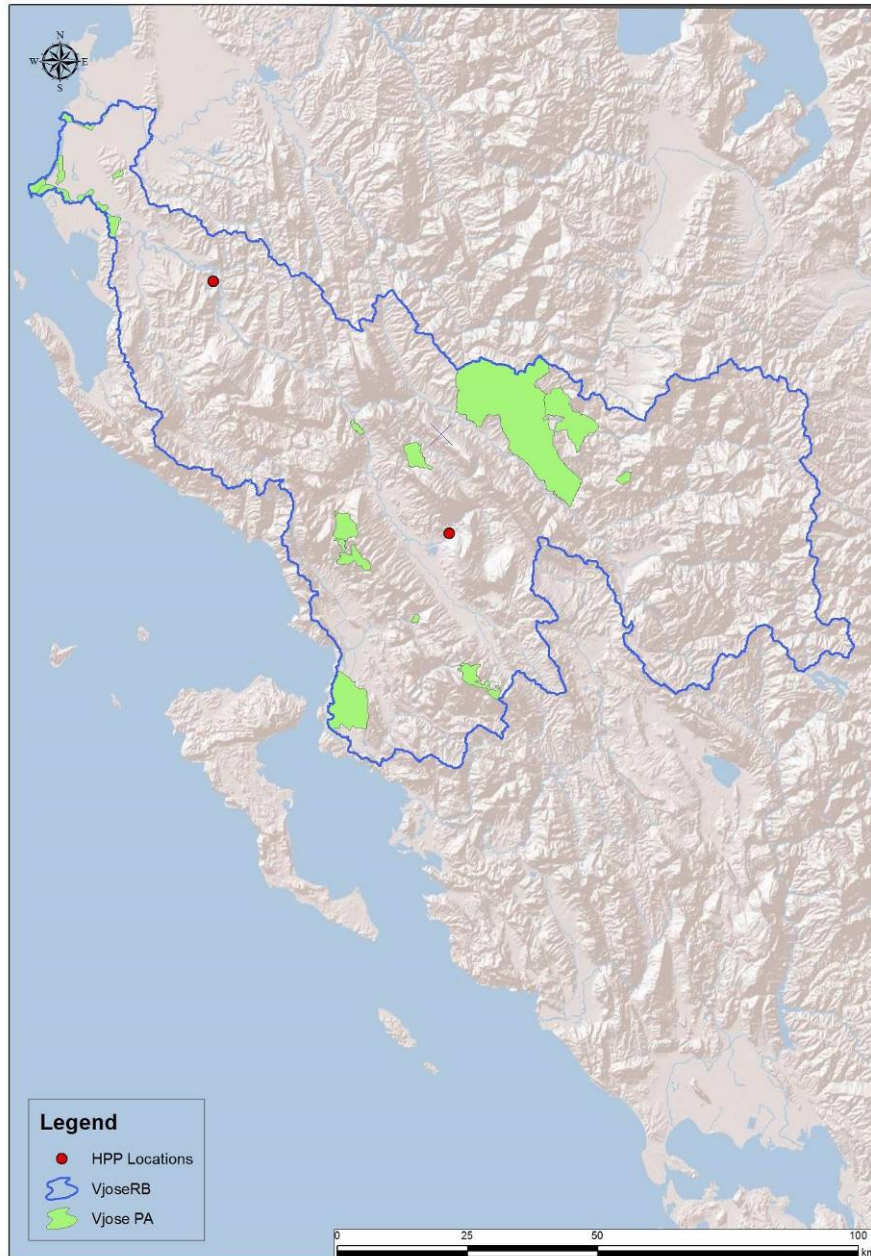


Figure 3.22 HPP Locations in Vjose river basin

3.3.7 Adriatic Sea RB

In the Adriatic sea river basin 1 HPP location (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) was analysed. Impact on protected areas is not expected, but construction may negatively affect current landuse and resettlement could be required.

Table 3.15 HPP locations in Adriatic Sea river basin

Location Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
CHE Vrilo	BIH		No impact	>50%	areas of special importance for fish fauna	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will negatively affect current landuse	No impacts on cultural heritage sites	Resettlement needed

*Impact on protected areas is a preliminary indication and it is very important to stress that only proper assessment (SEA, EIA) will conclude on the possible impacts of the project to the environment and nature - species and habitats of the protected area

** flooded forest, wetlands and/or agricultural land

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3.4 Environmental Analysis for HPP projects in Aegean Sea drainage basin

Environmental Analysis in Aegean Sea drainage basin was conducted for 1 river basin (Vardar) and 15 HPP locations in total. (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations))

The locations of HPPs are shown in Figure 3.24.

3.4.1 RB Vardar

The catchment area of the Vardar River (Figure 3.23) covers a territory of approx. 28,588 km² of which 20,535 km² (72%) belong to the former Yugoslav Republic of Macedonia and 6,843 km² (24%) belong to Greece. The most northern region of the watershed, with an area of 1,210 km² (4%), belongs to Kosovo (Lepenec river) and Serbia (Pcinja river).

The main feature of Vardar's course through the former Yugoslav Republic of Macedonia is its composite character since it runs through five valleys (the Polog, Skopje, Veles, Tikves and Valandovo-Gevgelija valleys) and four gorges (the Dervenski, Taor, Veles and Demir Kapija gorges), which alternately change along the riverbed. Out of the total length of the Vardar River in the former Yugoslav Republic of Macedonia, two thirds (207 km) is plain terrain and one third (94 km) has the characteristics of a narrow valley. The total decline of the riverbed from the river's source to the former Yugoslav Republic of Macedonia – Greek border is 640 m and the average drop 2.1‰.

The total average annual discharge of the Vardar River in an annual average rainfall (600 mm/year) is approx. 4,600x10⁶ m³.

The capital of the former Yugoslav Republic of Macedonia – Skopje - and several big industrial cities with a total population of over 1 million are located along the Vardar River.

The Vardar River Basin is divided into the following (Sub)River Basins: the Upper Vardar, Treska, Lepenec, Middle Vardar, Pchinja, Bregalnica, Crna Reka and Lower Vardar (Figure 3.23).

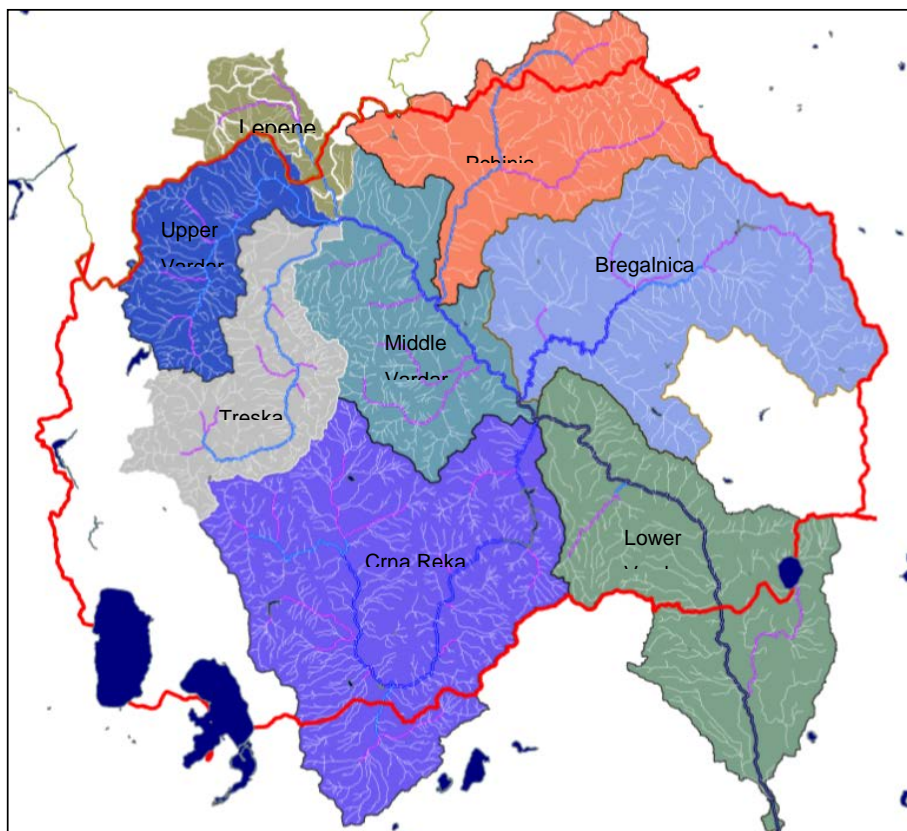


Figure 3.23 Hydrographic elements of the Vardar river basin

Table 3.16 Hydrographic characteristics of major tributaries of the Vardar River

River (river basin)	Total area [km ²]	Total length [km]	Area in Macedonia [km ²]	Length in Macedonia [km]	Average annual flow (Q) ^{*)} [m ³ /s]	Average annual volume (V) [m ³ x10 ⁶]	Specific run- off [l/s/km ²]
Treska	2,068	138	2,068	138	30.0	764	12.9
Lepenec	770	75	75	21	8.7	271	11.2
Pchinja	2,840	137	2,317	76	16.3	400	4.6
Bregalnica	4,307	225	4,307	225	28.0	444	4.1
Crna Reka	5,890	207	5,130	207	37.0	1,178	5.1

*) - At confluence in Vardar River

The main forms of land use in the area of the Vardar River Basin are cropland (68.7%), grassland (7.4%) and forests (7.9%). Water is abstracted from the River Basin area for different purposes: irrigation (63%), fishponds (10%) and drinking water (12%), as well as for municipal and industrial uses (15%).

In Vardar river basin 15 HPP locations (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) were analysed (Table 3.17, Figure 3.24).

Two HPP locations are in protected areas in the area of nature monuments, and 9 can have an impact on nearby protected areas. At 8 locations, flooding of cultural heritage of local importance is likely to occur. At 8 HPP locations, resettlement may be needed.

Table 3.17 HPP locations in Vardar river basin

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Cebren	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Gevgelija	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Vardar / Gjavato (Gavato)	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Galiste	MKD		High impact	>50%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Miletkovo	MKD		No impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Gradec	MKD		No impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Vardar / Demir Kapija	MKD	2-Nature Monument	Severe impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Dubrovo	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Vardar / Krivolak	MKD	2-Nature Monument	Severe impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Kukuricani	MKD		Moderate impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	No impacts on cultural heritage sites	No resettlement needed
Vardar / Gradsko	MKD		No impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed

Location /Project Name	Country	Protected area	Impact on protected area*	Land occupation by the HPP (flooding)**	Target species (migratory / threatened fish species)	HPP Type	Landuse/Livelihoods (effects on current land use)	Cultural heritage	Resettlement
Vardar / Zgropolci	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Vardar / Babuna	MKD		Moderate impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Vardar / Veles	MKD		Low impact	<10%	historical distribution area of target species	Cascade HPP	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed
Tenovo	MKD		No impact	<10%	historical distribution area of target species	Single HPP with reservoir/derivative or Run-of-river with dam height above 25 m	HPP will not affect current landuse	Potential impacts on cultural heritage of local importance	Resettlement needed

*Impact on protected areas is a preliminary indication and it is very important to stress that only proper assessment (SEA, EIA) will conclude on the possible impacts of the project to the environment and nature - species and habitats of the protected area

** flooded forest, wetlands and/or agricultural land

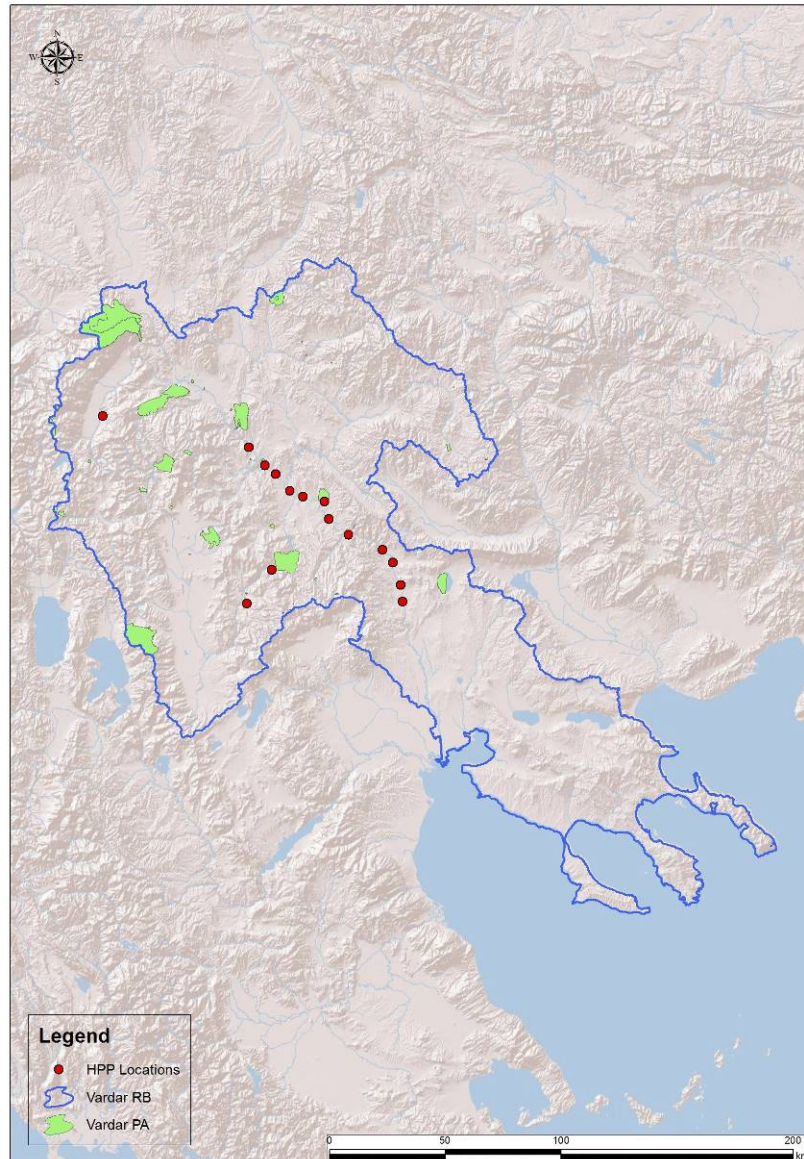


Figure 3.24 HPP locations in Vardar river basin

3.5 Environmental Analysis for HPP projects in Ionian Sea drainage basin

3.5.1 RB Bistrice

River Bistrice: River Bistrice is the only river in the southern part of Albania, with a length of 25km that flows into the Ionian Sea, not navigable. The river springs from the “Mali I Gjerw” mountain and flows toward the south-west part of the country. The river from the its spring until Finiq has created a deep valley, where is actually the national road that connects Gjirokastra with Saranda. Until 1958, the rivers discharged into the Lake of Butrinti. In that year, an intervention was made to derive the flow along the Çuka canal towards the south of the city of Saranda, then into the Ionian Sea.

In the Bistrice river basin (based on consultant's methodology; see Sub-section 3.1.1 Overview of HPP locations) there are no HPP locations for analyses and consequently the environmental analysis was not conducted.

3.6 Environmental Analysis for HPP projects: Rehabilitation projects

On existing dams and hydropower plants, in WB6 countries, the Ecological Acceptable Flow (EAF) has not been established, and even in cases where there is a decision on the EAF, the prescribed flow is not maintained. This fact represents a negative effect of hydropower schemes, on river continuity for sediment transport, and on fish migration, which can be very negative and very hard to mitigate retrospectively.

The Water Framework Directive (WFD) requires that the water bodies (both surface and groundwater) of all EU MSs should achieve 'good status'. The Directive also requires that no such water bodies experience deterioration in status. Good status is a function of both good ecological status and good chemical status, as defined by a number of quantifiable quality elements. One of those biological elements is fish.

Freshwater ecosystems have suffered the most intense intervention of all ecosystems over the past 100 years of human history, with severe consequences on fish biodiversity (Cowx, 2002). Many fish species are now extinct, rare or endangered; the need for conservation action is paramount and the conservation of fish diversity remains one of the most difficult challenges facing the EU in preserving the natural biological diversity. In the Study, we are focusing on two problems caused by the existing HPPs in WB6 region: blockage of migration routes and the usage of water for HPP.

3.6.1.1 Fish migration

The re-establishment of longitudinal (and lateral) connectivity for fish at the catchment level is thought to be crucial for achieving the central targets of the WFD, so implementing suitable measures (fishpasses, removal of dams no longer in use) constitutes a major challenge for the improvement of environmental conditions and for the achievement of the objectives of WFD. The mitigation measures already applied in the WB6 countries result from an increasing awareness of the importance of preserving natural heritage.

Existing HPPs have undoubtedly negative impacts on the rivers and the fish fauna in the WB6 countries, which in magnitude differ from one HPP to another. The blockage of migration routes is just one, significant, impact of the existing HPPs. The EU guideline on hydropower and Natura 2000 mentions: *"Hence the importance of ensuring not only that the fish pass or adapted turbine is built according to state of the art developments in this sector and current best practices but also that a sound monitoring system is in place to provide feedback on its effectiveness. In general, the device should be able to demonstrate through monitoring that all riverine species can enter and that the vast majority (e.g. 85%) can also exit alive."*

We obtained data for 122 HPPs in WB6 region, with capacity ranges both above and below 10 MW (Table 3.18).

Table 3.18 Number of HPP, available data and fishpasses, by capacity range of HPP and country

capacity range	no. of HPP		no. of data		no. of fishpasses	
	> 10 MW	< 10 MW	> 10 MW	< 10 MW	> 10 MW	< 10 MW
Albania	15	137	0	0	0	0
Bosnia and Herzegovina	16	66	7	46	0	46
The former Yugoslav Republic of Macedonia	9	76	8	10	0	0
Kosovo	1	8	1	8	1	8
Montenegro	2	16	2	7	0	0
Serbia	12	85	1	15	1	3
Total	57	388	19	86	2	57

To our knowledge, there are two HPPs in the capacity range above 10 MW, that have fishpasses, one in Kosovo and one in Serbia. The share of large HPPs with fishpasses is small (Figure 3.25), probably because they were

built in times when the importance of free passages for fish was not yet recognised and occasionally because the dams are very high (up to 500 m), which poses a real technical challenge for fish pass construction.

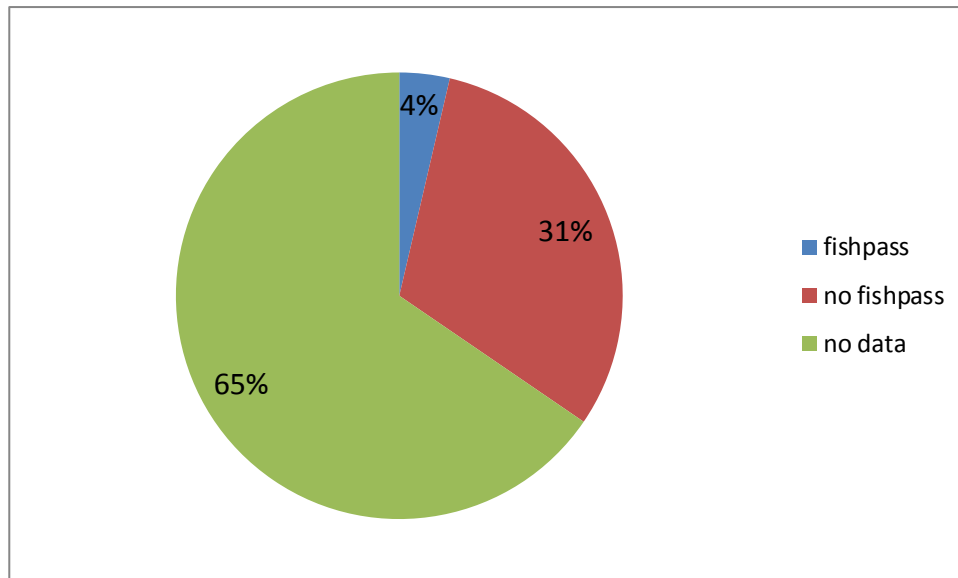


Figure 3.25 Portions of HPP with capacity range above 10 MW, equipped with fishpass, with no fishpass and with no available data

Small HPPs, with capacity range below 10 MW, are more numerous, and the share of those equipped with fishpasses is higher (Figure 3.26). The reasons might be that small HPPs are newer and the weirs are lower and thus easier surmountable. Furthermore, if financed by an IFI, the installation of a fishpass would be required. Two countries stand out. Kosovo, where all small HPPs have fishpasses and Bosna and Herzegovina where 70% of small HPPs are so equipped. The worst situations are, it seems, is in Albania, the former Yugoslav Republic of Macedonia and Montenegro, where no fishpasses have been built so far, according to the data we received.

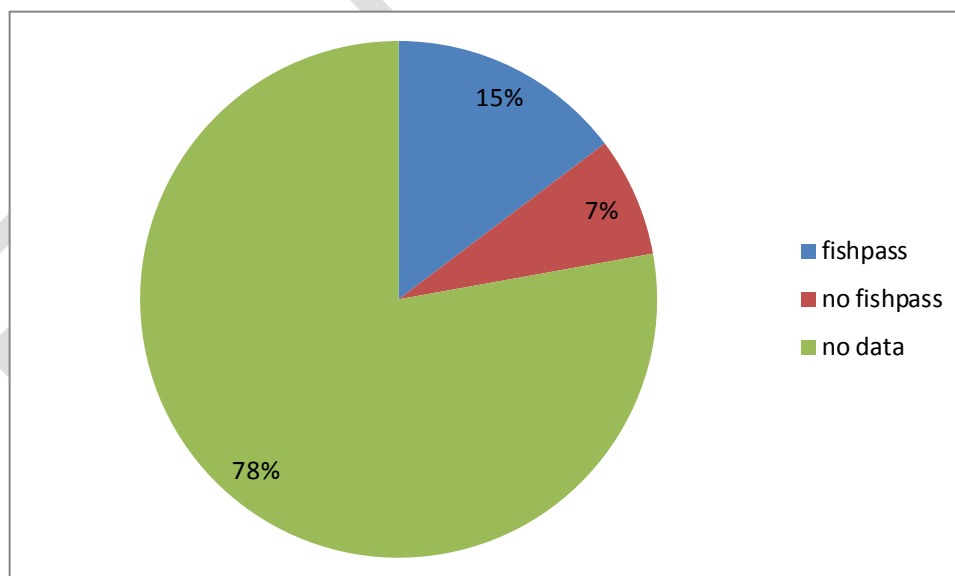


Figure 3.26 Portions of HPP with capacity below 10 MW, equipped with fishpass, with no fishpass and with no available data

Therefore, most of the existing HPPs in the WB6 region are built without fishpasses, which poses a significant threat to the abundance of fish and other aquatic populations, the composition of species as well as to fish migration.

A well-known example is European eel that is widespread below the impassable dams in Adriatic and Aegean Sea Drainages, but cannot reach the stretches of those rivers upstream. For example, this species cannot reach the lake Ohrid from the sea anymore, due to the HPPs on Drin river and Black Drin.

The largest populations of *Alosa immaculate* enter Danube so it is a priority to restore migration routes within the Danube drainage basin and to restore sections with spawning grounds. The impoundments of hydropower plants have also significantly reduced migration routes of *Alosa falax*.

The importance of restoring migration routes of sturgeons in the Danube and major tributaries is recognised by ICPDR (2013) in “Guiding Principles on Sustainable Hydropower Development”. Planning new hydropower plants in river sections formerly used by sturgeons must, at a minimum, include sturgeon migration and habitat requirements in the required EIA, and also a coherent and thorough application of all relevant assessments (e.g. SEA/EIA/Appropriate Assessment under Article 6(3) of the Habitats directive of Natura 2000 areas or equivalent areas under the Water framework directive), including the assessment of transboundary aspects. These assessments must be seen as a prerequisite for sound strategic and project design in hydropower. The allocation of funding to restore sturgeon migration at the Iron Gate dams, for example, must be pursued with the highest priority.

The restoration of downstream connectivity is much less advanced than it is upstream. It has only been recognised more recently. Facilities are needed to support up- and downstream migration, since downstream migration represents a significant process within the fish life cycle. Downstream migration occurs especially after reproduction or during the drift of fry and juveniles. Therefore, significant fish losses may result if continuity is not restored in both directions (ICPDR, 2013).

The efficient functioning of fish passes is a prerequisite for the restoration of free passage in rivers. Studies of existing devices have shown that many of them do not function correctly. Many specialists have therefore declared great interest in generally valid design criteria and instructions that correspond to the present state-of-the-art of experience and knowledge. The International Commission for the Protection of the Danube river (ICPDR) issued a document that provides a summary of existing knowledge in technical solutions for restoring river continuity for fish migration “Measures for ensuring fish migration at transversal structures” (2013) which gives useful information to Danubian countries but which can also be adopted to the other parts of the WB6 region.

Assessment of the functionality of fish passes is of great importance since the results of such monitoring present valuable information needed to make corrections and adjustment of the fishpass. Monitoring should include not just evaluation of abiotic parameters (hydraulic parameters, morphometric dimensions, slope) but also fish – ecological investigations. We were unable to obtain any report on the monitoring of any fishpass in the region, so we conclude that either it is not done or it is performed very rarely. Some basic guidelines, detailing how the assessment of a fishpass should be done, are to be found in above mentioned booklet, published by ICPDR (2013). In our final recommendations, we emphasise the need to adopt legislation which requires the building of fishpasses in the region. The monitoring of the functionality of fishpasses should also be prescribed in legislation.

Functional fishpasses should be planned and built at existing and planned HPPs to connect populations inhabiting different habitats and sections of rivers and enabling migration pathways also for sturgeons and European eel, where their corridor is proven by historical data. Where dams or weirs are no longer in use, removal of the obstacle is also a good option. There are some cases where building a fishpass, especially on an existing dam, is not a suitable solution. A good example is where an obstacle built on a stream prevents the hybridization of a genetically pure population from above the obstacle with genetically polluted population below, which is hybridized with an introduced non-indigenous species. In this case the pure population is now available upstream from the obstacle and building a fishpass would cause its extinction. Such special cases must be assessed case by case. The often heard argument is that populations which have been separated by dams for decades are now adapted to this new situation and it would be harmful to connect them. This assumption however is not supported by scientifically proven facts that isolated populations are not vital and in long term they degrade and possibly extinct due to inbreeding. There are rare situations where building a fishpass is technically impossible, but more often that is an excuse for not financing it.

3.7 Good practices examples and conclusion

The European Commission is providing with the forthcoming guidance document on Natura 2000 and hydropower general principles and good practice recommendations in mitigating impacts and applying ecological restoration measures to hydropower.

Good practice recommendations for environmental mitigation during hydropower refurbishment projects include providing:

- An ecologically optimised river flow reflecting the ecologically important components of the natural flow regime, including a relatively constant base flow and more dynamic/variable flows;
- Where relevant, effective provision for upstream and downstream migration of fish, including sufficient flows;
- Dampening of hydropeaking by, for example, gentle ramping or discharging tailrace flows into a retention basin.

The choice and design of mitigation should take account of relevant site-specific circumstances, in particular the potential for ecological improvement.

Good practice recommendations

- Good practices on strategic planning include:
 - Using the strategic planning process as a key opportunity to help integrate water and energy policy objectives as well as the objectives of other key policy areas, such as nature conservation, climate change vulnerability (e.g. by engaging the different Ministries/policy leads in the development of the plan; sharing ownership of the plan);
 - Linking strategic planning for the water environment, nature conservation and hydropower with the national energy planning on renewable electricity;
 - Involving all interested parties in the development of plans;
 - Using the planning process to help set priorities (e.g. with respect to balancing energy, environment and water management priorities);
 - Transboundary cooperation.
- Good practice uses of strategic plans include:
 - Using the plan to provide upfront information to developers about where (geographically) gaining authorisation will be more, or less, difficult;
 - Using the criteria on which the strategic plans are based as a framework for project level decision-making;
 - Using the policies and criteria established in the plans to help manage risk of cumulative impacts from schemes in the (sub)river basin and even to decommission hydropower plants on priority river sections.
- There is already considerable expertise on strategic planning in relation to hydropower and the water environment. The workshop recommended establishing a mechanism to collate and share the criteria on which countries' strategic planning frameworks are based.

4 Fish fauna and ecologically acceptable flow

4.1 Fish fauna in the WB6 countries

Fish fauna of the Balkans is very diverse; endemic species are numerous. In comparison with Central and Western Europe, the WB6 countries still have long pristine stretches of rivers with highly diverse fish assemblages.

Following the IUCN assessment, freshwater fishes are the most threatened group in Europe, where 37% (194) of species are threatened globally. From all European threatened species, 28% (52) of freshwater fishes occur in the Balkans, which makes the Balkans a “hotspot” for threatened biodiversity in Europe. At least 75 % of threatened fishes in the Balkans are very sensitive to the construction of HPP, which poses the most serious threat to freshwater fishes in the region (Freyhof, 2012).

Freshwater fish fauna of The Balkans, especially in Albania, is still poorly investigated, which demands for comprehensive surveys of freshwater fishes and thorough reflection before planning new HPPs in the Balkans. Our study is mainly based on data obtained from global information systems:

- www.fishbase.org, version (10/2016) (Froese, R. and D. Pauly. Editors. 2016. FishBase. World Wide Web electronic publication),
- IUCN 2016. *The IUCN Red List of Threatened Species. Version 2016-3*. <<http://www.iucnredlist.org>>.

Additional information on distribution of species, their habitat requirements and resistance to changes in the habitat that come with hydropower plants were found in: *Handbook of Freshwater Fishes of Europe* (Kottelat and Freyhof, 2007) and *Threatened freshwater species and molluscs of the Balkan. Potential impact of hydropower projects* (Freyhof, J. 2012).

The threatened species that we present in this study are those whose distribution and conservation status are known relatively well. We did not include the species that are not assessed by IUCN and the species whose taxonomy is still unclear. Threatened species from the WB6 region are presented by drainage basins (DB) and River basins (RB). Scientific names are used for all species, following binomial nomenclature, which is a formal system of naming species of living things. Common names often differ from one source to another.

In total 42 selected fish species were used in the study to delineate the areas which are threatened the most by hydropower development and to illustrate the diverse impacts of HPPs on fish fauna. In Table 4.1 selected species, their ecological requirements regarding habitat and migration as well as their sensitivity to HPP impacts are presented.

Most of the selected species need running waters to survive and thrive (rheophilic species). The transformation from river to accumulation lake, which is formed behind the dam, means a big change in habitat which can be devastating for fish. Regarding their migratory behaviour, there are eight species that as adult fish migrate from the ocean into freshwater rivers and lakes in order to spawn (anadromous), one migrates in opposite direction (from river to the sea, to spawn) - catadromous, at least eight species migrate within rivers in order to get to the suitable spawning grounds (potamodromous). Not all fish species are equally sensitive to habitat alternations, but most of the threatened species in the region are very sensitive to big habitat changes that occur with HPP, including the presence of alien species that are most often introduced after accumulation lake is build. It is well documented that alien species of trouts often hybridize with native trout species, wild form of carp hybridize with feral form of the carp and so on. Most of the presented species do not inhabit accumulation lakes, some persist in them and for those it is often crucial to have access to the spawning grounds in the tributaries. Selected threatened species are hereinafter presented by drainage basins.

Species	Habitat requirements	Sensitivity_habitat	Sensitivity_habitat_description	Migration type	Sensitivity_migration	Adaptability to impoundments
<i>Acipenser gueldenstaedtii</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Acipenser naccarii</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Acipenser nudiventris</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Acipenser ruthenus</i>	rheophilic	moderate	habitat alternations	anadromous	very high	small populations persist, don't spawn
<i>Acipenser stellatus</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Acipenser sturio</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Alburnoides ohridanus</i>	stagnophilic	high	alien species			
<i>Alburnoides prespensis</i>	stagnophilic	high	alien species		low	
<i>Alosa immaculata</i>	rheophilic			anadromous	very high	
<i>Anguilla anguilla</i>	rheophilic	low		catadromous	very high	able to inhabit
<i>Aulopyge huegelii</i>	stagnophilic	high	habitat alternations, alien species		low	
<i>Chondrostoma knerii</i>	rheophilic			potamodromous	very high	able to inhabit if it can enter streams for spawning
<i>Chondrostoma phoxinus</i>	stagnophilic	moderate	alien species		low	able to inhabit
<i>Chondrostoma prespense</i>	stagnophilic /rheophilic			potamodromous	high	able to inhabit if it can enter streams for spawning
<i>Cobitis meridionalis</i>	stagnophilic	high	alien species		low	
<i>Cobitis narentana</i>	stagnophilic	moderate	alien species		low	not able to inhabit (can live in lakes with semi-natural conditions)
<i>Cyprinus carpio - wild form</i>	rheophilic	high	alien species (hybridization with feral carp), disturbance of flooding			able to inhabit
<i>Delminichthys adspersus</i>	stagnophilic	very high	habitat alternations, alien species		low	able to inhabit
<i>Delminichthys ghetaldii</i>	stagnophilic	very high	habitat alternations, alien species		low	able to inhabit
<i>Gobio skadarensis</i>	rheophilic	very high	habitat alternations, alien species	potamodromous	very high	able to inhabit if it can enter

Species	Habitat requirements	Sensitivity_habitat	Sensitivity_habitat_description	Migration type	Sensitivity_migration	Adaptability to impoundments
						streams for spawning
<i>Hucho hucho</i>	rheophilic	very high	habitat alternations	potamodromous	very high	not able to inhabit (sometimes enters from large tributary)
<i>Huso huso</i>	rheophilic			anadromous	very high	not able to inhabit
<i>Oxynoemacheilus pindus</i>	rheophilic	high	habitat alternations, alien species			not able to inhabit
<i>Pelasgus prespensis</i>	stagnophilic	high	habitat alternations, alien species		low	
<i>Phoxinellus alepidotus</i>	stagnophilic	very high	habitat alternations, alien species		low	able to inhabit
<i>Phoxinellus pseudalepidotus</i>	stagnophilic	very high	habitat alternations, alien species		low	able to inhabit
<i>Romanogobio uranoscopus</i>	rheophilic	very high	habitat alternations			not able to inhabit
<i>Salmo marmoratus</i>	rheophilic	very high	habitat alternations, alien species	potamodromous	very high	
<i>Salmo obtusirostris</i>	rheophilic	very high	habitat alternations, alien species (hybridization with alien trouts)	potamodromous	very high	not able to inhabit
<i>Salmo ohridanus</i>	stagnophilic	high	habitat alternations, alien species (hybridization with <i>Salmo letnica</i>)		low	
<i>Salmo pelagonicus</i>	rheophilic	very high	habitat alternations, water abstraction, alien species (hybridization with alien trouts)			not able to inhabit
<i>Salmo peristericus</i>	rheophilic /stagnophilic	very high	habitat alternation	potamodromous /resident	very high	
<i>Scardinius dergle</i>	stagnophilic	very high	habitat alternations, alien species		low	able to inhabit
<i>Scardinius knezevici</i>	stagnophilic	high	alien species		low	
<i>Squalius microlepis</i>	stagnophilic	moderate	alien species		low	able to inhabit
<i>Squalius svallize</i>	stagnophilic	moderate			high	maybe able to inhabit if it can enter streams for spawning
<i>Squalius tenellus</i>	stagnophilic	moderate	alien species		low	able to inhabit

Species	Habitat requirements	Sensitivity_habitat	Sensitivity_habitat_description	Migration type	Sensitivity_migration	Adaptability to impoundments
<i>Telestes metohiensis</i>	stagnophilic /rheophilic	very high	habitat alternations, alien species	potamodromous	very high	not able to inhabit
<i>Umbra krameri</i>	stagnophilic	very high	habitat alternations, disturbance of flooding			not able to inhabit
<i>Valencia letourneuxi</i>	stagnophilic	very high	habitat alternations, alien species			
<i>Zingel streber</i>	rheophilic	very high	habitat alternations			not able to inhabit
<i>Zingel zingel</i>	rheophilic	very high	habitat alternations			not able to inhabit

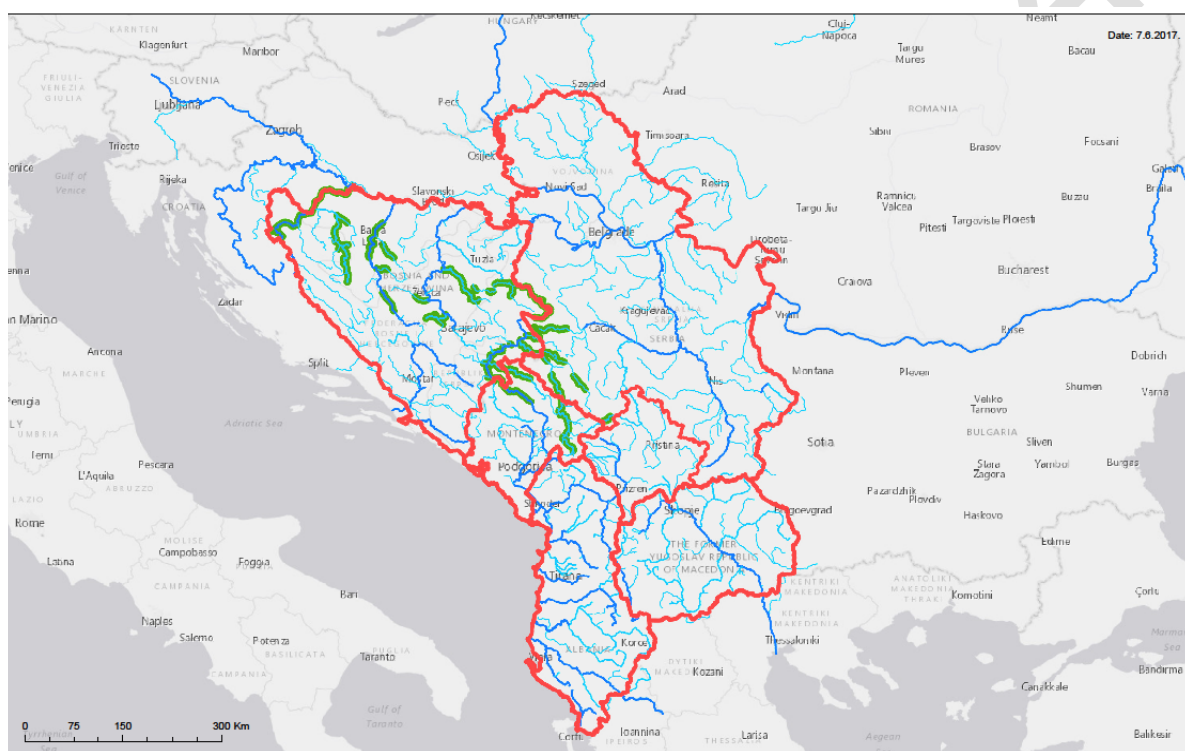
Legend:

rheophilic species	Species which prefer to live in running or fast-moving water.
stagnophilic species	Species which prefer to live in standing water bodies
potamodromous	Species which migrate within streams, migratory in rivers.
anadromous	Species with annual migratory behaviour of adult fish from the ocean into freshwater rivers and lakes in order to spawn.
catadromous	Species with annual migratory behaviour of adult fish from freshwater to the sea to spawn.

4.2 Threatened species in the Black Sea drainage basin

Here we present 12 threatened species that are believed not to be resistant to habitat changes that result from hydropower plants.

Danube Salmon (*Hucho hucho*) is the largest salmonid species living in the Balkan, which is the global hot spot for the species. It is one of the most enigmatic species of Europe's freshwater fauna. Danube salmon is a sensitive indicator species for some of the most ecologically valuable rivers in the Danube drainage. Historically, the species was wide-spread across the entire Danube basin. Its current conservation status is Endangered (E). In 2015, a group of experts from throughout the region published a survey on a status of Danube salmon in the Balkan rivers along with a detailed map of occurrence of self-sustaining populations (Freyhof et al., 2015). Since these are the most up to date data for the species, we used them in our study. There are 34 stretches of rivers with self-sustainable populations of Danube salmon in the WB6 region. Most of them are found in Bosnia and Herzegovina, with a few in Serbia and Montenegro (Figure 4.1).



Source: WBEC-REG-ENE-01 GIS application

Figure 4.1 Distribution of Danube salmon in WB6 region

Sturgeon is a common name for a species belonging to the family Acipenseridae. Once they were present in large and vital populations which declined in the last century to the extent that in the Danube basin there are five species critically endangered (CR) (*Acipenser gueldenstaedtii*, *A. nudiventris*, *A. stellatus*, *A. sturio*, *Huso huso*) and one categorised as vulnerable (VU) (*Acipenser ruthenus*). They are important from the biodiversity perspective as well as from an economic perspective. They are considered as “living fossils” since their morphological characteristics have remained relatively unchanged since the earliest fossil records. They are long-lived and they mature relatively late and can grow quite large. Most of them are long distance migratory species that migrate from marine waters or freshwater estuaries upstream into the rivers to spawn (anadromous). Among European fishes, sturgeons are the family most strongly impacted by human activities. Historically they inhabited the Danube and larger tributaries (Figure 4.2) in Serbia and Bosnia and Herzegovina, but now, their distribution range ends at “Iron gate” – HPP Djerdap, except the one of *A. ruthenus*, which still lives in the Danube and its larger tributaries (Figure 4.3). Sturgeons are highly endangered by hydropower plants which block their migration routes and by habitat degradation, as well as by their overexploitation. *A. ruthenus* is the only one that can somehow resist human impacts. Populations of all species, except *A. ruthenus* depend on

stocking. Present distribution for sturgeon species is not relevant since stocked sturgeons are often hybrids produced in fish farms.



Figure 4.2 Historical distribution of long-distance migratory species in WB6 region



Figure 4.3 Present distribution of *Acipenser ruthenus* in WB6 region

Alosaimmaculata is another long distance anadromous migrant, whose adults ascend the rivers from Black and Azov Sea. Earlier it migrated upstream the Danube to Mohacs (Hungary), and now is absent from WB6 region. It spawns in middle reaches of large rivers.

Cyprinus carpio (wild form) is native in the Black Sea drainage. Its wild form is considered to be still abundant in the Danube and its larger tributaries in Bosnia and Herzegovina and Serbia. The major threats are river regulations (they require flooded areas to spawn) and hybridisation with introduced stocks. It is considered vulnerable (VU).

Umbra krameri is an inhabitant of wetlands, often oxbows with dense vegetation in Sava drainage in Bosnia and Herzegovina, as well as by other larger tributaries of Danube in Serbia. It is considered vulnerable (VU). The major threats are drainage of wetlands, channelization and damming of the rivers which impact the backwaters.

Below, we present three species which conservation status is Least Concerned (LC) at the moment, but they are highly sensitive to changes caused by hydropower plants and further hydropower development in the region would present a significant threat to them. They inhabit the Danube and larger tributaries in Bosnia and Herzegovina and Serbia, and the Vardar drainage in the former Yugoslav Republic of Macedonia.

Zingel zingel is endemic to the Black Sea Drainage basin (the Danube and Dniester drainages). Its habitat is the main course of large and fast flowing waters. The species is impacted by dams as it needs strong currents to survive.

Zingel streber is endemic to the Black Sea Drainage Basin (the Danube and Dniester). Its habitat is main course of small to large rivers, in stretches with strong current. The alternation of habitat due to damming of the rivers presents a high threat to the species.



Figure 4.4 Distribution of *Zingel zingel* and *Zingel streber* in WB6 region

Romanogobio uranoscopus is endemic to the Danube drainage. In the Balkan region, it is absent from the Danube. It inhabits the riffles of small, fast-flowing rivers and bottom of large rivers with strong currents in Bosnia and Herzegovina and Serbia. It is still frequent in suitable habitats but it is declining mainly due to hydropower development and pollution. It is already extirpated in the upper Danube (Figure 4.5).



Figure 4.5 Distribution of *Romanogobio uranoscopus* in WB6 region

Selected threatened species are hereafter listed by river basins.

- ❖ **RB Velika Morava:** *Hucho hucho*, *Zingel zingel*, *Zingel streber*, *Romanogobio uranoscopus*, *Acipenser ruthenus* historically and present;
- ❖ **RB Timok:** *Zingel zingel*, *Zingel streber*, *Romanogobio uranoscopus*, *Acipenser ruthenus* – historically and present and *Acipenser gueldenstaedtii*, *Acipenser nudiventris*, *Acipenser stellatus*, *Husso huso*, *Alosa immaculata* – historically;
- ❖ **RB Temištica:** *Zingel zingel*, *Zingel streber*, *Romanogobio uranoscopus*;
- ❖ **RB Sava:** *Hucho hucho*, *Zingel zingel*, *Zingel streber*, *Romanogobio uranoscopus* and *Acipenser gueldenstaedtii*, *Acipenser ruthenus*, *Husso huso* – historically.

4.3 Threatened species in the Adriatic Sea drainage basin

Fish fauna of the Adriatic Sea Drainage Basin part of the WB6 region is especially diverse. It stands out even among Balkan regions which are known as a “hot spot” of European biodiversity. There are many endemic species and practically each river of the region has its own endemics. We highlight four long distance migratory species and 26 threatened endemic species.

Two long distance migratory species are anadromous (*Acipenser naccarii*, *Acipenser sturio*), one is catadromous – European Eel (*Anguilla Anguilla*). The population of *A. naccarii* is most probably extinct in the wild, there is no evidence of natural reproduction since 1990 in Albania. However, there also is a slim chance that wild individuals still exist there. The species is assessed as Critically Endangered (CE) (Possibly Extinct). Historically the species was present in Bosnia and Herzegovina and Montenegro (Lake Skadar). It was last recorded from ALB in 1997 in the Buna River.

Historically *A. sturio* inhabited rivers from Adriatic see: Neretva, Bojana (to Skadarsko lake in Bosnia and Harezegovina and Montenegro, from the Aegean Sea to Marica and Strumica (The former Yugoslav Republic of Macedonia). At present, it is considered Critically Endangered (CE).

European Eel spawns in Sargasso Sea in Western subtropical Atlantic. Adults die after spawning. Larvae reach the European coast, they mature while migrating upstream and live up to 12 years in the river. They are critically endangered (CR) and their populations are still declining. Weirs and dams block their migration routes and they are extinct from many rivers in Adriatic drainage basin (Bosnia and Herzegovina, Montenegro, ALB), Aegean drainage basin (Albania) and Ionian drainage basin (The former Yugoslav Republic of Macedonia).

Alosa falax enters rivers of WB6 countries from Adriatic Sea (Bosnia and Herzegovina, Montenegro, Albania). It is considered Least Concerned (LC) globally, but it is threatened in the region. The main threats are impassable dams and pollution. Most populations declined during first decades of 20th century.

Numerous endemic freshwater fishes inhabit the karstic fields in Bosnia and Herzegovina (Zupančić, 2008): Glamočko, Livanjsko, Duvanjsko, Popovo, Ljubomirsko, Dabarsko, Fatničko, Nevesinje, Gacko, Cerničko, Lukovac, Mostarsko blato and some others. Special fish fauna which includes many endemic species is also found in lakes Buško, Blidinje, Mandečko. These species have very narrow distribution range. They are often found only on a few locations and are very sensitive to habitat alternations and the presence of alien species that always follow HPP construction: *Aulopyge huegelii* (EN), *Chondrostoma phoxinus* (EN), *Delminichthys ghetaldii* (VU), *Phoxinellus alepidotus* (EN), *Phoxinellus pseudalepidotus* (VU), *Scardinius dergle*(NT), *Squalius svalize* (VU), *Squalius tenellus* (EN), *Telestes metohiensis* (VU).



Figure 4.6 Distribution of threatened species in karstic fields and Neretva drainage in WB6 region

Relatively well known is fish fauna from Neretva, Trebišnjica, Ljuta, Tihaljina and Trebižat, together with special habitats, like Hutovoblato in Bosnia and Herzegovina. Glamuzina et al. (2013) have reported about 45 freshwater fishes, 17 of those with very narrow distribution range. The Neretva drainage holds diverse fish fauna with high portion of endemics (Glamuzina et al. 2013): *Cobitis narentana* (VU), *Chondrostoma knerii* (VU), *Delminichthys adspersus* (VU), *Phoxinellus pseudalepidotus* (VU), *Squalius microlepis* (EN), *Squalius svalize* (VU), *Salmo obtusirostris* (EN), *Salmo marmoratus* (LC).

In the Adriatic Drainage basin, there are three lakes with very unique fish fauna: Lake Skadar (Montenegro, Albania), Lake Ohrid (Albania, the former Yugoslav Republic of Macedonia) and Lake Prespa (Albania, the former Yugoslav Republic of Macedonia).

Lake Skadar is the biggest lake in the Balkans. Lake is mainly fed by river Morača. The Bojana river connects the lake with the Adriatic Sea. 34 fish species are native to Lake Skadar basin, seven of them are endemic (Talevski et al., 2009). There are still many species not been assessed yet. Lake Skadar is important hotspot of freshwater biodiversity (*Gobio skadarensis* (EN), *Salmo obtusirostris* (EN), *Scardinius knezevici* (LC)).



Figure 4.7 Distribution of threatened species of Morača and Lake Skadar

Lake Ohrid is one of Europe’s deepest and oldest lakes, preserving a unique aquatic ecosystem that is of worldwide importance, with more than 200 endemic species. https://en.wikipedia.org/wiki/Lake_Ohrid - cite note-8 The importance of the lake was further emphasised when it was declared a world Heritage Site by UNESCO. About 20% of water comes underground from Lake Prespa. Water leaves the lake by Black Drin river. The lake hosts 21 native freshwater fishes, 7 of them are endemic. The Drin drainage is inhabited by many endemic trouts from genus *Salmo* (Talevski et al., 2009). Plans for building HPP inside the Drin drainage would endanger many of them and other endemic species: *Alburnoides ohridanus* (VU), *Salmo ohridanus* (VU), *Scardinius knezevici* (LC).

Lake Prespa hosts many endemic species as well: *Chondrostoma prespense* (VU), *Salmo peristericus*(EN), *Cobitis meridionalis*(VU), *Alburnoides prespensis* (VU), *Pelagus prespensis*(EN), *Scardinius knezevici* (LC).



Figure 4.8 Distribution of threatened species of Lake Ohrid and Lake Skadar

We did not find many data on freshwater fishes from Albania. The Vjosa River was surveyed along its course in 2014, and 10 species of fish were identified. The most distributed species are: *Barbus prespensis*, *Gobio gobio*, *Squalius cephalus*, *Oxyzoemacheilus pindus* and *Alburnus sp.* *Oxyzoemacheilus pindus* is vulnerable (VU) and *European Eel* is critically endangered (CR), according to IUCN. The species *European Eel*, *Barbus prespensis*, *Alburnoides bipunctatus* and *Oxyzoemacheilus pindus*, *Pachychilon pictum*, *Alburnus alborella*, *Squalius cephalus* and *Gobio gobio*, *Cobitis ohridana* have different conservation statuses, according to IUCN, the Albanian Red Book 2007 and the Bern Convention at European level (GEO Biodiversity Days 2014, Vjosa River Report, Riverwatch, Euronatur, PPNEA). Since its main course is still undammed and unregulated, it represents one of the last European pristine habitats which can host large enough and vital populations.

There is a lack of information on fish fauna of RB Mat, Ishem, Erzen, Shkumbin and Seman, as well.

- ❖ **RB Neretva:** *Cobitis narentana*, *Chondrostoma knerii*, *Delminichthys adspersus*, *Phoxinellus pseudalepidotus*, *Squalius microlepis*, *Squalius svalize*, *Salmo obtusirostris*, *Salmo marmoratus*;
- ❖ **RB Morača:** *Salmo marmoratus*, *Salmo obtusirostris*, *Gobio skadarensis* and *Anguilla Anguilla*, *Acipenser naccarii*, *Acipenser sturio* – historically;
- ❖ **RB Drin-Bune:** *Salmo ohridanus*, *Alburnoides ohridanus*, *Sacardinius knezevici* and *Anguilla Anguilla*, *Acipenser naccarii*– historically;
- ❖ **RB Mat:** *Anguilla Anguilla*– hystorically;
- ❖ **RB Ishem:** /;
- ❖ **RB Erzen:** *Anguilla Anguilla*, *Oxynomacheilus pindus*;
- ❖ **RB Shkumbin:** *Anguilla Anguilla*, *Oxynomacheilus pindus*;
- ❖ **RB Seman:** *Anguilla Anguilla*, *Oxynomacheilus pindus*;
- ❖ **RB Vjose:** *Anguilla Anguilla*, *Oxynomacheilus pindus*.

4.4 Threatened species in the Ionian Sea drainage basin

The Ionian Sea Drainage basin in the WB6 region is represented only by RB Bistrice. Lake Butrint. The River Bistrice is a home of the Corfu toothcarp (*Valencia letourneuxi*), which is a critically endangered species (CE) (Figure 4.9). This species has undergone a suspected population decline of at least 50% in the last 10 years. Major threats are habitat destruction, water abstraction, and aggressive interaction with the introduced species *Gambusia sp.*



Figure 4.9 Distribution of *Valencia letourneuxi* in WB6 region

❖ **RB Bistrice:** *Valencia letourneuxi*.

4.5 Threatened species in the Aegean Sea drainage basin

The Aegean Sea Drainage basin is represented only by one river basin - Vardar. Based on available information we highlight two migratory species (*A. Anguilla* and *A. sturio*), *Z. zingel*, *Z. streber* and *R. uranoscopus* that are all presented above. Specific for the drainage basin is *Salmo pelagonicus* which is assessed as vulnerable (VU).



Figure 4.10 Distribution of *Salmo pelagonicus* in WB6 region

- ❖ **RB Vardar:** *Anguilla*, *Anguilla*, *Acipenser sturio*, *Zingel zingel*, *Zingel streber*, *Romanogobio uranoscopus* and *Salmo pelagonicus*.

4.6 Areas of special importance for fish fauna

An overview of threatened fishes of the WB6 region (Sections 4.2-4.5) reveals that there are some areas with outstanding diversity, high portions of endemic species and pristine and preserved rivers that present a remarkable habitat for many native species. Most of the 42 threatened fish species included in the study were used to delineate six “areas of special importance for fish fauna”, listed below (Table 4.2). The areas hold at least two, but usually more, populations of threatened species and freshwater habitats that are in a condition to maintain these populations:

Table 4.2 Areas of special importance for fish and selected threatened species

Area of special importance for fish	Drainage basin	Country	Target species – IUCN category
Self-sustainable populations of Danube salmon	Black Sea	BIH SER MNE	<i>Hucho hucho</i> (E) <i>Romano gobio uranoscopus</i> (LC)
The Neretva drainage with its endemic fish fauna	Adriatic Sea	BIH	<i>Cobitis narentana</i> (VU) <i>Chondrostoma knerii</i> (VU) <i>Delminichthys adspersus</i> (VU) <i>Phoxinellus pseudalepidotus</i> (VU) <i>Squalius microlepis</i> (EN) <i>Squalius svallize</i> (VU) <i>Salmo obtusirostris</i> (EN) <i>Salmo marmoratus</i> (LC) <i>Acipenser sturio</i> (CE) <i>Anguilla anguilla</i> (CR) <i>Alosa falax</i> (LC)

Area of special importance for fish	Drainage basin	Country	Target species – IUCN category
Karstic fields with its endemic fish fauna	Adriatic Sea	BIH	<i>Aulopyge huegelii</i> (EN) <i>Chondrostoma phoxinus</i> (EN) <i>Delminichthys ghetaldii</i> (VU) <i>Phoxinellus alepidotus</i> (EN) <i>Phoxinellus pseudalepidotus</i> (VU) <i>Scardinius dergle</i> (NT) <i>Squalius svalize</i> (VU) <i>Squalius tenellus</i> (EN) <i>Telestes metohiensis</i> (VU)
The Morača river drainage with Lake Skadar and its unique fish fauna	Adriatic Sea	MNE ALB	<i>Gobio skadarensis</i> (EN) <i>Salmo obtusirostris</i> (EN) <i>Scardinius knezevici</i> (LC) <i>Acipenser sturio</i> (CE) <i>Anguilla anguilla</i> (CR) <i>Alosa falax</i> (LC)
The Drin river drainage with Lake Ohrid and Lake Prespa and its unique fish fauna	Adriatic Sea	ALB MKD	<i>Alburnoides ohridanus</i> (VU) <i>Salmo ohridanus</i> (VU) <i>Scardinius knezevici</i> (LC) <i>Chondrostoma prespense</i> (VU) <i>Salmo peristericus</i> (EN) <i>Cobitis meridionalis</i> (VU) <i>Alburnoides prespensis</i> (VU) <i>Pelagus prespensis</i> (EN) <i>Anguilla anguilla</i> (CR)
The Vjose river as one of the last preserved rivers of Europe	Adriatic Sea	ALB	<i>Anguilla Anguilla</i> (CR) <i>Oxynomacheilus pindus</i> (VU)

These areas hold many but not all populations of threatened species in the region. There is a great need for further ichthyological research. New investigations will result in new lists of species and more precise distribution areas and therefore in an expanded list of key areas with high biodiversity of fish fauna and possibly new species for science, since there are still many taxonomical questions unsolved. The six “areas of special importance for fish fauna” listed above, therefore, present just a preliminary list, based on current knowledge and available data. It is imperative for the region to perform further investigations of fish fauna. It is highly recommended to increase funding and direct research efforts towards freshwater biodiversity to increase knowledge on trends, distribution areas and threats for further effective conservation planning. Investigations should not focus only on fish species but on other freshwater taxa as well. The results would then enable more precise analysis, such as the performance of standardized KBAs procedure to identify freshwater Key Biodiversity Areas in the region, which was elaborated by the International Union for the Conservation of Nature (IUCN, 2014).

New hydropower development in these areas would critically endanger many of threatened species, and might cause their extinction. In order to preserve them and their uniqueness, the existing HPPs should be rehabilitated with functional fishpasses and with applied ecologically acceptable flow, at least. Hydropower plants, planned inside the areas of special importance for fish are listed in Tables 3.5 (Sava RB), 3.6 (Velika Morava RB), 3.8 (Neretva nad Trebišnjica RB), 3.9. (Morača RB), 3.10 (Drin – Bune RB), 3.14 (Vjose RB). The expected impacts of planned HPP inside the “areas of special importance for fish fauna” are described in Section 4.7.1 and present a base for assessments in MCA. Ledec and Quintero (2003) emphasized that “the most effective environmental mitigation measure is good site selection”, which should be the imperative guideline where new locations for HPPs are assessed. Designation of “no-go areas” should be considered.

Areas that are not included in the group “areas of special importance for fish” comprise rivers, streams, oxbows, lakes, ponds and other water bodies inhabited by species that are not yet considered to be endangered or they

belong to long distance migratory group of fishes for which the main threat are unpassable dams that can be mitigated by building efficient fishpasses.

4.7 Impacts of HPP on fish fauna in the WB6 countries

Freshwater species are differently resistant to the changes in the habitat that come with HPP development. The threatened species that are presented in our study are highly or moderately sensitive to those changes, so as a rule we hardly find them in the reservoirs or in the habitats that are directly damaged by the HPP. Existing HPPs in the WB6 region do have negative impacts on the populations of selected species that inhabit habitats downstream or upstream of the HPP or are otherwise connected to it. The same negative effects are expected for HPP that are going to be built in the future, except that most of them will be subject to stricter environmental legislation.

The most common impacts of existing HPP on fish populations are:

- **blocked or seriously reduced passability** of the dam or weir (lack of, or poor performance of fishpass);
- **destroyed spawning grounds**, especially for the species that lay eggs on the stony substratum and have higher oxygen demands;
- **habitat degradation**, due to the transformation of riverine conditions to stagnant water with daily denivelation of water level. **Denivelation** is a difference in water level in the accumulation lake, that results from the operation of the HPP, which causes fish eggs laid on the water vegetation near the shore to dry. The effect is detected on the whole length of the accumulation lake. It severely impacts fishes that need riverine conditions to live and spawn;
- **Effects of hydropeaking**. Hydropeaking is the fluctuating release of different volumes of water through turbines to meet fluctuating demands in energy use or to deal with too limited discharge of rivers for continuous power production, usually twice daily. Such fluctuations leave spawning and rearing areas in gravel banks or side channel habitats dry, daily. While some adult fishes can adapt to such fluctuations, reproduction is severely impacted and usually inhibited;
- **Reservoir flushing**: The combined effects of hydropeaking and uncontrolled reservoir flushing if executed improperly can also lead to the clogging of interstitial space in the river substrate, which chokes out invertebrate life and eliminates spawning grounds;
- **Blocked sediment transportation**: Long-term, this can further lead to the isolation of tributaries from the main stream of the river, dropping the ground water table and reduction of wetland and riparian agricultural area. Larger storage facilities are seldom equipped with the capacity to flush fine sediments from the reservoirs, but when they do, such flushing often results in acute or even catastrophic kills of aquatic life below the dam, often for many kilometres depending on the size of the flushing event. Reduction of the gravel in the river results in the reduction of spawning grounds for many species that lay eggs on a stony substratum;.
- **Introduction of alien species** that often follows the construction of the accumulation lake. One of the most insidious threats to fish conservation around the world is the deliberate or accidental introduction of fish species. Most fishes are introduced solely for sport. Historically the social value of recreational fishing was usually more important than conserving biodiversity. Alien invasive recreational fish species are now recognised as a global environmental degradation problem resulting in the loss of biodiversity.

The severity of the impacts of planned HPP depends on the geographical region and fish zone of the river where the HPP is built, the type, size and number of HPPs in the river basin or if cascade HPP are going to be built. The impact on a specific population also depends on how degraded the ecosystem is already, i.e. how many HPPs are already built inside the distribution area of the population.

All HPPs have negative impacts on fish fauna, regardless of whether it is a storage, run-of-river, reversible or derivation type HPP, but some types have larger impacts than the others.

Run-of-river HPP is a type of hydroelectric generation plant with little or no water storage and is, therefore, subject to seasonal river flows. Such type of HPP has the least impact on the fish fauna, since it alters the riverine conditions less than the other types of HPP. There is no or little effect of denivelations of water levels and

hydropеaking because of the operation of the plant, sediment transportation is less blocked, but the effect on fish migration is still prominent.

One must be careful, since most of the run-of-river HPP do have storage reservoirs with limited amount of water – pondages. HPPs with pondage can regulate the water flow at all times and can serve as a peaking power plant. This type of HPP as well as any **storage HPP** have all the environmental problems listed above. The same goes for **reversible HPP**, where operation depends on accumulation lakes. For example, HPP Dјerdap 1 (Iron Gate 1) and Dјerdap 2 (Iron Gate 2) are listed as run-of-river HPPs, but it is well-known that there is a huge reservoir behind Dјerdap 1, which caused a 35 m level rise of the Danube which flooded the island of Ada Kaleh and at least five other villages, totalling a population of 17,000, had to move. People were relocated and their settlements have been lost forever to the Danube. Furthermore, the Iron Gate dams completely blocked fish migration routes, which have had a devastating impact on long distance migratory species.

Derivation HPP: While residual flow requirements (most often only a small fraction of the annual mean flow that we cannot determine as an ecologically acceptable flow) prevent the complete drying out of abstracted river reaches, a very large reduction in habitat area can occur, overall flow variation is increased, overall productivity of the river is reduced, which results in the shortage of available food, especially for top predators, such as Danube salmon, risking their survival.

Further hydropower development would, undoubtedly, present a threat to fish fauna, especially to populations of already globally threatened fish species that are highly sensitive to changes that result from the HPP, or species with small distribution range and narrow niche, which means they are able to thrive only in a narrow variety of environmental conditions.

Impacts of HPP planned inside the areas of special importance for fish

HPPs planned inside the areas of special importance for fish fauna, would have the most notable impact on fish populations in the WB6 region.

1. Self-sustainable populations of *Danube salmon* in Bosnia and Herzegovina, Serbia and Montenegro

Since the late 19th century, however, *Danube salmon* populations have declined by two thirds and the remaining populations are now highly endangered by hydropower development. The still remaining self-sustainable populations of *Danube salmon* are large enough and they occupy relatively long river stretches with spawning grounds, so that populations are vital and in-breeding does not present a problem. These populations do not depend on stocking by fishermen. There are 22 sustainable populations in Bosnia and Herzegovina, 6 in Serbia, one is shared between Croatia and Bosnia and Herzegovina, three are shared between Montenegro and Bosnia and Herzegovina and one between Montenegro and Serbia. Building new HPPs, where there are recognised self-sustainable populations of *Danube salmon*, could destroy the last remaining fragments of the *Danube salmon*'s distribution area. Freyhof et al. (2015) recommends that "there should be no hydropower development, including micro-hydropower in rivers holding self-sustaining populations of *Danube salmon*, including spawning streams". The recommendation of the experts is therefore: because the impacts of HPP are well recognised up and downstream of the dam or weir, the long-distance impacts should be taken into account. HPPs planned above and into the sections populated by self-sustainable populations of *Danube salmon* and the adjacent tributaries, would have an irreversible impact on already small and fragmented population of the species.

2. The Neretva drainage with its endemic fish fauna in Bosnia and Herzegovina

The Neretva with its tributaries has one of the most diverse fish fauna with numerous endemic species in the Mediterranean and Europe. Many fish species are not investigated well enough; they are data deficient (DD) so further surveys are needed. Fish fauna has already been significantly impacted by HPP in the middle section of the river in last 50 years. Endemic species are most seriously threatened by invasive species and alternation of habitat. There are three new hydropower plants planned on the Neretva river, which would further threaten sensitive fish fauna.

3. Karstic fields with its endemic fish fauna in Bosnia and Herzegovina

Fish fauna of the karstic fields in Bosnia and Herzegovina are especially sensitive to the impacts of HPPs. According to the experience with HPP Orlovac in Livanjsko polje and knowing ecological requirements of the

highly endemic fish fauna, we can conclude that building any new HPP in this area, could have an impact of such a magnitude that benefits of projects might not justify it. There are actually just a few HPPs planned in this area.

4. The Morača river drainage with Lake Skadar and its unique fish fauna in Montenegro and Albania

Five planned HPPs on the river Morača and its tributaries would interrupt migration between the Morača and Lake Skadar; construction of dam-lakes would make the river an unsuitable habitat for most of native species. The invasion of alien species into the dam-lakes that would happen as a result of stocking fish by fishermen would endanger the native fish fauna. There would be also impacts from hydropeaking below the dams and alternations of water levels in the lake Skadar.

The Montenegrin Elektroprivreda (Power Supply Company) has plans for diverting additional water from Tara to Morača in order to provide planned energy output. The realisation of such a plan would connect waters from two different drainage basins (Black Sea basin and Adriatic basin) which would severally endanger the endemic fauna of Lake Skadar. Building a new HPP inside the Morača river basin would irreversibly damage the unique fish fauna of Lake Skadar.

5. The Drin river drainage with Lake Ohrid and Lake Prespa and its unique fish fauna in the former Yugoslav Republic of Macedonia and Albania

The Drin river basin is characterised by many endemic species, especially trouts that are still not known well enough and their conservation status is not established yet – data deficient (DD). Planned HPP (Špilje 2, Boskov most, Skavica cascade) would have a devastating impact on fish fauna of river Drin and Lake Ohrid and connected Lake Prespa. Building new HPP would not only interrupt routes of migratory species, but would result in the introduction of non-native trouts in the accumulation lakes which would hybridize with native trouts and the changed hydromorphological conditions would reduce spawning grounds.

6. The Vjose river as one of the last preserved rivers of Europe in Albania

More than 230 km of the river is free flowing, characterised by beautiful canyons, braided river sections and meandering stretches, which makes up a large, quality, unfragmented habitat for vital populations. The Vjose river is unique and should be preserved as a European natural heritage. Eight large and one small HPPs are planned along its course, which would destroy the river and their habitats and as a result, it would destroy its pristine biota.

Impacts of HPP, planned inside present and historical distribution area of long distance migratory species and other threatened species not inhabiting the areas of special importance for fish

The historical distribution of long distance migratory species such as sturgeons, European eel and shads (*Alosa immaculata*, *Alosa, falax*) is not determined precisely, based on available data used in the study, so the presented historical distributions of those species are approximate. Stretches of rivers, where migration corridors should be re-established, should be chosen based on additional data on distribution, from prior to when the impassable obstacles were built. The present status of habitats should be taken into account as well.

Any new HPP that is built inside the confirmed historical distribution range of long distance migratory species, has to apply fishpass (one or several) that enables their migration.

The impacts on non-long-distance migratory, threatened species outside **the areas of special importance for fish** can be significant as well. Certain mitigation measures, such as functional fishpasses designed for target species and adopted EAF can be applied. If the distribution area of certain threaten species overlaps with historical distribution of long distance migratory species, or in case of *Acipenser ruthenus* also present distribution, fishpasses applied must enable their migration as well. Ecological requirements of all present species must be incorporated in the calculation and determination of EAF.

Impacts of HPP, planned in the areas, where according to present knowledge, there are no threatened species.

In any case, and also in case of an area where so far, no threatened fish species are recognised, ichthyological survey of river stretches that are long enough to cover the whole length of the river where long distance impacts can be noticed, must be done and special investigations of species which taxonomy and distribution is not known

well enough, must take place. All necessary data must be obtained when spatial plans are prepared and incorporated to the EAF.

4.7.1 Mitigation measures can reduce impacts of HPP

Even though attractive at first mention, the possible positive effects of mitigation measures used to minimize impacts of HPP have limited effects. Reasons range from not using the best technical solutions to the lack of legislation to support applying minimum standards and best practice. It has to be acknowledged as well that HPP often have such a devastating effect on fish fauna and other freshwater organisms that even the most advanced mitigation measures cannot prevent the loss of species and significant reduction of populations.

The most widely used and acknowledged mitigation measures are fishpasses and ecologically acceptable flow.

As explained and presented in more detail in Section 3.6.1.1, the majority of existing HPPs in WB6 region are not equipped with fishpasses, furthermore there are practically no plans for building them during the process of rehabilitation. To our knowledge, there are two HPP in the capacity range above 10 MW, which have fishpasses: HPP Ujmani (Kosovo) and HPP Zvornik (Serbia). We did not have any reports on the performance of those two fishpasses at our disposal. The water level difference between upstream and downstream often exceeds 15 m and aquatic ecosystems have over the years developed independently, and the rivers have not been recognized as migration routes. This approach does not follow modern guidelines and European directives, since open corridors are required and are recognized as one of the top priorities in the sustainable use of the hydro potential of rivers. However, in the small HPPs that have been constructed in recent decades, fish migration has been recognized as a major issue and implementation of fishpass has been considered mandatory.

Ecologically acceptable flow and water usage by HPPs in the WB6 region is explained in detail in Section 4.8. So far, we obtained data on determined EAF for five HPP planned for the rehabilitation: HPP Višegrad and HPP Una – Kostela (BIH), HPP Šipilje, HPP Tikveš and HPP Globočica in MKD. For the vast majority of existing HPPs, EAF is not determined.

Beside applying EAF and building fishpasses at HPPs, further mitigation measures can be used to minimize the impacts of HPP.

1. Opening of the corridors in the tributaries of the accumulation lakes (lateral connectivity), by putting up fishpasses at impassable weirs or removing the obstacles that are not in function any more. In the tributaries, we often find spawning grounds that often cannot be reached due to unpassable obstacles;
2. Changing the operation of the HPP. By minimizing the amplitude or/and frequency of the releasing discharge the impact of the hydropeaking can be reduced. In case of cascade HPPs, this negative effect can be mitigated by harmonizing the operation of all the HPPs in the chain;
3. Ensuring sediment transportation by the HPP, to prevent river bed erosion and the lack of gravel needed for spawning grounds for fish below the dams.

4.7.2 Recommendations and measures to mitigate the negative impacts of the HPP

Recommendations presented in this section are given for both existing and planned HPP's

1. "Areas of special importance for fish" should be preserved, since the damage for fish fauna would be of such magnitude that benefits of the planned HPP projects might not justify it.
2. Comprehensive appropriate assessment must be conducted before decision making as foreseen in article 6(3) of the Habitats Directive.
3. Fishpasses are well-known and the most commonly used mitigation measures, used to mitigate negative impacts of HPP. When constructed and built properly they can ensure fish migration at dams and weirs, but often monitoring of fish functionality is not performed and when it is, the results show that their performance is poor. Nevertheless, fishpasses in all their forms (pool passes, vertical slot passes, close-to-nature, fish lifts) are the only way to re-establish fish migration at existing HPP and as well at newly planned HPPs. There are published documents and guidelines that need to be incorporated in order to construct functional fishpasses for present fish assemblages, with special care for the largest species (*Danube salmon*, sturgeons) and species with special requirements (*European Eel*).

4. "Guidelines and technical solutions for restoring river continuity for fish migration, prepared for Danubian countries" by ICPDR (2013a), gives some technical framework for fishpasses, that can be used by different fish communities along the river course, as well as by sturgeons, as the largest fish in the drainage basin. The same principles can also be used in other drainage basins in the WB6 region.

The "Danube Task Force" (DSTF) was established in January 2012 to support the achievement of the "EU strategy for Danube Region" (EUSDR) target to "ensure viable populations of sturgeon and indigenous fish species by 2020". "Guiding Principles on Sustainable Hydropower Development in the Danube River Basin" (ICPDR, 2013b) stress the importance of restoring migration routes of sturgeons in the Danube and major tributaries. Planning new hydropower plants in river sections formerly used by sturgeons must, at a minimum, include sturgeon migration and habitat requirements in the requested EIA, and in dialogue with Priority Areas of EUSDR - PA2 (Energy) is essential. The allocation of funding to restore sturgeon migration at the Iron Gate dams must be pursued with highest priority. Species specific measures for the Middle Danube (sturgeon distribution areas between Gate dam II and the migration barrier at Gabčíkovo (Slovakia) are accepted to be applied after restoration of river continuity at the Iron Gate dams (ICPDR, 2016).

Passes for *Anguilla anguilla* are special in design and relatively cheap and easy to build. There are quite a number of European companies that have expertise in building eel ladders. Eel ladders are well presented in German guidelines (DWA – Regelwerk, 2014), relevant examples, best practice, good ideas and tips from who have designed and built eel and elver (young eel) passes are also brought together in one place in a manual "Elver and eel passes" (Environmental agency, 2011).

5. Adoption of legislation, which requires the building of fishpasses, is necessary. Functional fishpasses should be planned and built at all existing and planned HPP, enabling migration also for sturgeons and European eel, where their corridor is proven by historical data. Monitoring of functionality of fishpasses should be prescribed.
6. Downstream fishpasses, "fish friendly" turbines (which cause less damage), adaptations of the operational mode of spill flow and modifications of hydropower plant management are methods to enable downstream migration (AG-FAH, 2011). Some measures should be applied, especially on the rivers where European eel is, or was historically present and where upstream connectivity for the species is going to be approved.
7. Since ecologically acceptable flow methodology is not adopted in legislation in all countries, this should be a priority for them. For areas with conservation status, with high ecological values or areas inhabited with rare or endangered species, special holistic approaches should be planned. Monitoring compliance with the EAF is very important and should also be implemented in legislation.
8. Prior to planning any new HPP, an ichthyological survey should be done in order to obtain additional data on fish fauna, which is often inadequate. Since national Red Lists of threatened species often are not in accordance with IUCN Red List of threatened species, the threat assessment that is stricter must be used when evaluating the impacts of HPP on fish fauna.
9. In order to preserve as much as possible riverine biota, especially fish fauna, run-of-river type of HPP, with no pondage, should be the first choice. Storage and derivation HPP should be avoided.
10. Fish fauna of the WB6 region and the freshwater community as a whole is not investigated well enough. It is imperative for the region to perform further investigations of not only fish fauna but freshwater community as a whole. It is highly recommended to increase funding and direct research efforts towards freshwater biodiversity in order to increase knowledge on trends, distribution areas and threats for further effective conservation planning.

4.8 Ecologically acceptable flow

The pattern of the seasonal flow of water in a river channel over a year is known as the river regime. It depends on many attributes in the catchment area, of which the most important are: the rainfall amount, its intensity and the frequency, local geology and vegetation cover.

The changing discharge in interaction with the local geology determines shape and size of river channels, the distribution of riffle and pool habitats, and the stability of the substrate. It provides different habitats and significantly influences water quality, temperature, nutrient cycling and oxygen availability. Consequently, it has a major influence on: distribution, abundance, and diversity of stream and river organisms.

Aquatic and riparian biota are adapted to natural variability in the flow at a different time scales. That is why the magnitude, frequency, duration, timing and rate of change of the natural flow regime are the key elements to sustaining and conserving native species and ecological integrity.

Overuse of water for different reasons leads to major, mid and long term disastrous consequences for aquatic life. The concept of environmental flow was established to reduce the impact of water use and is very easy to understand. First it was meant only as minimal quantity of water that is left in rivers so that downstream mainly environmental but also social and economic benefits are ensured. Understanding of the concept is easy but establishing it is far from that.

It is now recognised that “minimum” flows are inadequate—the structure and function of a riverine ecosystem and many adaptations of its biota are dictated by patterns of temporal variation in river flows. To preserve the river ecosystem, we need to mimic components of natural flow variability, taking into consideration the magnitude, frequency, timing, duration, rate of change and predictability of flow events.

EU Member States legislation use different terms for required flows, very common is “environmental flow” but other terms are also frequently used, such as “ecological flow” or “ecological minimum flow” or “minimum acceptable flow”, “ecologically acceptable flow”, “common low flow”, “minimum allowable flow”, “minimal residual flow”, “biological minimum”, etc. In WB6 region, “ecologically acceptable flow” is most commonly used term and is used also in this study.

Ecologically acceptable flows are now defined as “the quality, quantity, and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems which provide goods and service to people” (Hirji and Davis, 2009).

But the determination of ecologically acceptable flows is, contrary to the public expectation, not that simple. Calculating environmental flow using only statistical properties of the natural flow regime is a common and simple method but has no ecological validity and so the uncertainty to achieve good results is very high.

Different responses of the aquatic species to flow alterations are reported in literature. Fish species typically show a negative response regardless of the type of flow alteration. Biological monitoring is needed to measure the effectiveness of ecologically acceptable flows.

With increasing concern about the impact of dams and flow regulation on river biota, more than 200 different methods have been developed in various countries. These methods can be grouped into four categories:

1. Look-up tables
2. Desk top analysis
3. Functional analysis
4. Habitat modelling.

There is no single best method, approach or framework to determine the ecologically acceptable flows, but the main question regardless of the method should be: “How much can we change the flow regime of a river before the aquatic ecosystem begins to show decline?” It is becoming obvious that failure to meet EAF flow requirements has disastrous consequences for many river users in the mid and long term. The existence of dependent ecosystems is put at risk, and therefore also the security of downstream communities and industries. There is no question if ecologically acceptable flows can be afforded because the cost of not establishing EAF can very quickly exceed several times the cost of establishing it in the first place.

4.8.1 Legal grounds in the WB6 region

The legal framework for implementation of E-flows in EU Member States is set out in the Water Framework Directive 2000/60/EC (WFD) and in the Birds and the Habitats Directives. The WFD’s main objectives are to prevent deterioration of the status of all water bodies and to protect, enhance and restore all water bodies, with the aim of achieving good ecological status. Although environmental flow is not explicitly defined in the Directives, the flow regime is for most of the aquatic ecosystems a critical element controlling the conservation status of the

related protected habitats and species. E-flows are implied in WFD in Article 8 as “the volume and level or rate of flow to the extent relevant for ecological and chemical status and ecological potential”. One of the main objectives of the WFD is also the integrated view and the protection of aquatic ecosystems using a holistic approach (European Environment Agency, 2012a).

We obtained data on if and how the methodology for environmental flow is adopted in WB6 countries and how often it is calculated. Methodology and calculations were adopted in Federation of Bosnia and Herzegovina and in Montenegro. In the other countries of the region, the environmental flow is usually mentioned in water or nature laws but specific methodology is still not adopted in legislation. Before legislation is adopted in these countries the calculation of the environmental flow is very simplified (Table 4.3).

Table 4.3 E-flow methodology, bases for calculations, used terms and a request for special studies by country

Country	Entity	E-flow methodology adopted in legislation	E-flow calculations based on:	Term used	Special study for protected areas, endangered species
BiH	Federation of BiH	yes (1)	hydrological data	ecologically acceptable flow	Yes (expert opinion of a biologist is needed in general evaluation about the need of special study)
	Republika Srpska	temporary (3)	hydrological data (95% of minimum mean monthly flow)	ecologically acceptable flow	\
	Brčko District	No	Expert opinion (7)	ecologically acceptable minimal flow	\
SER		No		minimal sustainable flow (8)	\
MNE		yes (2)	hydrological data	ecologically acceptable flow	Yes (methodology not specified)
KOS		Temporary (4)	hydrological data (95% of minimum mean monthly flow)	ecologically acceptable flow	\
ALB		temporary	hydrological data (cannot be less than min Q355)	minimal ecological flow	\
MKD		No (10 % is used as mandatory threshold)	expert opinion is used as guideline	biological minimum (5) or minimal acceptable flow (6)	\

References (for Section 5):

1	Pravilnik o načinu određivanja ekološki prihvatljivog protoka. Službene novine Federacije BiH, broj 04/13
2	Pravilnik o načinu određivanja ekološki prihvatljivog protoka površinskih voda. Službeni list Crne Gore, broj 2/16
3	Zakon o vodama, Sl. glasnik RS", br. 30/2010, 93/2012 i 101/2016
4	Law on waters of the Republic of Kosovo, No. 04 / L-147, april 2013
5	Law on Nature Protection, Official Gazette of the Republic of Macedonia, No. 67/2004
6	Law on Waters, Macedonia, Official Gazette of the Republic of Macedonia", No. 4/98; 19/2000
7	Zakon o zaštiti voda, Službeni glasnik Brčko Distrikta BiH", broj: 25/04, 1/05 i 19/07
8	Zakon o vodama, Službeni.glasnik RS, 30/2010, 93/2012, 101/2016)
9	LIGJ, Nr. 111/2012, Për menaxhimin e integruar të burimeve ujore2

To our knowledge, EAF is very rarely determined in most countries of the WB6 region (Figure 4.11). The situation is very different in some countries where, for example, all HPP above and below 10 MW in Kosovo have specified EAF. On the other hand, no EAF is in use for any HPP in Albania but EAF is planned for all HPPs under concession, which is determined by the Albanian Environmental Ministry in 2012. The situation is also good in Serbia where the majority of HPP below 10 MW have EAF determined. In Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and in larger HPP in Serbia the situation is alarming, with EAF determined in only about 2% of HPP cases. Insufficient flow downstream of HPP has major consequences for the aquatic life and can lead to local extinctions of threatened fish species.

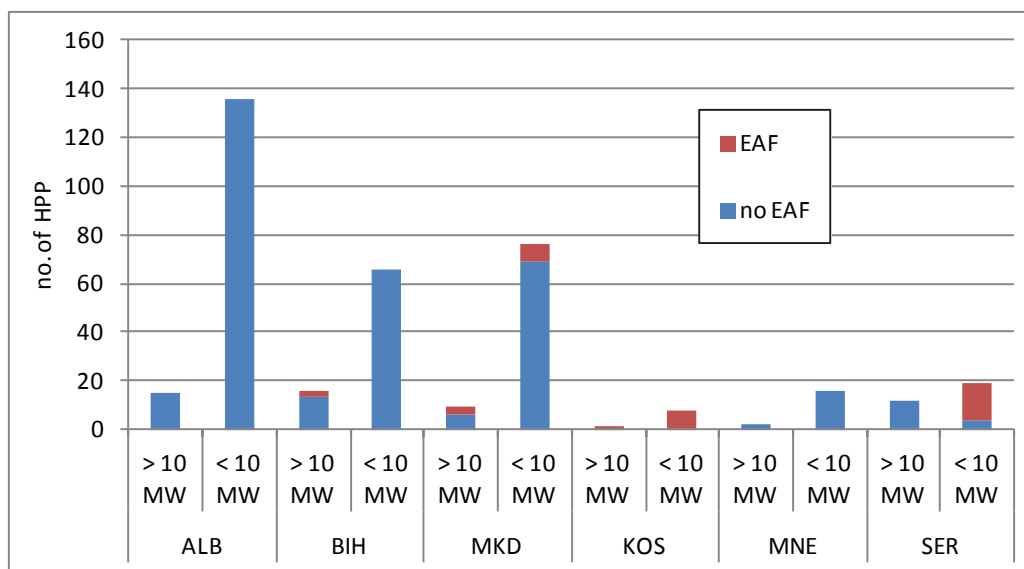


Figure 4.11 Number of different-sized HPP with determined EAF, per country in WB6 region

Federation of Bosnia and Herzegovina

Environmental flow was adopted in the Water Laws in 2006. The environmental flow has been established in Federation bylaw (“Pravilnik o načinu određivanja ekološki prihvatljivog protoka”) since 2013 and it is called Ecologically Acceptable Flow.

A special holistic study is needed for areas with conservation status and even with areas without conservation status but with high ecological, historical or cultural values and for lakes and swamps.

For other streams, the ecologically acceptable flow is equal or 1.5 times higher than mean small discharge (arithmetic average of the lowest annual mean daily flow (LQ) on the spot over a longer observation period). The multiplying factor depends on the relationship between the annual mean and ten-year mean. An exception to this rule are streams with very low mean small discharge, where ecologically acceptable flow is calculated as annual mean multiplied by 0.1 or 0.15.

Montenegro

In Montenegro, environmental flow was adopted in the legislation in January 2016. A special study is needed for protected areas, lakes, swamps and some other exception regarding rare and protected species. For other areas, ecologically acceptable flow is calculated for every month separately: if the ratio between the mean small discharge and the mean month discharge is less than 10, than EAF is equal to the mean small discharge. If this ratio is equal to or greater than 10, than EAF is equal to 20% of the mean month discharge.

An extreme example of not respecting EAF in the WB6 region is HPP Orlovac with its big accumulation lake – Lake Buško. The HPP was built in 1974 in the middle of karstic field Livanjsko polje, which had a huge impact on native fish fauna, including many globally threatened species. Water is drained from the lake to River Cetina to produce electricity. *Squallius tenellus*, before endemic to Livanjsko polje, once that connection was artificially made, has inhabited Cetina river, where it is invasive. Draining water from one water body to the other is a bad practice which has huge impact on biota as well as on hydrology, and drinking water.

Hydropower production benefits / impacts / issues and mitigation concepts

In spite of the proven benefits of hydropower, HPP construction has a significant impact on the development of the river system, by changing its physical, chemical and biological characteristics.

Mainly, the consequences of HPP construction from an environmental perspective are:

1. Transformation of the river flow upstream of the dam, from a natural river system into an artificial reservoir with stagnant waters;
2. Blocking of fishes and other aquatic species migration;
3. Disruption of the physical processes and balance in habitats by changing the flow downstream of the dam.

HPPs can cause a reduction of the river flow, which has a significant importance on agriculture, especially during summer time, or a reduction of the available waters for agriculture and other sectors. Good knowledge of the dams' structure and the amount of waters of the flow river that is allowed to be discharged, can give a clear picture of the amount of water that inhabitants (people) can use in the future at the downstream of the dam. It is very important to emphasise that most of the rivers are important for the development of the agriculture. If their system is disrupted, apart from the fact that the environment is damaged in one way or another, a social problem emerges, as the reduction of river flows and the water available for agriculture would lead to a shortage of agricultural production followed by other economic consequences. On the other hand, a reduction of river flows can reduce the amount of water in aquifers, which are crucial to supply the population with drinking water. It is possible that some negative effects occur only 10 or 20 years after HPP construction, such as coastal erosion, and obstruction of the transport of the sediment.

Hydropower is one of several main causes of hydromorphological changes in a riverbed. In order to avoid or minimise the negative effects of HPP construction, appropriate technical and other measures must be applied and preferably proposed in early design phases. Measures should be focused on integration between different water users and natural conditions. The main benefits and impacts are discussed further below.

5 Hydropower production benefits / impacts / issues and mitigation concepts

5.1 Benefits

The advantages of hydropower are various but firstly and most importantly is that the electric energy produced is renewable energy and this process is in itself not a source of pollution once constructed (although pollution may occur in the construction phase). Hydroelectricity is very reliable and cost-effective, unlike wind or solar power which is much more variable. Water flows can be adjusted to meet operational requirements and consequentially the output of electricity can be better optimised.

Once a HPP is constructed, the operating and maintenance costs are much easier to manage. "Fuel" for HPP, i.e. water, does not need to be transformed in any way before being used, unlike for example oil, and there are no fuel costs associated with this aspect of hydropower. However, a fee for using the water, as a natural resource may be determined in the concession agreement and/or location/building licence. Furthermore, using water, input prices fluctuations are partially avoided and once built, HPPs last a long time, at least 50 years or more (which through refurbishment can be extended to 100 years or more) and can be upgraded to use new improved technologies.

The main benefits of hydropower can be divided in 3 types; economic, social and environmental, which are further described below.

5.1.1 Economic benefits

The economic benefits of HPP construction are in relatively low-cost energy production and as mentioned before, because HPPs have no fuel costs, operating costs are low and are immune to rising fossil fuel market prices. HPP last a long time, and can keep electricity costs affordable for users, which represents a positive impact on the economy.

Hydropower represents a stable and flexible source of energy and can be used to cover peaks of demand, and rapid variations in demand can be compensated at very short notice and much faster than through fossil fuel plants. HPPs therefore contribute to the security of supply, system services like regulation and black start, national energy self-sufficiency and provide a virtual energy storage capacity in retained water volumes.

Additionally, HPP development provides economic benefits in terms of creating new job opportunities and providing different opportunities in various sectors such as agriculture, tourism and others. According to the Hydropower Sustainability Assessment Protocol, local capacity building is an essential aspect in respect of developing local economic benefits.

5.1.2 Social benefits

Apart from the benefits mentioned above, HPP construction contributes to the development of industry and infrastructure and to local development (new jobs, tourism, recreation...).

In cases where reservoirs are formed, the new water area can be used for water sports and recreational activities and water can be used for irrigation purposes. In some cases, building a dam can also improve the water supply for households and industry.

Larger HPPs are important because of their multi-functional usage: for hydropower generation, water storage, flood protection, fishing, swimming, boating and similar.

5.2 Environmental impacts and their significance

According to ICPDR documents, the characteristics of environmental impacts vary. Typical parameters to be taken into account in impact prediction and decision-making include:

- nature (positive, negative, direct, indirect, cumulative);
- magnitude (severe, moderate, low);

- extent/location (area/volume covered, distribution);
- timing (during construction, operation, decommissioning, immediate, delayed, rate of change);
- duration (short term, long term, intermittent, continuous);
- reversibility/irreversibility;
- likelihood (probability, uncertainty or confidence in the prediction); and
- significance (local, regional, global).

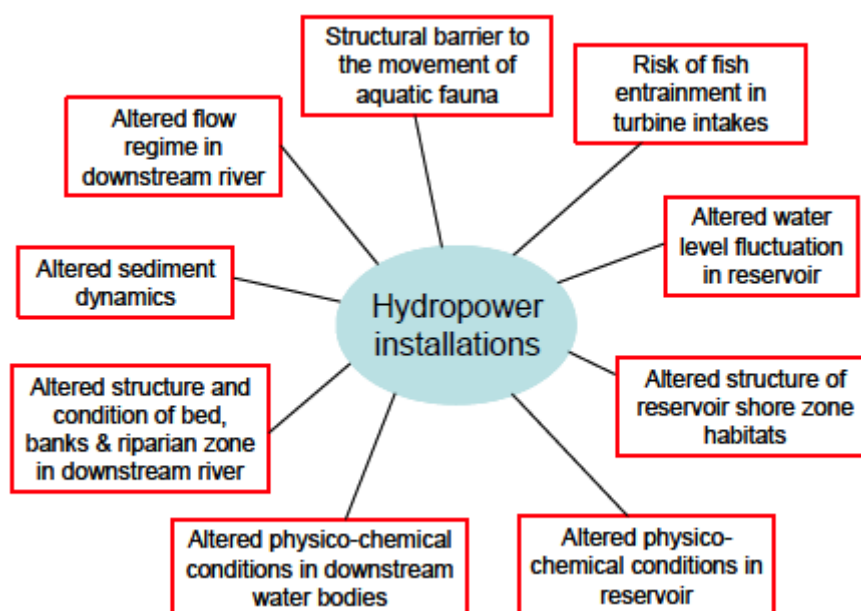
All the above-mentioned aspects should be assessed in a project EIA in detail, along with proposed mitigation measures. Some of most important impacts of HPP construction are described below.

5.2.1 Hydromorphological changes and impacts on biodiversity

Hydropower infrastructure and their construction in a riverbed can cause different hydromorphological changes with potential adverse ecological effects. Hydropower can impact water quality and flows which can cause the lowering of dissolved oxygen levels in the water, and consequently have negative effects on riparian habitats. The direct impact of dam construction is the obstacle in the river for fish and other fauna migration, possible load (sediment) transport blocking and in the end, erosion of shores and the riverbed downstream with accompanying changes in habitat. An overview of prospective impacts is presented in Figure 5.1.

The main biodiversity aspects of aquatic ecosystems and hydromorphological change that need to be addressed in the planning stages of HPP projects development are:

- riparian forests, macrophytes and other relevant flora mapping;
- drainage density, physical diversity of the main river channel, heterogeneity of river habitats, ecologically strategic habitats, biology and ecology of the most representative fish species;
- distribution of main migratory routes, breeding grounds and feeding grounds;
- identification of the most productive fishing areas (volume captured - historic records, workforce employed);
- identification of main species, especially migratory species and those associated with habitats with high hydrodynamics;
- aquatic and terrestrial fauna investigation with identification of endemic, threatened and rare species;
- pressure on the river ecosystems (logging, farming, ranching, deforestation);
- protected and valuable areas mapping.



Source: EC, WFD AND Hydromorphological pressures Technical Report, November 2006

Figure 5.1 Illustrative range of possible alterations typically associated with hydropower dams with subsequent biological alterations

5.2.2 Hydro-peaking impacts

Hydropeaking is caused by the fast increase or decrease in the release of water from the HPP reservoir in response to changing demands for power consumption. This process changes the flow regime downstream of the HPP in different seasons (summer to winter) or in the short short-term. These artificial fluctuations in flow (seasonal, weekly and daily) are differentiated from natural flooding events. Hydro-peaking is mainly caused by large hydropower plants in combination with reservoirs.

According to ICPDR, depending on the rate of discharge acceleration, benthic invertebrates and also juvenile and small fish can get washed away with the flush, which results in the decimation of benthic fauna, reduction of fish biomass and also changes to the structure of fish populations. During the down-surge, benthic invertebrates and fish can get trapped in pools that might dry out later on, so the animals either die or become easy prey for predators.

In reservoirs and impounded river stretches, the reduced flow velocity leads to an increased deposition of fine sediment that makes periodical flushing of the reservoirs necessary. This flushing process can cause a number of negative effects on freshwater ecology.

5.2.3 Social impacts and public participation

New hydropower facilities impact the local environment and may compete with other uses for the land they occupy. These alternative uses may be more highly valued than electricity generation. Humans, flora, and fauna may lose their natural habitat. Local cultures and historical sites may be impinged upon. Some older hydropower facilities may have historic value, so renovations of these facilities must also be sensitive to such preservation concerns and to impacts on plant and animal life. Hydropower plants can be impacted by drought. When water is not available, the hydropower plants cannot produce electricity but on the other hand, dam construction can ensure better water availability and/or easier water extraction for local communities at the same time. Flood control has already been mentioned as one of important impacts. HPP construction can also help in flood prevention and control due to climate changes and help with adoption and resilience (discussed in more details in BR-2) to climate changes by storing water in drought periods.

Local communities under the impact of planned, new HPPs are a very important factor for the success of a project. In order to fulfil sustainable development goals, clear benefits to communities must be communicated with both the directly-affected people and a wider group of interested stakeholders.

One of the most important impacts is resettlement followed by land expropriation. In cases where the HPP uses a dam to store river water in a reservoir, the flooding of settlements or solitary houses, land (agricultural land, pastures) and infrastructure occurs. These direct impacts are located in the upstream area of a dam. Indirectly, HPP construction can have negative impacts on the downstream area and cause resettlement due to hydropeaking impacts, hydromorphological changes and possible water quality and changes. Because of this change, water use and other river related activities can be reduced or completely lost,

However, HPP construction and creation of reservoirs can also have some positive impacts on local communities and give new opportunities in the area, like the development of tourism and recreation or irrigation. On the other hand, people sometimes perceive an opportunity to sell their properties and to relocate to a more attractive or urban area.

Public participation refers to the mechanism to inform the potentially affected community about HPP projects and to ensure their participation in the planning/ decision processes. The key factor is to include all relevant stakeholders, such as agencies, organisations and the affected public. The potential benefits and consequences of a proposed action, alternative courses of action and their impacts must be communicated clearly, as the main purpose of this process is to give the opportunity to the local community to provide their input to a proposed plan and before a final decision is reached.

Aarhus Convention: The 1998 UNECE Convention on Access to Information. Participation in Decision-Making and Access to Justice in Environmental Matters, also known as the Aarhus Convention, provides the fundamental aspects to facilitate the adoption of the necessary national regulations and guidelines, and to harmonise and improve practices to advance public participation in the European context.

5.2.4 Transboundary impacts

Transboundary impacts and transboundary impact assessment is needed to ensure sustainable hydropower development on the river basin scale. The Espoo Convention on environmental impact assessment relates to environmental assessment in a transboundary context. According to UNECE, the Espoo (EIA) Convention sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries and borders. The Convention was adopted in 1991 and entered into force on 10 September 1997.²⁸ This Convention was adopted by all 6 WB countries except Kosovo.

According to Article 2 of the Convention, each Party must take the necessary legal, administrative or other measures to implement the provisions Convention, for proposed activities that are likely to cause significant adverse transboundary impact, and establish an environmental impact assessment procedure with public participation and prepare environmental impact assessment documentation in compliance with [Appendix II](#) of Convention.

In the proposed list of activities from [Appendix I](#) of Convention hydropower is connected with hydropower construction:

- Large dams and reservoirs.
- (a) Works for the transfer of water resources between river basins where this transfer aims at preventing possible shortages of water and where the amount of water transferred exceeds 100 million cubic metres/year;
(b) In all other cases, works for the transfer of water resources between river basins where the multi-annual average flow of the basin of abstraction exceeds 2,000 million cubic metres/year and where the amount of water transferred exceeds 5 per cent of this flow.
- Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.

Transboundary environmental impact assessment, as a minimum, must include information in accordance with Article 4 of the Espoo Convention:

²⁸ <http://www.unece.org/env/eia/eia.html>

- A description of the proposed activity and its purpose;
- A description, where appropriate, of reasonable alternatives (locational or technological) to the proposed activity and also the no-action alternative;
- A description of the environment likely to be significantly affected by the proposed activity and its alternatives;
- A description of the potential environmental impact of the proposed activity and its alternatives and an estimation of its significance;
- A description of mitigation measures to keep adverse environmental impact to a minimum;
- An explicit indication of predictive methods and underlying assumptions as well as the relevant environmental data used;
- An identification of gaps in knowledge and uncertainties encountered in compiling the required information;
- Where appropriate, an outline for monitoring and management programmes and any plans for post-project analysis; and
- A non-technical summary including a visual presentation as appropriate (maps, graphs, etc.).

Considering hydropower, the main focus in transboundary impact assessment should be on the following: upstream/downstream effects, EAF regime and sediment transport. Transboundary impact assessment should also assess cumulative impacts on the river basin through a Cumulative Impact Assessment.

5.2.5 Health impacts

Adverse health impacts can also occur as a result of HPP development projects, directly from changes to the biophysical environment (such as exposure to pollutants) or indirectly as a secondary result of other changes; for example, the creation of habitat conditions favourable to the spread or intensification of disease vectors, such as mosquitoes (malaria) or water snails (schistosomiasis). Health impacts assessment should be integrated with the EIA process. Possible health impacts are listed in Table 5.1.

Table 5.1 Possible health impacts and hydropower

Sector	Communicable	Non communicable	Nutrition	Injury	Psychosocial disorder and loss of well-being
Energy		Indoor air pollution		Electromagnetic radiation	Community displacement
Dams and irrigation schemes	Water borne diseases	Poisoning by pollutants	Increased food production	Drowning	Involuntary displacement

5.3 Mitigation concepts and environmental aspects of sustainability

It is necessary to propose and apply adequate mitigation measures and monitor their effectiveness to improve overall environmental performance in the context of HPP development. It is very important to stress that mitigation measures may be expensive when taken into account during the planning phase of project, but it has been found to be cost-effective over the long run since the lifespan of HPP projects may be as long as 100 years.

For greenfield projects, the requirements are focused on following:

- mitigate impacts through good project design and environmental management;
- provide benefits to the community affected by the proposal;
- prepare plans for managing impacts so these are kept within acceptable levels.

Hydromorphological impacts mitigation

- Connectivity of fish migration routes - construction of bypass channels and in-channel fish passes.
- Flow alterations - increasing flows from dam outflows, reducing abstraction rates and altering river morphology to maximise habitat availability under low flows for low flows; hydropeaking mitigation (see below).
- Sediment alterations and erosion - managing water flows, reinforcement of river banks with rock or concrete.
- Impoundment of rivers – restoration of tributary and floodplain features in impounded stretches; the reduction of water storage levels above a dam or weir; construction of free-flowing channels with a bypassing impoundment; improvements to impounded channel habitats and reconnecting tributaries and floodplain features are the most realistic measures for implementation.
- Lake level alterations – management of abstraction rates and timing and ensuring reservoirs are properly connected to tributaries.
- Physical and chemical alterations - flexible and multiple intakes of water and controlled intake of water from different depths (and thus, temperature) from a reservoir to a downstream river.

Hydropeaking mitigation

Mitigation of hydropeaking impacts involves the mitigation of following impacts:

- river continuity disruption for aquatic fauna migration – upstream and downstream
- extreme or extended low flows or reduced river flow
- inadequate flows for biota caused pulses downstream
- sediment
- extreme changes in reservoir levels

Mitigation must be defined for each object separately and must include:

- Amplitude of flow fluctuation
- Frequency of hydropeaking
- Duration of rising and falling of hydropeaking
- Compensation basins
- Improvement of hydromorphological structures
- Coordination of plants' operation
- Afforestation the areas around the site where workings took place.

Fish migration aids for ensuring connectivity and access to habitats



Ensuring ecological flow requirements



Mitigating artificial flow fluctuations (hydropeaking)



+ other issues (such as sediment transport, improvement of lateral connectivity)

Figure 5.2 Examples illustrating mitigation measures (c/o Dr. Edith HÖDL, Technical Expert in River Basin Management ICPDR)

Environmental aspects of sustainability

Overall project sustainability consists of economic, social, and environmental aspects. Environmental sustainability is the ability of the environment to support a defined level of environmental quality and natural resource extraction rates indefinitely. The most important aspect of sustainability connected with hydropower is fact that it is a renewable energy source. However, for renewable resources, the rate of generation should not exceed the rate of regeneration, which is the sustainable yield. In case of HPPs, it is important to use adequate mitigation measures in order to ensure that there are not severe negative effects on aquatic fauna and habitats in the entire river basin.

6 Cumulative effects and impacts on rivers with reservoirs

6.1 Introduction

The advantages of hydropower as a highly reliable GHG absent and renewable source of electricity production and the need to maintain the ecological functions of hydropower-affected water stretches must be considered to achieve a proper and well-balanced approach to meet cumulative impact assessment objectives. It is important to ensure that existing and forthcoming EU policies to promote renewable energy sources, including hydropower, ensure coherence with the Water Framework Directive/other EU legislation related to environment and clearly consider impacts on the affected water bodies and the adjacent wetlands.

In general, holistic approaches for hydropower use are needed. The focus should be at catchment level and not only site-specific or on water body level; such is the nature of cumulative effects.

Especially in the BR-2 (Hydrology, integrated water resources management and climate change considerations) and BR-5 (Transboundary considerations) the limits for development of HPPs were defined and these reports provided clear indicators on the assessment of the number of HPPs, the type of construction, environmental flow requirements, ecological surveys and the assessment of cumulative impacts.

There is a reference to cumulative assessment in BR-5, for the assessment of cumulative impacts at the border line of countries sharing a river basin or at whichever river profile needed at project level elaboration for the water resources division between countries.

6.2 What are cumulative impacts?

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales. In some cases, cumulative impacts occur because a series of projects of the same type are being developed; for example, when several hydroelectric projects are constructed or planned on the same river or within the same watershed. In other cases, cumulative impacts occur from the combined effects, over a given resource, of a mix of different types of projects.

In the broadest sense, cumulative impacts are defined as a result from the successive, incremental, and/or combined effects of an action, project, development activity or schemes when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important concerns and/or the concerns of affected communities.

Examples of cumulative impacts to be considered include the following:

- Reduction of water flow in a watershed due to multiple withdrawals;
- Increases in sediment loads on a watershed or increased erosion;
- Interference with migratory fish routes or wildlife movement;
- Increased pressure on the survival of indicator species in ecosystem.

6.3 The role of the Cumulative Impact Assessment (CIA)

Cumulative Impact Assessment (CIA) is the process of:

- a) Analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen valued ecosystem components (VECs) over time, and
- b) Proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risks to the extent possible.

The key analytical task is to discern how the potential impacts of a proposed development might combine, cumulatively, with the potential impacts of the other human activities and other natural stressors such as water

balance change. VECs are immersed in a natural ever-changing environment that affects their condition and resilience. VECs are integrators of the stressors that affect them. For example, periodic extremes of precipitation (droughts or floods), temperature (extreme cold or heat), or fluctuations in predators affect the condition of biodiversity VECs. Today and into the future, global warming (climate change) can be expected to have substantial impacts on the condition of VECs.

VECs are environmental and social attributes that are considered to be important in assessing risks; they may be:

- Physical features, habitats, fish populations (e.g. water quantity, biodiversity);
- Natural processes (e.g. sediment transport).

“Other human activities” of greatest importance in CIA are those that (a) will occur in the future, or, if already existing, have on going influences on the environment in the future, and (b) are expected to interact with the same VECs in the future as does the development under assessment. CIA represents an analytical complication in EIA because the spatial horizon of impact assessment is usually greater than in “normal” project EIA, and the interactions between human activities and VECs increase in number and complexity.

Planning-initiated CIA has four objectives in the context of environmental assessment:

- Assess the potential impacts and risks of a proposed schemes over time, in the context of potential effects from other developments and natural environmental external drivers on a chosen VEC: sediment transport, water balance and biodiversity – at the suitable profile preferably at the border point where river is crossing.
- Verify that the proposed development’s cumulative environmental impacts and risks will not exceed a threshold that could compromise the sustainability or viability of selected VECs.
- Confirm that cumulative environmental effects do not limit the proposed scheme value and feasibility.
- Support the development of governance structures for making decisions and managing cumulative impacts at the appropriate geographic scale like river catchment or regional landscape.

Assessment of cumulative impacts should employ information from a variety of assessments including, regional and local environmental and resource studies, programmes and/ or planning documents; strategic, sectorial, and regional assessments; project impact assessments, cumulative impact assessments, and targeted studies on specific issues.

6.4 Which answers could CIA provide to Environmental Assessment?

Cumulative impact assessment and management is generally appropriate whenever there is concern that activity under review may contribute to cumulative impacts on one or more VECs.

This concern may be pre-existing or a consequence of the potential cumulative impacts of the development and other projects or actions, human activities, or exogenous factors (e.g., natural drivers). CIA is also appropriate whenever a given development is expected to have significant or irreversible impacts on the future condition of one or more VECs that also are, or will be affected by other developments.

The other schemes may already exist, or can be reasonably predictable, or be a mix of existing and reasonably anticipated developments. In circumstances where a series of schemes of the same type, like reservoirs is occurring, or being planned, the need for CIA can be fairly obvious when a series of HPP developments occur within the same river or within the same watershed with cumulative impacts in common on water flora and fauna, on downstream water quantity-availability, on watershed sediment dynamics.

Good CIA practice is not limited to assessing the impacts of developments of the same type. For example, a CIA might be needed for the development of a mine in perhaps association with developments in adjacent forest management, hydroelectric power developments, flood protection all of which may affect water availability. In some cases, CIA may be needed to assess and manage the impacts of several new projects, activities, or actions that are being under development.

In other situations, CIA of a single new scheme may be appropriate when it occurs in an area where concerns exist about cumulative impacts - concerns that are either well documented or identified through consultation with affected communities and other stakeholders. In some situations, different components of the same development are assessed in separate EIAs, and the cumulative impacts from these components should be subject to CIA. The key point in determining the need for CIA is that one or more VECs will be cumulatively impacted by different hydro scheme proposals.

Cumulative impacts may also be identified and acknowledged in the EIA process, and the measures proposed for managing the incremental contribution of a given project can be covered by the projects in the line of that contribution. This is often the case when dealing with well-studied watersheds and landscapes, or with widely recognised global issues such as climate change. Cases like climate change would not require a separate CIA process within environmental assessment or on a separate basis; the inclusion of standard mitigation and adaptation measures, as an integral component of environment and social management system would typically suffice.

6.5 What CIA will deliver?

The expected outcomes of a good CIA can be summarised as follows:

- Identification of all VECs that may be affected by the scheme put under evaluation.
- In consultation with stakeholders, agreement on the selected VECs the assessment will focus on.
- Identification of all other existing and reasonably anticipated and/or planned and potential schemes, as well as natural environmental drivers that could affect the selected VECs.
- Assessment and/or estimation of the future condition of selected VECs, as the result of the cumulative impacts that the scheme is expected to have, when combined with those of other reasonably predictable developments as well as those from natural environmental drivers.
- Evaluation of the future condition of the VECs relative to established or estimated thresholds of VEC condition or to comparable benchmarks.
- Avoidance and minimisation, in accordance with the mitigation hierarchy, of the schemes impact on the VECs for the life span or for as long as the impacts is present.
- Monitoring and management of risks related to VEC viability or sustainability over the life span of either the scheme or its effects, whichever lasts longer.
- Provision of project-related monitoring data to governments and other stakeholders for the life of the development, and material support for the development of collaborative regional monitoring and resource management initiatives.
- Continuous engagement and participation of the affected communities in the decision-making process, VEC selection, impact identification and mitigation, and monitoring and supervision.

Because cumulative impacts often result from the successive, incremental, and/or combined impacts of multiple schemes, responsibility for their prevention and management is shared among the various contributing developments

It is usually beyond the capability of a single party to implement all measures needed to reduce or eliminate cumulative impacts; therefore, collaborative efforts will likely be needed. Governments can play a significant role in ensuring environmental and social sustainability by providing and implementing enabling regulatory frameworks that guide and support the appropriate identification and management of cumulative impacts and risks. The different views are observed in how indicators are used to characterise an impact. In EIA, indicators may be chosen to reflect the incremental change in a VEC, while in CIA indicators are chosen to reflect the resulting condition of the VEC.

The two different views are not always distinct, and as noted before, CIA can be fully integrated throughout a good EIA process. Many practitioners have advocated this approach. EIAs should be conducted in a manner that supports systematic CIA.

6.6 Environmental key issues for CIA

There are three key environmental issues corresponding to WFD requirements for analysis: biodiversity, sediment transport and water balance change.

1. Environmental key issue: Biodiversity

The WB6 is a region of rich biodiversity with significance on the European and global level, including endangered aquatic species of fish and mollusc fauna. Hydropower schemes in general may represent a significant effect on many river ecosystems. So far, the decisions on the number, size and locations of new reservoirs for hydropower production are based on maximum energy exploitation rarely respecting compensation measures or the mitigation of negative impacts in planning practice.

Intact, natural river habitats are not counted as ecological compensation measures, instead new measures will be developed in order to near full biodiversity balance and minimize loss of biodiversity. Furthermore, the damaging impacts on ecosystems are putting them under stress to provide ecosystem services that benefit human living environment generally. These are nutrient cycling and primary production which underlie the delivery of all the other services but are not directly accessible to people.

Unsustainable and uncoordinated water use for energy production overuses the 'provisioning' services at the expense of the other ecosystem services, and the changes in water quality and hydrological regimes caused by hydropower plants undermine all of the above. The analysis of planned hydropower developments by the Multi-Criteria Assessment (MCA) presented in BR-8 shows that many of them will be in ecologically valuable areas; however high conservation value pertains to protected areas, which are to be avoided by any means. The expected damage to river ecosystems is consequently estimated as high. This threat appears to be highest in Albania and Montenegro, in particular, due to the fragmentation of still entirely free-flowing rivers. Planning procedures, which have ignored the environmental aspects focusing predominantly on maximum gains from power production are often criticised by Civil Society Organisations (CSOs).

In Bosnia and Herzegovina, the Vrbas and Bosna Rivers, measures are expected to be found which will avoid canalisation with embankments along chains of hydro power plants. The lower Drina in Serbia - a unique remnant of a meandering large gravel dominated river - might be developed for hydropower schemes without taking into account river morphology features. Many river valleys such as along the Middle Drina River in Serbia could be turned into chains of hydro power plants if aquatic corridors are not foreseen. The nearly untouched upper courses of the Morača and the Tara in Montenegro are the subject of construction plans, which would disconnect the upper river systems of the Morača River towards the Skadar/Shkoder Lake and the Adriatic Sea without proper measures which include fish passes (also in a broader sense passes for water organisms) and corridors. Major dams will segment two large braided rivers in Albania, the Vjosa and Devoll Rivers if not properly compensated or protected at similar locations along the Vjosa/Aoos, which could be a trade-off for utilisation of hydropower. The still free-flowing Vardar River in the former Yugoslav Republic of Macedonia would be turned into a hydropower cascade. Dams on the lower Velika Morava (Sub)River Basin in Serbia will interrupt large river ecosystems if not planned with fish passes and other mitigation measures.

The river basins and its tributaries should be strengthened and protected as main biological corridors within the region. The Danube, for example, needs a corridor of up to ten kilometres at each side providing habitats and likewise migration corridors for species. A comprehensive solution of the corridor would allow bypassing cities or industrial complexes and would include a selected range of remaining habitat patches. The corridor can be broader or smaller, be split up in different stripes or patches, having different qualities of connectivity, regarding the needs of different species communities adapted to different habitats. The main river course and riparian zones should have priority for protection and restoration as originally most dynamic elements of habitat and species diversity.

Smaller rivers can have reduced space along their sides, from up to five kilometres at each side for major Danube tributaries down to 500 or 50 meters respectively for larger and smaller streams.

2. Environmental key issue: Water Controlling Measures

With the expected socio-economic developments in the WB6, the demand for both water and energy is expected to increase as growing populations and economic development have increased water demand as they have in

other newly emerging countries. Securing access to water for all riparian countries in a basin is thereby essential and directly linked to water security. A water secure world integrates a concern for the intrinsic value of water together with its full range of uses for human survival and well-being. It means enough, safe, affordable water to lead a clean, healthy and productive life, including flood protection but also respecting environmental protection.

The IWRM (Integrated Water Resources Management) approach provides the necessary tools and guidance for achieving the above and in the context of water management; this also means that it has to go beyond water management and needs to also consider energy issues.

Barriers to progress for achieving water security through governance and establishing functioning IWRM frameworks are often related to: the lack of political will for functioning cooperation, simplistic solutions (i.e., not enough integration), a lack of stakeholder engagement, persistent inequities, lack, of or poor recognition of environmental issues, inadequate and inflexible regulations and lack of proper implementation of existing adequate regulations.

Changes in flow regarding water regime or volume should be agreed upon between riparian countries. Excessive abstractions of water from rivers and lakes for irrigation, urban supply, inter-basin transfers, or other consumptive purposes can significantly decrease downstream flow rates and diminish aquifer recharge. Conversely, large discharges of water from Storage Basins can modify the downstream flow patterns. These, in turn, are bound to modify downstream aquatic ecosystems, desiccation of wetlands, reduce capacity for digesting wastewater discharges, and lowered water tables. There is an abundance of possibilities for head storage basins in the Region. However, the best reservoir locations are to be found in the transboundary environment of nearly abandoned projects like Skavica (Albania – the former Yugoslav Republic of Macedonia) and Buk Bijela (Bosnia and Herzegovina – Montenegro - Serbia). Other less advantageous opportunities are positioned within national boundaries, like Žuti Krš (Montenegro). In principle, head storage basins are beneficial for all market orientated downstream water resources users, in the respect that flood protection is of crucial importance on rivers. For example, at the Drina River, which is known for notorious flooding, such a reservoir would enable high degree of flood control.

Apart from abstractions, barriers across rivers for storage or regulation such as dams for flood control, urban and irrigation water supply and hydropower generation can cause changes in flow patterns, increase stratification, and impede the movement of aquatic biota. These changes directly impact downstream communities by, for example, reducing the productivity of rivers, lakes and estuaries and reducing fish populations because of changes in breeding cues and changes in physical habitat.

Changes in flow quantities alter water levels in both rivers and lakes with detrimental effects on sensitive riparian areas such as wetlands and floodplains. These changes can alter the hydrodynamics of lakes, affecting water quality and habitat. In rivers, changes in flow velocity can affect the migratory and breeding behaviour of some species, as well as affect sediment transport and deposition.

Flows that are specifically intended to maintain the environmental benefits from river systems for peoples are termed environmental flows, rest flow or basic ecology flow. There is growing experience in the countries in the provision of EAF, although it remains one of the weaker aspects of integrated water resources management.

To sufficiently control water balance at river basins, a reliable measurement of flow should be put into existence. The best locations for discharge gauging stations are near state borders, where the cumulative effects of upstream catchment should be essentially recorded. The degree of tolerance regarding what value of natural against modified run-off hydrograph is acceptable is a matter for riparian countries to agree upon.

Generally, the effect of seasonal or yearly water quantity shift, which is done for example at the upper river section, is felt all the way downstream. By proper operation of the head reservoir, hydropower is going to benefit tremendously in terms of peaking or energy production safety. On the other hand, this presents pressure on habitats and some other water resources users, therefore the issue of storage basins should be planned within river basins and harmonised throughout different state administrations. By such an approach, the opportunity emerges for downstream countries to participate either in investment or participate in some other means of compensation.

3. Environmental key issue: Transport of Sediments

Sediments themselves can provide a risk or benefit to the well-being of a river system, through excess or lack or through incompatible physical characteristics. For example, sediments in rivers, reservoirs, lakes and impoundments can reduce storage and flow capacity, increase flood risk, damage hydropower installations, degrade habitats, erode river channels downstream of sediment blockages, and undermine the stability of channels and infrastructure (e.g. erosion of bridge piers). Benefits include a sediment supply to the riverbanks environment, the provision or sustenance of wetland and aquatic habitats, sediment extraction for use in building/road industries, and beneficial uses like the capping function of contaminants.

In thinking about sediments holistically (i.e. at the river basin level), it is necessary to consider several issues. For instance, many riverbanks and flood-banks are highly contaminated with historical industrial waste or even dredged material. During flood events, contaminated sediment deposited on fields may take fields out of agricultural use classes. Nutrients bound to sediments may play an important role in eutrophication, and pesticides and pharmaceuticals bound to sediments may prove to be a long-term problem.

The storage and diversion of water on rivers has often triggered tensions between countries within a shared watershed. Often, characterised by standstill, there is no outcome in such a situation. As a specific structure for retaining water, dams require constructive multilateral co-operation. Consequently, it increasingly becomes the subject of legal agreement(s) between countries to secure the mutual interest for effective cooperation.

Changes in land use in watersheds can release large loads of sediments and attached contaminants into waterways and coastal zones. Typically, this arises in the headwaters, where steeper upland areas subject to higher rainfall are converted from forestry to agriculture, although any land use conversion, such as urban expansion, that removes groundcover can cause the erosion and sedimentation of waterways and can also impact coral reefs in the nearby marine areas. Poor management of agricultural land is another source of sediment in many countries.

7 Proposals for follow-up actions

7.1 Regional level

Table 7.1 Proposed actions at the regional WB6 level

SN	Brief description of proposed Action	Assumed implementing agent	Anticipated timeframe
1	Develop pre-planning mechanisms and designate “no-go” areas for new hydro-power projects.	Governments, regulators, with public participation	ASAP
2	Full transposition, implementation and enforcement of EU legislation (Environment – Birds and Habitats Directive, WFD)	Governments, regulators	ASAP
3	Ensure that mitigation measures for ecology and biodiversity are specific for the area and project and that they are implemented – develop a monitoring system for the effectiveness of mitigation measures assessment	Governments, regulators	ASAP
4	Develop a unified methodology for EAF calculations and harmonise regulations between countries (MKD and SER - harmonisation)	Governments	ASAP
5	Map riparian natural habitats according to Habitats Directive	Governments, Environmental agencies, Scientific institutions	ASAP
6	Develop inventory of benthic fauna and invasive species	Governments, Environmental agencies, Scientific institutions	ASAP
7	Develop and harmonise biodiversity monitoring programme for transboundary river basins	Governments, Environmental agencies, Scientific institutions	ASAP
8	Ensure that all pollutants are moved outside flood plain (e.g. landfill) or are appropriate managed (e.g. wastewaters)	Governments, Environmental agencies	ASAP
9	Conduct transboundary river basin assessment (transboundary EIA) or cross-border SEA, including CIA, as an activity to be carried out at the earliest stage of project identification	Governments	Planning phase
10	Map all planned and proposed protected areas (including future Natura 2000 areas and assessment under article 6 of the Habitats Directive).	Governments, regulators	ASAP
11	Build capacity within agencies on technical approaches and also on policy solutions	Governments, regulators	ASAP

7.2 Country level

Table 7.2 Proposed actions at the country level

SN	Brief description of proposed Action	Assumed implementing agent	Anticipated timeframe
(1) Albania			
1.1	Identify biodiversity areas of potential significant impact	Governments,	ASAP

SN	Brief description of proposed Action	Assumed implementing agent	Anticipated timeframe
		Environmental agencies, Scientific institutions	
1.2	Assess potential transboundary impacts		
1.3	Transpose and implement EU directives	Governments, regulators	ASAP
(2) Bosnia and Herzegovina			
2.1	Conduct new biodiversity surveys and field investigations	Governments, Environmental agencies, Scientific institutions	ASAP
2.2	Improve social and economic impact assessment procedures	Governments, regulators	ASAP
2.3	Harmonise regulations on EAF within the State	Governments, regulators	ASAP
(3) The former Yugoslav Republic of Macedonia			
3.1	Amend cost-benefit assessment of the projects and alternatives taking into account mitigation measures	Governments, regulators	Conceptual solution phase
3.2	Implement and use in practice transposed legislation for SEA and EIA	Governments, regulators	ASAP
(4) Montenegro			
4.1	Conduct SEA process in early phases of project prepared	Governments, regulators	ASAP
(5) Kosovo			
5.1	Identify biodiversity areas of potential significant impact	Governments, Environmental agencies, Scientific institutions	ASAP
5.2	Improve waste disposal issue	Governments, regulators	ASAP
5.3	Assess potential transboundary impacts	Governments, regulators	Before main design
5.4	Capacity building in environmental and nature protection sector	Governments, regulators	ASAP
(6) Serbia			
6.1	Assess potential transboundary impacts	Governments, regulators	Before main design
6.2	Implement and use in practice transposed legislation for SEA and EIA	Governments, regulators	ASAP

8 Conclusions, recommendations and final remarks

8.1 Introduction

Building a sustainable energy sector in accordance with all the relevant conditions and guidelines mentioned above, facilitates the replacement of fossil fuels with renewable energy and lowers dependence on external energy sources. Consequently, developing sustainable and environmentally-acceptable hydropower assists in the mitigation of climate change, which is a significant threat to sustainable economic development.

A significant observation concluded from this activity within the Project is the need to conclude the full transposition, implementation and enforcement of EU environmental legislation within the WB6 Region. In the WB6, it is essential that hydropower projects must be planned and developed based upon either already-transposed and implemented legislation or the principles of EU legislation where transposition and adoption does not yet exist. Specifically, in the environmental and sustainability context, this refers to the SEA, EIA, Birds and Habitats directives, together with the Water Framework Directive and Floods Directive. Using additional guidance (such as the forthcoming European Commission guidance documents on Natura 2000 and hydropower) in the hydropower planning may also prove instrumental for the successful development of sustainable hydropower in the Western Balkans. WB6 HPP must, in any case, follow this route if their preparatory activities will be supported by the EC and the HPP construction will be financed by EIB, EBRD or another IFI.

The requirements of EU environmental legislation and applicable international conventions shall remain the reference for hydropower projects in WB6 countries, the implementation of which should be supported through the Energy Community Treaty. The most important to fully consider in the HPP development process is the Water Framework Directive, the Floods Directive and the Birds and Habitats Directives as well as the Environmental Impact Assessment Directives (EIA and SEA). These directives are interlinked and should therefore be implemented in a coordinated way to ensure that they operate in an integrated manner.

It is very important to use pre-planning and planning mechanisms to designate specific river basins, or stretches of rivers, for areas for hydropower development, either for individual projects or hydropower cascades. More importantly, it is our view that the WB6 countries should establish clear “no-go” areas for new hydro-power projects, based on the protection of nature conservation values. The available strategic planning mechanisms (SEA, RBMP) are irreplaceable tools for sustainable hydropower development and successful multiple water uses.

Hydropower plants have impacts not only on freshwater species and habitats but also on terrestrial ones. In the report, the impact evaluation of existing and planned HPPs on fish species was based on the distribution of selected species in each drainage and river basin in the WB6 region and was related to the types of HPPs planned in that river basin. The distribution of selected species represents the fish assemblages and their freshwater habitats that are the most sensitive to the changes in the waterbody resulting from planned HPP development, while their threat status reflects their risk of global extinction. Existing legislation relating to Ecologically Acceptable Flow has been analysed, based on national legislation in the WB 6 countries, and a recommendation has been made relating firstly to the establishment of EAF, and secondly to the processes for monitoring that the EAF is maintained.

Transboundary issues and cumulative effects must be addressed properly at the river basin area level. In general, it is very important to ensure that impact management and mitigation measures are in place before construction, and that these mitigation measures are fully costed and taken into account, before final decision making.

The activities that could be undertaken to stimulate the transition to more adaptive management of transboundary regimes differs between river basins throughout the WB6 region. It is clear that some transboundary regimes (for some detail, see below) have already developed much further than others.

A full assessment of cumulative effects (including impacts on other water users within the catchment) should be undertaken for every hydropower project during the HPP project development, where existing or planned HPP or water control measures exist within the same catchment.

Joint mechanisms implemented from the start of a cooperative hydropower project can help to prevent, mitigate and monitor adverse effects, such as the consequences on ecosystems integrity and diversity (aquatic, terrestrial, hydrological dynamics and sediment/nutrient transport) and on social systems (because of the

negative impacts on fisheries, agriculture and food security) and dialogue will ensure that nonetheless emerging adverse effects (and possibly benefits) are shared in a fair and equitable manner between the countries.

Resettlement / expropriation can occur in the area upstream of the dam as one of the most important impacts where the HPP stores water in a reservoir as a consequence of the flooding of houses and land. Unmitigated or poorly mitigated negative impacts can cause the same effect in the downstream area. On the other hand, HPP construction can create a new opportunity for local inhabitants to sell their properties and voluntarily relocate to a more attractive area.

In order to develop the next steps, a screening of HPP projects from the environmental and social context has been made, where hydropower production benefits, main impacts and issues are described. Prospective mitigation concepts were identified and based on that, recommendations for follow-up were made.

8.2 Regional level

The sustainable development of hydropower in the WB6 region relating to possible environmental and social impacts would be greatly improved if regional level planning and pre-planning mechanisms and procedures were in place, especially regarding the establishment of "no-go" areas for new hydropower plants and the conducting of an Appropriate Assessment (AA) according to Article 6 of the Habitats Directive. This is especially important in the cases where the location and impacts of HPP in one country could present negative impacts on "no-go" or protected zones in adjacent WB6 countries. Transboundary planning of hydropower use is essential for the proper protection of all new "no-go" or sensitive zones across the Region. The governments of WB6 countries through their agencies and Ministries should initiate this transboundary dialogue as soon as possible.

Full exploitation of hydropower potential of Western Balkan in sustainable way and strategic sound planning, with minimised negative impacts on the environment and maximised benefits for the local population, will be much easier with the full transposition, implementation and enforcement of EU legislation (Environment – Birds and Habitats Directive, WFD, Floods directive, EIA, SEA). WB6 countries are at various stages of transposing and implementing EU principles into their legislative frameworks, and those further ahead could make the process on the regional level quicker and easier by enhanced sharing their experiences. Later, it is important to install procedures to monitor and evaluate how the transposed EU legislation is enforced in practice, and what the effects of the EU legislation are in the local environmental and social background.

Proper prescription, dedicated execution and continuous monitoring are steps that are crucial for the implementation of mitigating measures and the removal or avoidance of the detrimental effects of hydropower projects on the environment and local population. Hence, it is of utmost importance for each country in the region to ensure that mitigation measures for ecology and biodiversity are location- and project-specific. The development of monitoring systems for the effectiveness of prescribed mitigation measures is essential for the assessment of their successful application.

It is recommended that the countries of WB6 region develop a methodology for EAF calculation, and harmonise the respective regulations across the region. A unified methodology for assessing EAF and monitoring its proper implementation would help to minimise the impact of hydropower on river biodiversity, especially on the components of fish fauna. This task should start as soon as possible, and it falls into the responsibility of Governmental bodies to initiate the process, and environmental agencies and scientific institutions should be included and consulted in the development of the final regulatory framework.

Riparian habitats in the region are among the rarest in the Europe, and simultaneously are among the most endangered habitats under pressure from future hydropower development. Therefore, it is essential to map all the riparian habitats and harmonise habitat data across the region.

Similar to riparian habitats, it is recommended that WB6 countries develop and maintain a regional inventory of benthic fauna and invasive species. This task should be initiated by the relevant governmental bodies and joined by scientific institutions in the mapping and inventorying of benthic fauna and invasive species.

WB6 countries should develop and harmonise a biodiversity monitoring programme for transboundary river basins. Databases on all transboundary river basins should be readily available for all stakeholders involved in the process of the hydropower development. This task should start as soon as possible, preferably with the compilation of already existing data, followed by a gap analysis and the development of a monitoring programme.

All countries in the region should make a strong effort to ensure that all pollutants are moved outside of the flood plains (e.g. landfill) or are appropriately managed (e.g. wastewaters). This task should start as soon as possible with the government agencies responsible for environmental protection.

It is important to take into account the transboundary impacts of HPP construction. Therefore, WB6 countries should start as soon as possible the development of transboundary river basin environmental impact assessments (transboundary EIA), or cross-border SEA, including CIA, for all planned HPP's with potential transboundary impact, as an activity to be carried out at the earliest stage of project identification. The action needed to fulfil this recommendation should be instigated by the Governments of the WB6 countries.

All WB6 countries need to develop a public inventory of all planned protected areas. The database on planned protected areas should include whenever possible, the GIS defined borders of planned protected areas. The progress on the implementation of the Natura 2000 network should also be included, and all locations of future HPP's should be evaluated against the inventory of planned protected areas.

Sustainable development of hydropower in the region absolutely requires the improvement of resources, skills and institutional capacity within both the agencies dealing with the technical approaches to hydropower development, and also within agencies responsible for the environmental protection and formulation of relevant policy solutions. Close coordination between energy, environment and climate change policies is essential in this context. This is responsibility of government of each of the WB6 countries.

8.3 Country specific level

8.3.1 Albania

In Albania, it is recommended that the framework and procedures are established to identify biodiversity areas that could be most impacted by the HPP development. The procedure should screen for protected areas and river stretches to be excluded from the future development of hydropower projects. This task would be best executed jointly by Government, Environmental agencies and scientific institutions. The execution of this task has no foreseeable obstacles and its implementation should be commenced as soon as possible.

A second recommendation for Albania concerns the transboundary effects of hydropower development. As soon as possible, Government bodies responsible for international cooperation should initiate transboundary cooperation with neighbouring countries to investigate potential transboundary effects of hydropower development, and through dialogue to introduce mitigation measures wherever possible.

8.3.2 Bosnia and Herzegovina

In Bosnia and Herzegovina, it is important to start as soon as possible with biodiversity surveys and field investigations to update existing data on biodiversity hot spots, the status of protected areas, rare species and habitats. The success of this task would be maximised through the joint work of Government bodies and agencies in the field of environmental and nature protection and scientific institutions.

The procedures for environmental and social impact assessments need to be improved, with special emphasis given to the unification of procedures, criteria and guidelines between the State's entities (Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District). It is recommended to start with improving and harmonisation of the procedures as soon as possible.

Another key issue important for sustainable hydropower development at the state level of Bosnia and Herzegovina is the harmonisation of Ecologically Acceptable Flow between the entities. This task should also start as soon as possible, thus enabling incorporation of EAF in the early stages of designs for new HPP projects. The execution of these recommendations should fall into the responsibility of Governmental regulatory offices.

8.3.3 Kosovo

In Kosovo, there is a need for the development of a database on biodiversity which would encompass data on spatial distribution and the status of animal and plant species, as well as habitats. This database can then serve as a sound base for the impact assessments either on strategic or project level for all future HPP projects. The

Government should instigate this process as soon as possible and ensure the joint work of governmental agencies and scientific institutions.

Later, it is important to improve waste disposal in Kosovo, pertaining to pollution in water courses. Governmental bodies responsible for the protection of the environment should start with planning steps to resolve this issue. Significant capacity building in the environmental and nature protection sector is essential.

Finally, the question of the transboundary impacts of hydropower projects development in Kosovo should be considered. Consultations with neighbouring countries for each project should start prior to the development of main design for a HPP. This task should fall into the responsibility of governmental bodies or agencies in charge of international cooperation of Kosovo regarding environmental issues.

8.3.4 The former Yugoslav Republic of Macedonia

In the former Yugoslav Republic of Macedonia, it is recommended that the cost-benefit assessment for hydropower projects and alternatives is amended to take into account the costs and benefits of mitigation measures. This improvement should be implemented for all future projects, at the stage of conceptual solution development. This task would be best executed through updates on Government and Regulators procedures.

SEA and EIA legislation have been transposed more than 10 years ago, but are still not properly monitored, implemented and enforced; improvement in practice is needed.

8.3.5 Montenegro

The implementation of Strategic Environmental Assessment procedures in the early stages of project development would greatly benefit the further development of the hydropower sector in Montenegro. At present, SEA is not applied for all strategies, plans or programmes. It is the task of Government and its Ministries and Regulatory agencies to ensure implementation of SEA processes in hydropower sector. The proper SEA implementation should start as soon as possible.

8.3.6 Serbia

In Serbia, it is important to ensure the implementation of procedures that will minimise the possible transboundary effects of HPP project development with neighbouring countries. This is the task of the government bodies and agencies responsible for international cooperation in the field of environmental protection. Contact with countries which would be potentially impacted by any specific HPP project should be established, well before the stage of the main design of the HPP. European directives are transposed into the national legislation, but the procedures for implementation and practice do not meet the objectives of the EU legislation.

8.4 Final remarks and observations

The key message of this Background Report for WB6 countries is that without properly addressing and resolving the conflicts of interest between the maximum development of the hydropower potential and use of water resources, and the preservation of environmental values and biodiversity, it is not possible to develop sustainable hydropower in the region.

The focus must be on the best use of water resources. Best use does not mean maximum use, but confining the development of hydropower to the level where mitigation measures can minimise impacts on habitats, species and local communities.

Important sustainability issues are better resolved during the planning and designing phases of a HPP project. This is even more important when a HPP cascade is planned or when there is plan to build a number of micro and small HPPs on the same river or river tributaries. For that reason, all stakeholder sectors must be involved and a strategic assessment must be made to consider all the development plans for that specific river basin, in

the transboundary context if applicable. By adopting such a process, potential conflicts are identified at an early stage and different solutions can be discussed before reaching a final decision.

In the cases where a design has been already developed without proper assessment relating to environmental factors at a strategic level or even on the project level, redesigning should be considered to avoid the cost of retrofitting environmental mitigation measures afterwards, when the HPP is already operational. Additional unforeseen mitigation measures are usually costlier and harder to implement after construction and in the private sector the concessionaire, operating under contract, will not be prepared to finance these measures.

Because of HPP construction without adequate mitigation, negative effects are visible in all WB6 countries. HPP rehabilitation projects should also include ecological restoration measures (e.g. EAF, measures for improvement of river continuity for sediment transport, and fish migration).

Integrated planning is even more essential in cases where a river basin is shared between countries; all countries sharing a river basin should be involved in a joint process, to conduct assessments, to follow guidelines, recommendations and conclusions that origin from that process, to establish a common monitoring system, to share collected data and to react by implementing additional mitigation measures if unpredicted negative effects occur.

It is important to emphasise that regardless of whether it is strategic policy, a plan or project level, the public must be involved from the earliest planning phase - for example in the development of a spatial plan, renewable energy plan, water management plan, irrigation plan and similar plans which relate to the same natural resources.

The WB6 are in the process of transposing and implementing EU legislation. We advocate that HPPs are planned and developed in a coherent way, following the provisions of the EU directives. After the transposition of EU legislation into the national legislation of WB6 countries, it is then important to implement, monitor and enforce the terms and regulations contained within the relevant national laws, not just satisfy formal adoption, but to ensure sustainable hydropower development and operation.

Hydroelectricity is very reliable and cost-effective energy and, with reservoirs, water flows can be adjusted to meet flood control and operational requirements, together with providing a means to adapt to future climate change impacts in rainfall patterns. In spite of positive impacts, recent study has confirmed that reservoirs of large hydropower plant dams may be a significant emitter of methane, a very important greenhouse gas. The study found that methane is responsible for 90 percent of the global warming impact of reservoir emissions over the short-term (20 years). Finally, if all prospective positive and negative effects are not considered together in a systematic, structured and coherent way, adequate mitigation measures cannot be effectively implemented and the consequences could be irreversible, permanent damage to ecosystems and the environment.

9 Literature

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Final Draft 4

Annex 1:

National SEA/EIA legal procedures in WB6 countries

Final Draft 4

A.1 Albania

SEA - Strategic Environmental Assessment

The Government of Albania approved for the first time on February 2013, the first law ever into force in Albanian, on Strategic Environmental Assessment (Law no.91, date 28.02.2013). Until that moment all the SEAs required from some urban development plans in the country, due to other laws obligations, followed the EIA procedure just to satisfy the fact that an SEA report was needed.

After the new law entered into force²⁹, other by-laws that fulfil the frame of the SEA legislations came into force:

1. **DCM no. 219, date 11.3.2015** "On defining rules and procedures consultation with the group of interest and the public, and the public hearing during the process of the strategic environmental assessment"³⁰;
2. **DCM no. 507, date 10.06.2015** "On approval of the detailed list on plans and programmes with negative impacts to the environment, that will have to go under an SEA process";
3. **DCM no. 620, date 07.07.2015** "On approval of the rules, responsibilities and detailed procedures for the strategic environmental assessment in the cross-border context"³¹;
4. **Common guideline of the Minister of Environment and the Minister of Finances, no.5**, date 06.06.2016 "On defining the service tariff for the process of Strategic Environmental Assessment".

The law set the framework for the process of the SEA, that all the plans and programmes under the above DCM no.507 should go under the SEA process. The aim of the law is to ensure high environmental protection and sustainable development, through involving environmental issues during the drafting, approval, review, changes and modification of the plans and programmes that have potential negative impact to the environment. The law defines institutions and their rights and responsibilities and the procedures to develop the Strategic Environmental Assessment.

The other DCM on public consultation and SEA process on cross-border context explain in detail these two processes, which are mentioned as one of the phase of the SEA process. The plans and programmes that should go under the process of SEA follow under these thematic: i) Mining sector; ii) **Energy resources**; iii) Treatment, transport, trade of oil and gas and under gas product; iv) Sector natural gas; v) Research and treatment of hydrocarbons; vi) Integrated waste management; vii) Forestry and pasture; viii) Environmental protection; ix) Hunting; x) Legalization, urbanization and integration of constructions; xi) Planning and territorial development; xii) Administration and land protection; xiii) Agriculture and farming; xiv) Fishing; xv) Rural development; xvi) Cultural heritage; xvii) Integrated management of water resources; xviii) Tourism; xix) Other plans that have an impact to the environment and human health. The process of the SEA is shown in the flow chart below (Figure A1.1).

²⁹The law transposes completely Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

³⁰This decision transposes partly the Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

³¹This decision transposes completely the Directive 2001/42/EC of the European Parliament and the Council, date 27 of June 2001 "On the consequences in the environment from defined plans and programs"

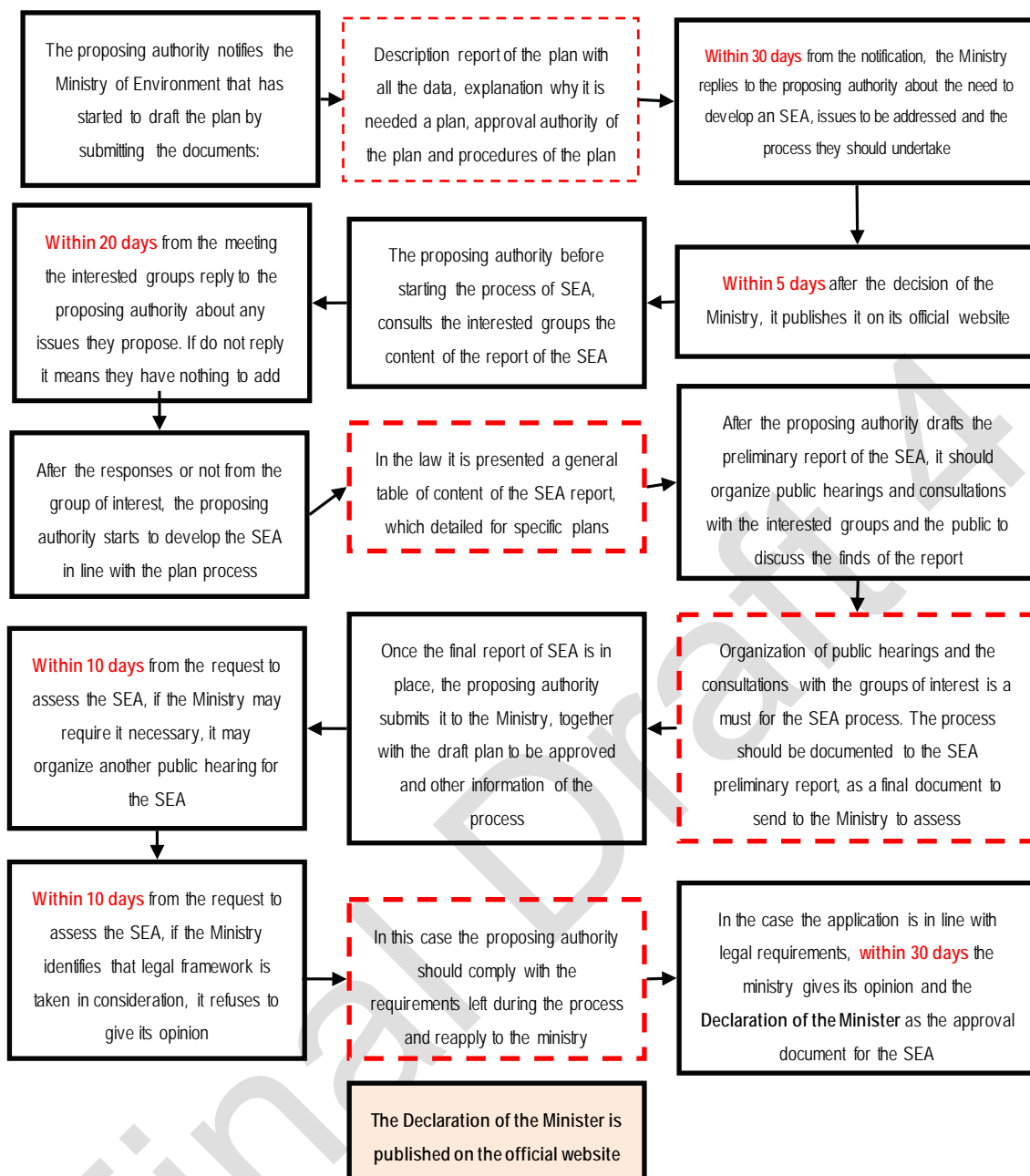


Figure A1.1 Process of SEA based on the Albanian Law

Later on, once the DCM no.219 on the rules and procedures on the public consultation came into force, it regulated better this process based on 5 main phases as the following (Figure A1.2):

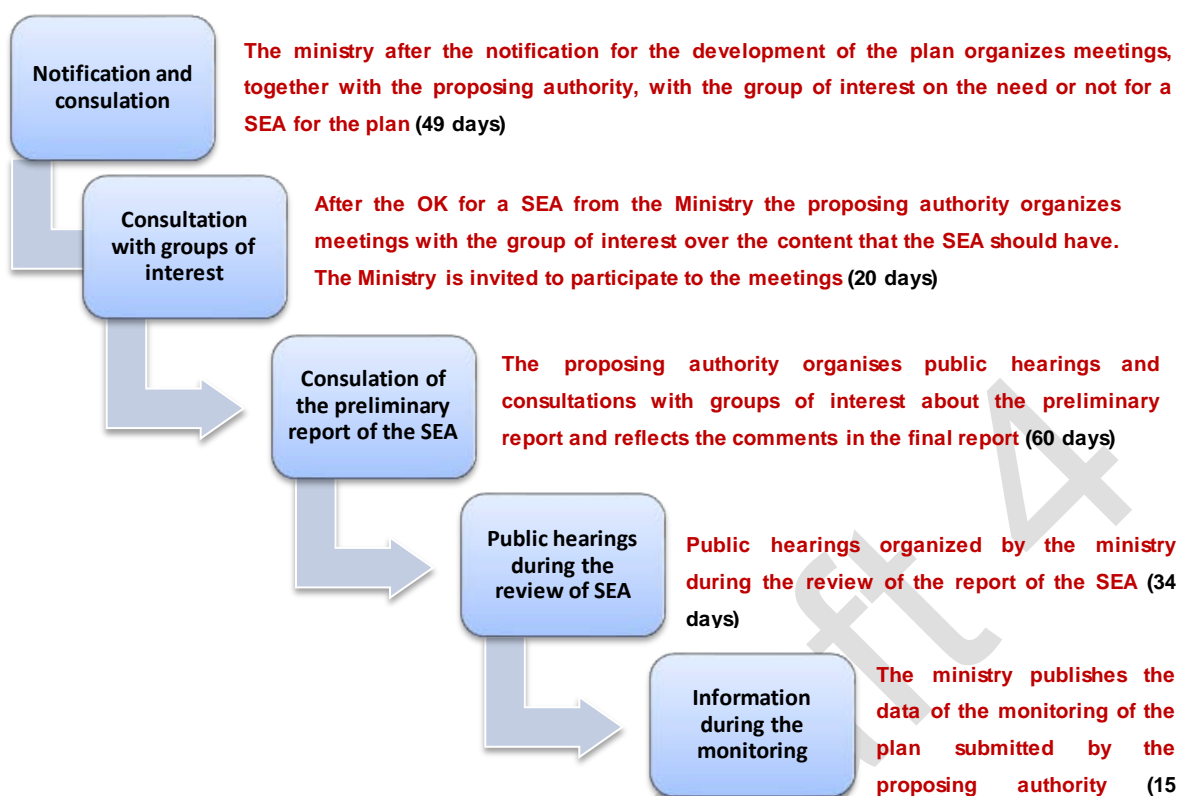


Figure A1.2 Process of public consultations on SEA process in Albania

The DCM no.620 explains in detail the process of SEA, in case the plan development would have any crossborder effects. Apart from the Ministry of Environment and the Proposing authority, as the main actors in the process, the Ministries of Foreign Affairs of respective countries will be involved in the process. The Albanian state authority should, through the Ministry of Foreign Affairs, inform the other cross border state on the development of the plan and the possible environmental effects that it might have. It is the crossborder state decision to be involved in the process of public hearings or not. All public hearings in the case of a cross border SEA should fall under the rules of DCM no.219.

EIA – Environmental Impact Assessment

The history of legal framework regarding EIA in Albania is a little different from the one of the SEA. Albania approved for the first time in 2003 the first law on EIA, which was not in line with EU Directive. In 2011, the Government of Albania approved the new law on EIA, in line with EU Directive followed, during the years, by a number of bylaws that meet the law's requirements. The new law on EIA aims to ensure a high level of environmental protection, through preventing, reducing and compensating environmental damages, from proposed projects before their development approval. The laws guarantee an open process of decision-making, during the identification, description and assessment of the negative impacts to the environment, on the right way and on the right time, including all interested parties.

Also during the years, the law of 2011 was amended, where the body of the National Business Centre, was excluded from the application process. Today the legal framework into force regarding EIA is composed of the followings pieces of legislation:

1. **Law no. 10440, date 07.07.2011**³² “On Environmental Impact Assessment”, amended with law no.12, date 26.02.2015
2. **DCM no. 598, date 01.07.2015**³³ “On defining rules and procedures for the cross-border Environmental Impact Assessment”

³²The law transposes completely EU Directive 85/337/EC of the European Parliament and the Council, date 27th of June 1985 “On the assessment of public and private project effects on the environment”

3. **DCM no. 686, date 29.07.2015**³⁴ “On approval of rules, responsibilities and timeline for the development of the EIA procedure and the procedure for the transfer of the Decision and the Environmental Declaration”
4. **Law no.11/2015** “On the accession of the Republic of Albania in the multilateral agreement of the South East European Countries for the development of the Convention ‘Environmental Impact Assessment in the cross-border context”
5. **DCM no.912, date 11.11.2015** “On the approval of the national methodology on the process of EIA” – entered into force on 1st of September 2016

The new law on EIA introduces the concept of the preliminary EIA and the full EIA.

Preliminary EIA procedure

In Annex I of the law there is the list of activities that require a full EIA and in Annex II of the law there is a list of activities that require a preliminary EIA³⁵. For all activities that fall under either Annex I or Annex II, they should follow the procedure approved in the DCM no. 686 for the development and the approval of the EIS, as the following flowcharts show (Figure A1.3-A1.4):

³³This decision aims to fully transpose the EU Directive 2011/92/EU of the European Parliament and the Council, date 13 December 2011 “On the assessment of environmental impacts from public and private projects”

³⁴This decision aims to fully transpose the EU Directive 2011/92/EU of the European Parliament and the Council, date 13 December 2011 “On the assessment of environmental impacts from public and private projects”

³⁵Based on the list of activities that should have a preliminary or full EIA, the installation for production of hydroelectric energy fall under the Annex, i.e. they need a preliminary EIA. In any case the Ministry should give the final decision for what type of EIA they need

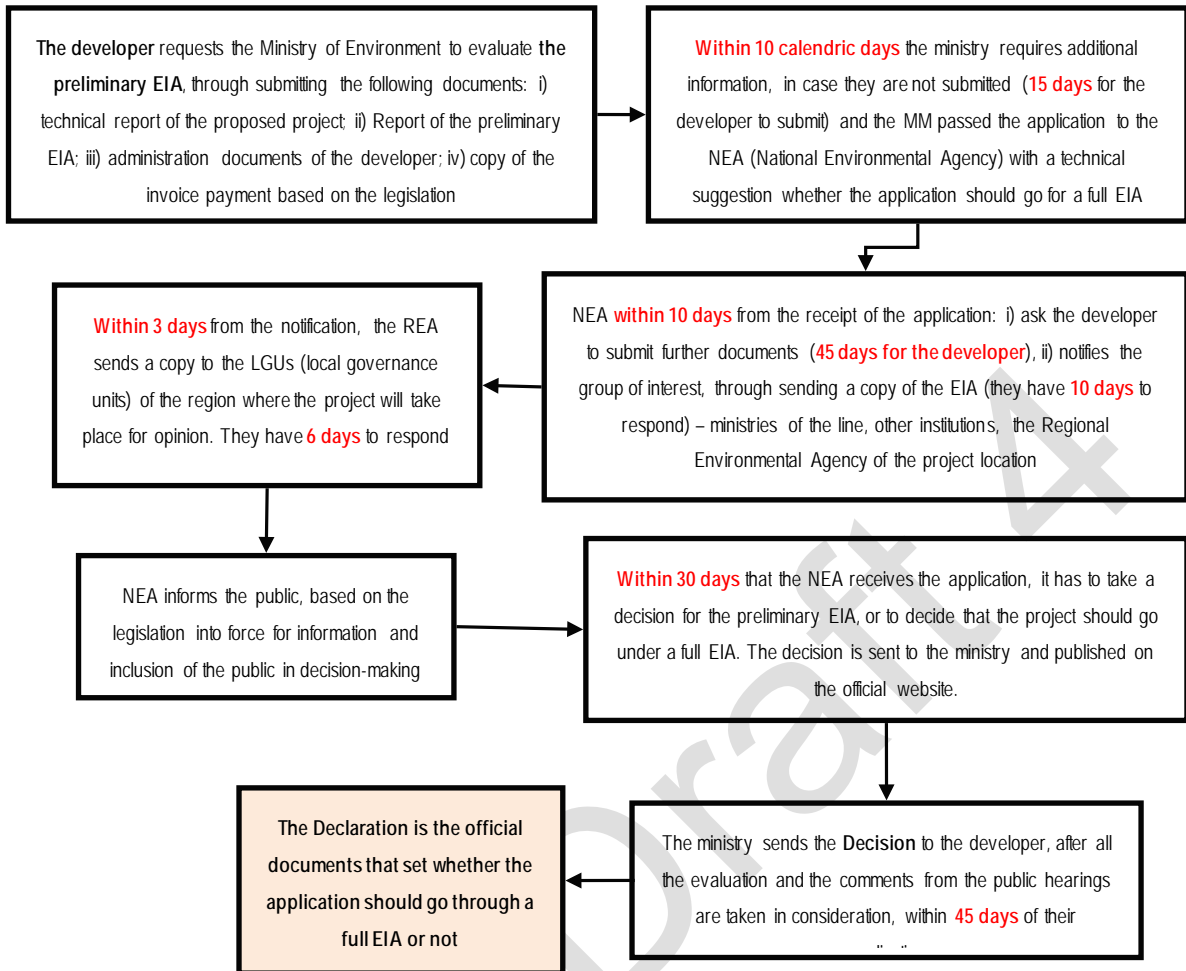


Figure A1.3 Process of the preliminary EIA based on the Albanian legislation

Profound EIA procedure

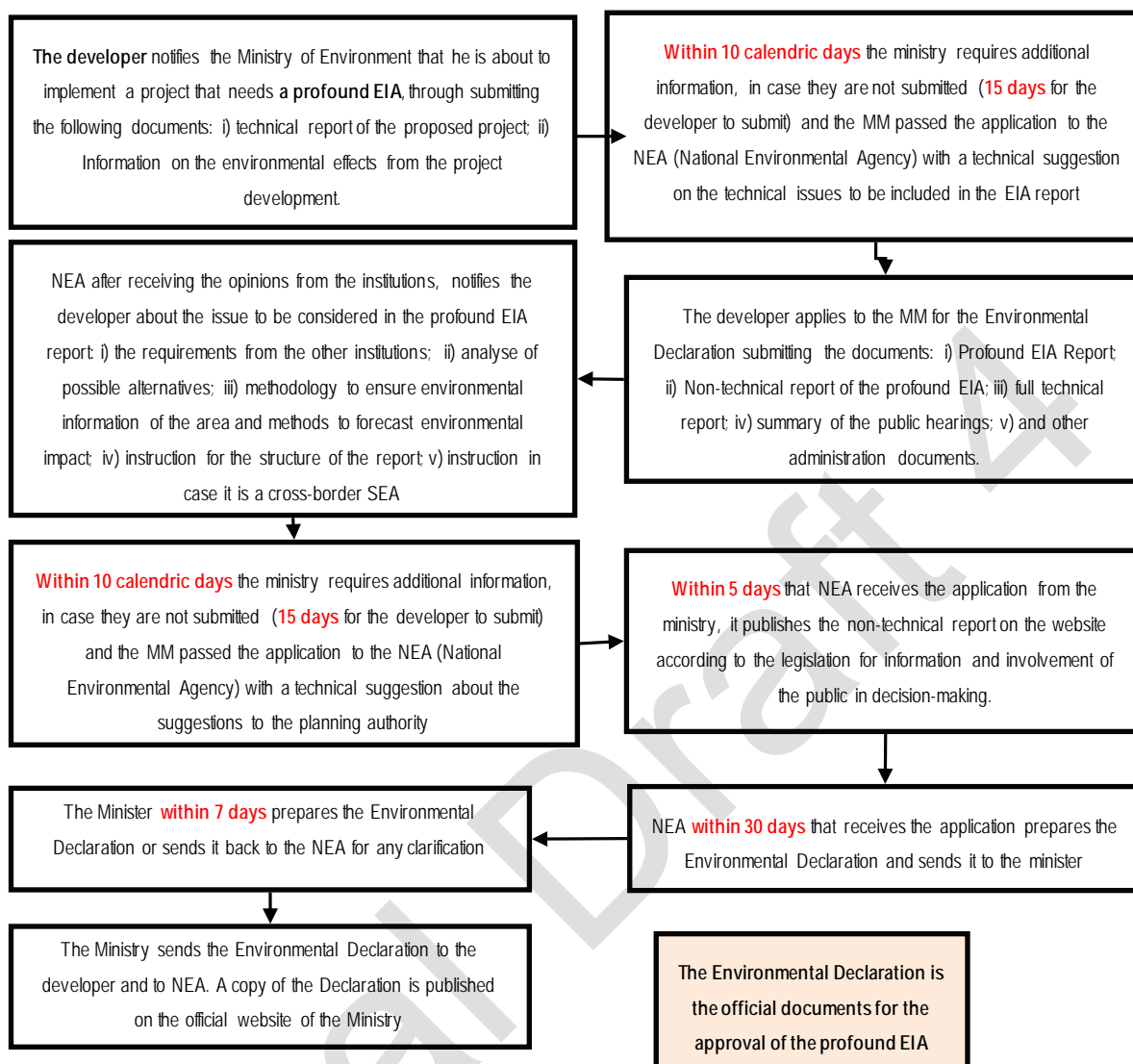


Figure A1.4 Process of the profound EIA based on the Albanian legislation

A.2 Bosnia & Herzegovina

The Constitution of Bosnia and Herzegovina (BiH), an annex to the General Framework Agreement for Peace in Bosnia and Herzegovina (the Dayton Agreement) adopted in 1995, defines BiH as a sovereign state with a decentralised political and administrative structure, and several levels of political governance:

- Government at the level of the state of BiH,
- The two Entities: the Federation of BiH (FBiH) which is further decentralised into 10 Cantons with their own governments and the Republika Srpska (RS),
- The Brčko District (BD) is a self-governing administrative unit, under the sovereignty of BiH and formally a part of both Entities.

Environmental protection issues are not one of the ten items defined in the Constitution as competencies of State institutions, therefore they fall under the following provision: “All governmental functions and powers not expressly assigned in this Constitution to the institutions of BiH shall be those of the Entities” (Article III, Paragraph 3).

The constitutional organisation of BiH defines the environmental protection policy-making, but on the other hand there are several levels of responsibilities and bodies that regulate them:

- The State of BiH (the Ministry of Foreign Trade and Economic Relations)
- The entities:
 - The RS:
 - ✓ The Ministry of Spatial Planning, Civil Engineering and Ecology,
 - ✓ Municipalities.
 - The FBiH:
 - ✓ The Federal Ministry of Environment and Tourism,
 - ✓ Cantonal ministries (10 cantons/different ministries in the cantons),
 - ✓ Municipalities.
- The BD (Department of Municipal Affairs).

Due to the very complex administrative structure, BiH has also a very complex legal framework since entities (FBiH and RS) as well as BD adopts their own laws, as well as the cantons in FBiH.

Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) has been regulated by the entity and BD Laws on environmental protection as follows:

- Environmental protection law of FBiH (OG FBiH, no. 33/03 and 38/09);
- Environmental protection law of RS (OG RS, no. 71/12 and 79/15);
- Environmental protection law of BD (OG BD, no. 24/04, 19/07, 01/05 and 09/09).

These laws regulate that SEA should be implemented on plans and programmes in the field of spatial and physical planning or land use, agriculture, forestry, fishery, hunting, energetics, industry, traffic, water management, waste management, tourism etc. They also provide brief framework for the procedure to be followed. SEA's developed for plans and programmes on different levels (entity, municipal) must be mutually harmonised as well as harmonised with EIA's and environmental protection plans and programmes.

FBiH

SEA in FBiH is regulated by the articles 50.-51. of Environmental protection law of FBiH (OG FBiH, no. 33/03) and articles 14.-15. of the amendments to the Environmental protection law of FBiH (OG FBiH, no. 38/09). The SEA is very poorly defined within the existing Environmental protection law of FBiH. However, the draft of the new Environmental protection law of FBiH is in the preparation phase and it will very precisely define the procedure for SEA in accordance with the 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.

According to the article 51. of the law, the authorities responsible for the preparation of spatial planning documents and the authorities responsible for the development of plans, programmes and strategies in the field of agriculture, fisheries, forestry, energy, mining and industry, transport, waste management, water management and whose content might have a negative impact on the environment are obliged to prepare a SEA. During development of the SEA, the components of the environment, the quality of the environment and impact on human health are taken into account. Article 52. of the law defines that SEA contains:

- Assessment of the state of environment;
- Identification of development goals by determining priorities in terms of environmental / sustainable development;
- Consideration of development alternatives for the realization of the goals and priorities;
- Drafting an environmental assessment;
- Determination of environmental indicators for monitoring the impact on the environment and changes in the status of the environment;
- The integration of the planned measures in the final document of plans, programmes and strategies.

Drafts of spatial planning documents, strategies, plans or programmes of federal jurisdiction are submitted to the federal ministries responsible for the environment and health. SEA from the federal jurisdiction shall be

submitted to the Advisory Council for review and provision of the opinion. SEA is adopted by the Government of FBiH. SEA of the cantonal competence is adopted by the cantonal government. The SEA Procedure in FBiH is presented in Figure A.1.5 below.

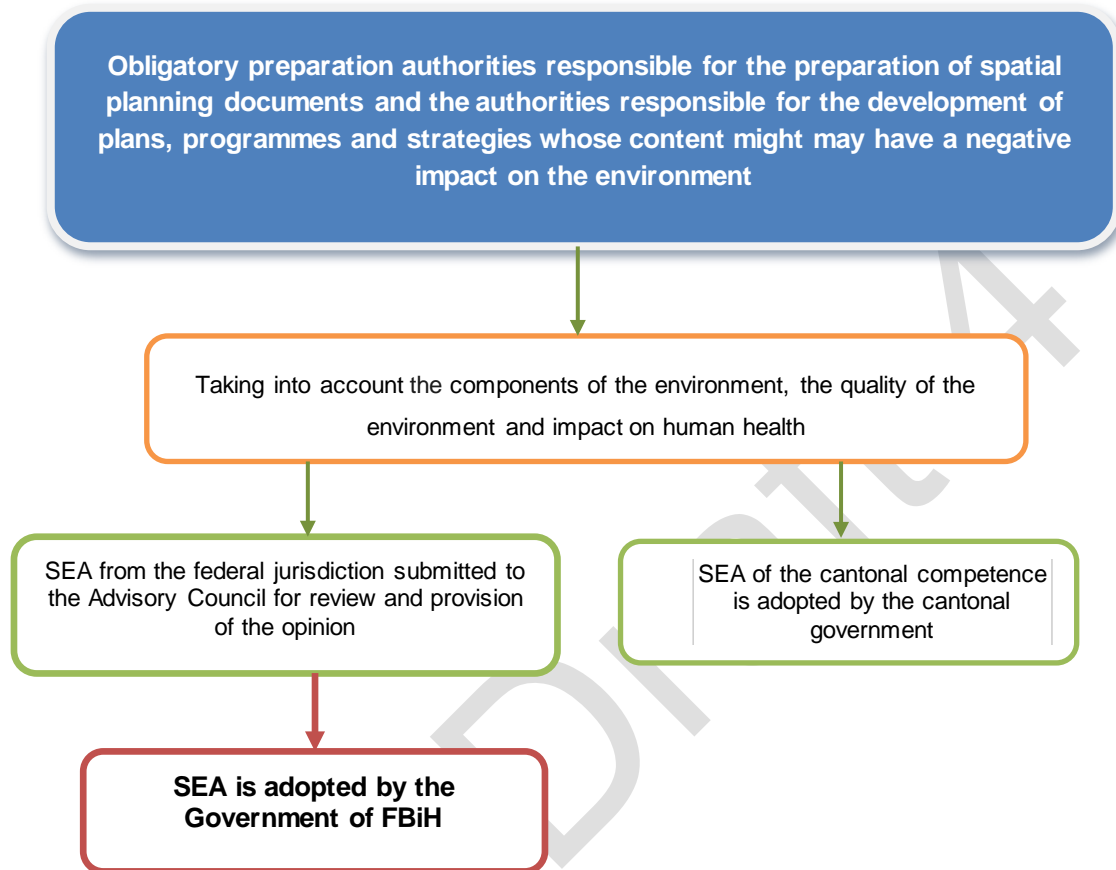


Figure A1.5 SEA procedure in FBiH

RS

SEA in RS is regulated by articles 48.-59. of Environmental protection law of RS (OG RS no. 71/12 and 79/15). This law identifies that the criteria, on the basis of which decision on preparation of SEA is made shall be determined by a by-law. According to the article 51. of the law SEA is implemented through following phases:

- Phase of preparatory work which includes:
 - ✓ decision on preparation of SEA;
 - ✓ the selection of the consultant for preparation SEA report;
 - ✓ participation of interested bodies and organisations;
- Phase of preparation of the report on SEA

- Consultation phase which includes:
 - ✓ participation of authorities and organisations;
 - ✓ public participation;
 - ✓ the consultation with interested bodies, organisations and the public of the other entity or BD or other country, if the execution of the plan or program may have an impact on the environment of other entity, BD or other country;
 - ✓ report on the results of participation of interested bodies and organisations and public;
- Phase of the assessment of SEA report that includes issuing of the Ministry opinion on the SEA report, which takes into account the results of consultations with bodies and organisations, and with public and special consultations conducted with representatives of other entities, BD or other countries.

Decision on preparation of SEA is adopted by authorised body for preparation of the plan or programme on the basis of previously obtained opinion of the body authorised for environmental protection and other interested bodies and organisations. Article 52. more precisely defines the context of the decision on obligation of preparation SEA report, as well as the decision which determines that preparation of SEA report is not obligatory. Body authorised for preparation of the plan or programme decides on selection of the consultant for preparation of SEA report. Selected consultant must have a license for performance of environmental protection related activities according to the relevant by-law adopted on the basis of Environmental protection law of RS.

Prior to the adoption of plans and programmes, the authorised body for preparation of plans and programmes is taking into account the opinion of the Ministry in accordance with which aligns the plan or programme with the interests of the protection, preservation and improvement of the environment.

Opinion on the SEA report, the SEA report, a report on the results of participation of bodies and organisations and the public is an integral part of the documentation basis of plans and programmes.

The SEA Procedure in RS is presented in Figure A1.6 below.

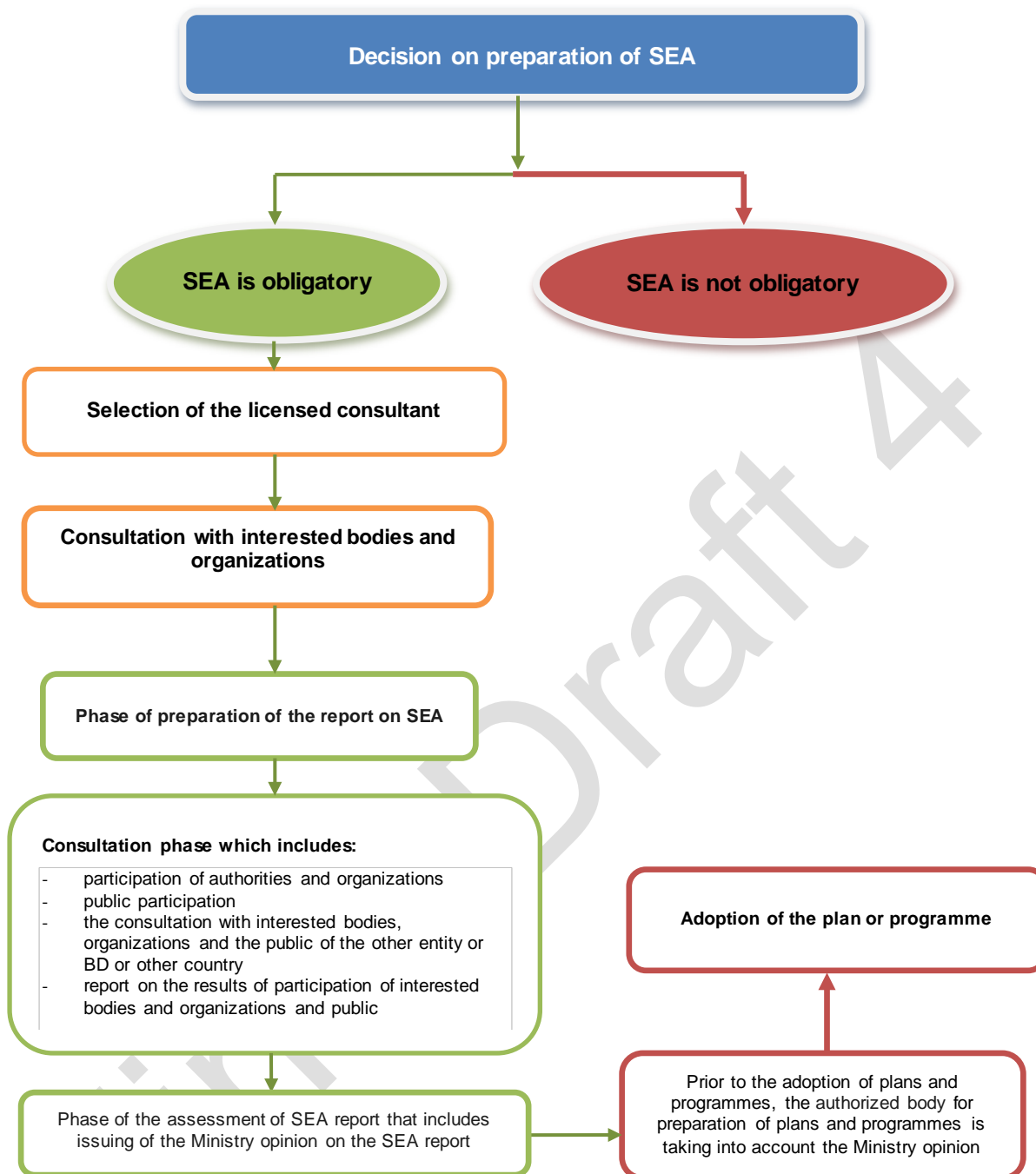


Figure A1.6 SEA procedure in RS

BD

SEA is regulated by articles 50.-51. of Environmental protection law of BD (OG BD, no. 24/04, 19/07, 01/05 and 09/09). This law defines that during adoption of the regulations and decisions by the authorised department, Government or Assembly of the District, which may adversely affect the quality of the environment and human health, it is necessary to obtain a SEA to environment.

SEA is being prepared by a consultancy company which obtained a license from the authorised department or entity ministry of BiH. SEA is obtained by a proposer of regulations or decisions and it is submitted with the draft of regulation or decision to body authorised for its adoption, together with the opinion of Advisory Council for Environmental Protection.

According to the article 51. SEA contains:

- The extent to which the intended regulation or decision may positively or negatively affect the state of the environment;
- The damage that might occur to environment, i.e. the population, if regulation or decision is not adopted;
- The extent to which conditions for the introduction of measures are favourable by intended regulation or decision;
- What are the possibilities of the authorised bodies to implement the regulations, or a decision that is intended to be adopted.

SEA is submitted to the Advisory Council for environmental protection, together with the draft regulations or decisions. The Advisory Council is obliged to provide its opinion on the draft regulations and decisions and SEA within 90 days. The Advisory Council can require a professional assistance in order to assess in detail an environmental impact for certain regulation or decision.

The SEA Procedure in BD is presented in Figure A1.7 below.

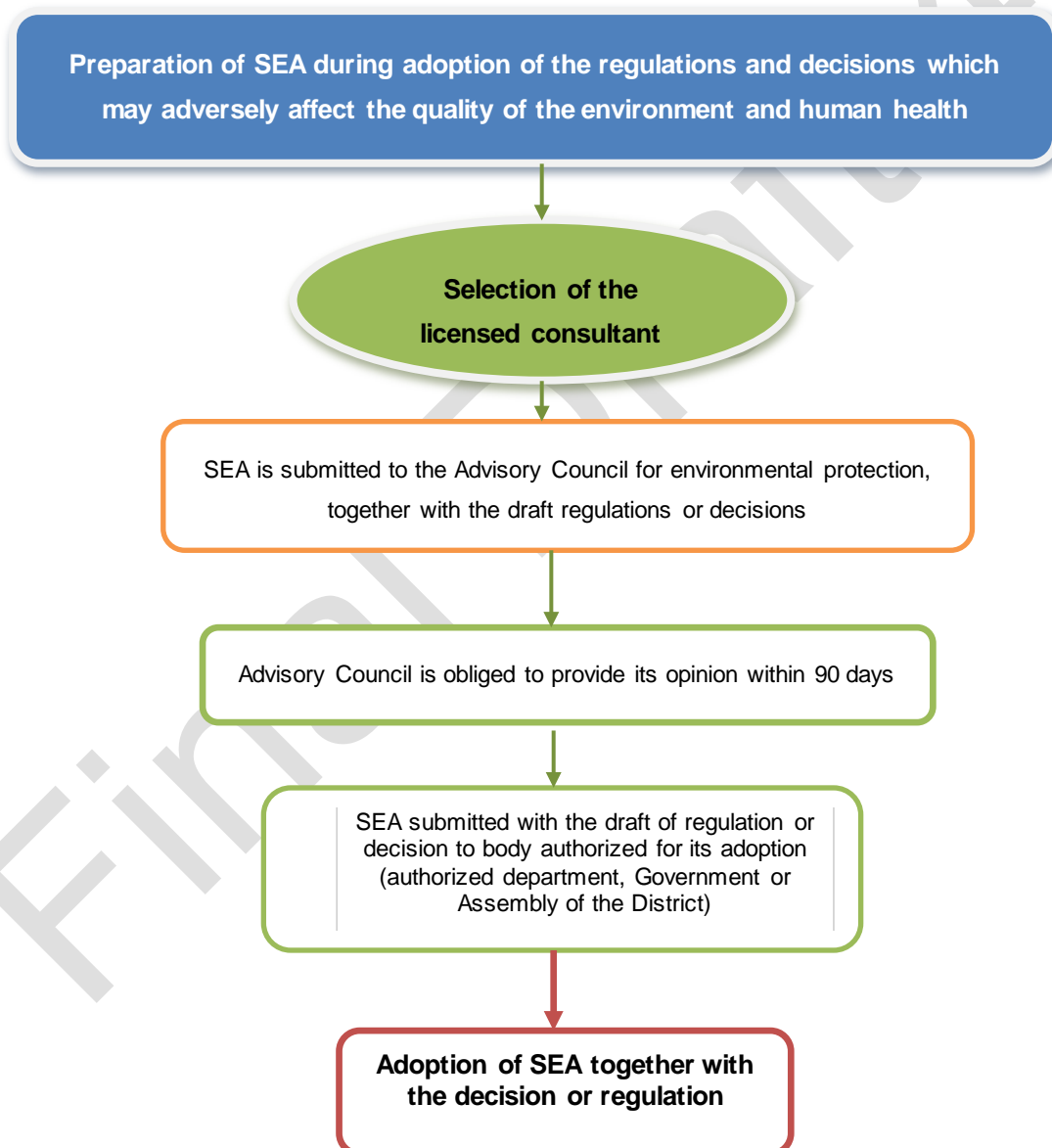


Figure A1.7 SEA procedure in BD

In July 2016, Agency for watershed area of Sava River engaged a consultancy company E-nova Sarajevo to prepare a "Strategic environmental assessment Study of Water management plan for the Sava river basin in FBiH (2016-2021)".

In the same period, Agency for watershed area of the Adriatic Sea engaged a consortium of consulting companies IGH Mostar i Dvokut Ecro Zagreb to prepare a Strategic environmental assessment Study of Water management plan for the Adriatic Sea in FBiH (2016-2021)".

Environmental Impact Assessment (EIA)

The requirements of the EIA Directive 2011/92/EU are transposed through entities' and BD's Law on environmental protection (OG FBiH, no. 33/03, 38/09; OG RS, no. 71/12, 79/15; OG BD, no. 24/04, 1/05, 19/07, 9/09) and specific rulebooks that provide list of installations that are subject to EIA:

- Rulebook on installations for which EIA is mandatory and installations that can be put in use only if they obtained the environmental permit (OG FBiH, no. 19/04);
- Rulebook on installations for which can be constructed and put in use only if they obtained environmental permit (OG RS, no. 124/12);
- Rulebook on projects for which environmental impact assessment is performed and criteria for determination of obligation and scope of the environmental impact assessment (OG RS, no. 124/12);
- Rulebook on installations for which EIA is mandatory and installations that can be put in use only if they obtained the environmental permit (OG BD, no. 30/06).

According to these rulebooks the EIA is obligatory for hydropower plants over 5 MW for single plants, or over 2 MW for several plants in line at a distance less than 2 km. For the plants with capacity less than 5 MW and bigger than 1 MW decision on EIA will be taken by the competent authority. Decision is made in line with the Criteria set in the Rulebook. In case that decision is in favour of EIA, the EIA Study is to be prepared, which should identify impacts and propose measures in the phase of project document preparation, construction, use and demolition. Among the other criteria, the decision will be in favour of EIA if the project is located in the protected area. The EIA process is completed by issuing the environmental permit in line with the requirements from the respective Law on environmental protection. In case that EIA is not required, the relevant entity ministry/BD department will directly proceed with issuing environmental permit based on the Request for environmental permit that will also identify environmental protection measures. The both, the EIA Study and the Request for environmental permit are prepared by the companies licensed by entity ministries.

FBiH

For plants and facilities requiring environmental impact assessment, assessment procedure begins with the submission of the Environmental Impact Study (the Study) to the Federal Ministry of Environment and Tourism (hereinafter: the Ministry). Throughout the assessment procedure, the Ministry provides the Study available to the public via the website of the Ministry, informs and invites public to discuss the Study (ensuring participation of the public and the stakeholders), and appoints an expert committee to review the Study. After conducting the public hearing and assessment of the expert committee, the Ministry issues a Decision approving or rejecting the Study. In case of the approval, the Ministry issues a Decision approving the environmental permit. In case of refusal, the procedure is terminated.

For plants and facilities for which the environmental impact assessment is carried out based on the assessment of the Federal Ministry, the assessment procedure begins by preparation and submission of the Request for environmental permit to the competent Ministry and the Ministry submits the Request along with the attachments to the competent authorities and stakeholders for the purpose of receiving opinions and suggestions (ensuring participation of the public and the stakeholders). While reviewing the Request for the environmental permit, the Ministry takes into account the following criteria:

- Project characteristics (size, accumulation of other structures, use of natural resources, production of waste, pollution and interferences, the risk of accidents, etc.);
- Project location and environmental sensitivity of geographical areas likely to be affected by the project (existing land use, availability, quality and regenerative capacity of natural resources, absorption capacity of the natural environment: wetlands, coastal zones, protected areas, etc.);

- Characteristics of potential impacts (extent of impact, impact of the transboundary nature, size and complexity of the impact, impact probability, duration, frequency and reversibility).

If it is determined that the location of the project is in the zone under a specific protection regime, either under the Water Law (water protection zone) or Law on Environment Protection, then the estimate is required to verify compliance of the activities with the protection regimes and potential impacts. If, based on the Environmental Permit Request and the enclosed evidence, it is determined that the Environmental Impact Study (EIS) is not necessary, the Ministry shall issue the Environmental Permit. Otherwise, the Ministry issues the Decision on the necessity of carrying out the Environmental Impact Assessment. The development of the Study includes the obligation to conduct a public discussion, and the evaluation of the Study is carried out by the expert commission appointed by the Minister.

A graphic presentation of the above described EIA procedure in FBiH is presented in Figure A1.8 below.

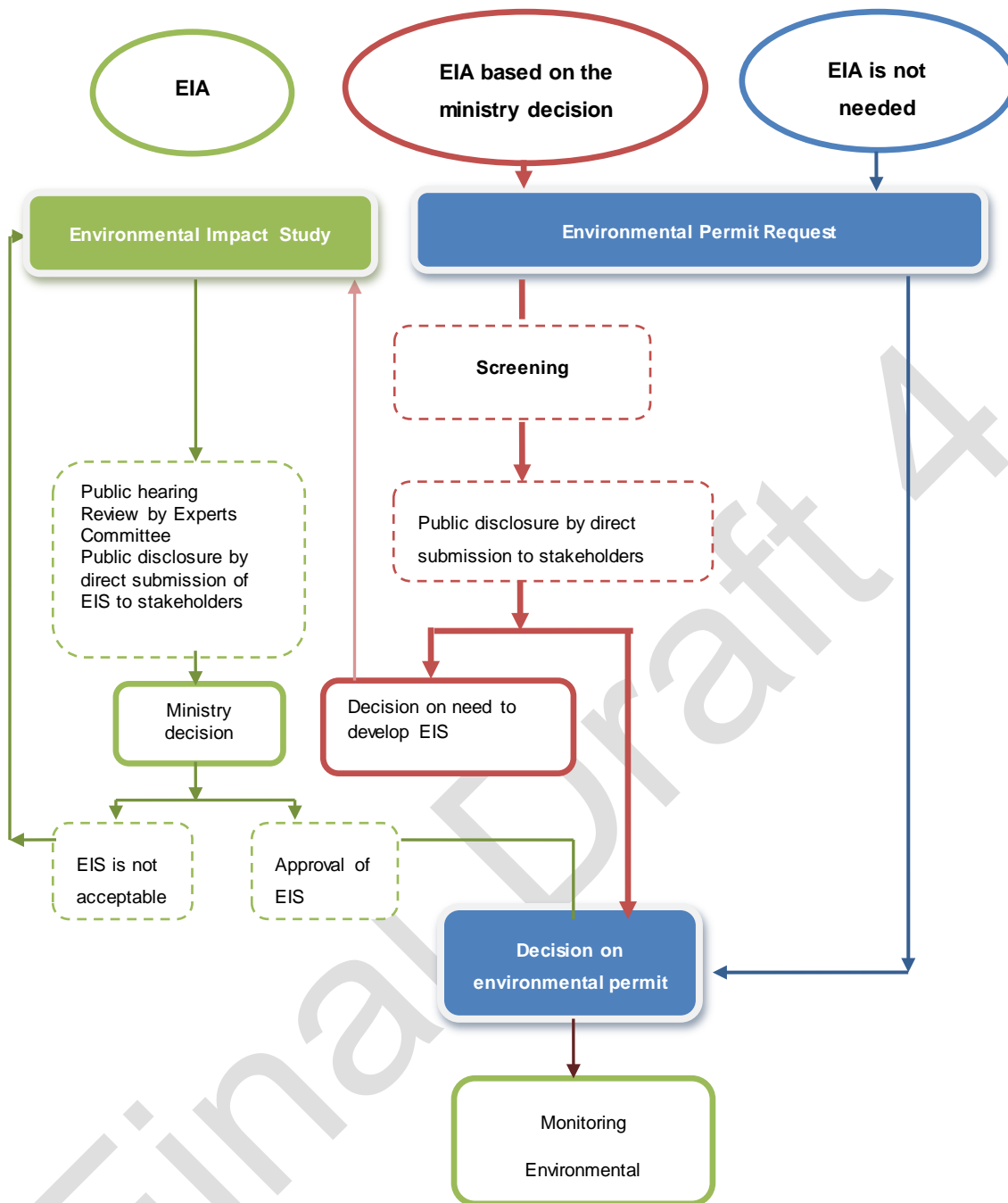


Figure A1.8 EIA procedure in FBiH

RS

The Procedure for the Preliminary Environmental Impact Assessment starts with the request the project developer submits to the Ministry of Physical Planning, Civil Engineering and Ecology in the RS (hereinafter referred to as the Ministry). The Ministry, at this stage of assessment, decides on the Request for the Preliminary Environmental Impact Assessment with the Decision of EIA Implementation for projects listed in the Regulation on projects requiring the EIA, taking into account:

- Particular sensitivity of the project environment;
- Special environment protection measures for the project area;
- Significant impact of the project on the environment of other entity, BD and other state.

The Ministry decides on the scope of the impact assessment for each individual case, taking into account the criteria identified in subordinate act (Regulation). Also, the Ministry has an obligation to provide a copy of the Request for review to:

- The authority responsible for physical planning in the local government body;
- Administrative bodies and organisations responsible for protection of the elements of the environment and
- Inter-entity body, if it is a project that may have an impact on the environment of other entity, BD and other state.

In this way, participation of the public is ensured in the Preliminary EIA phase. After reviewing the received opinions, the Ministry issues the Decision defining the obligation of the applicant:

- To conduct the Impact Assessment and provide the Environmental Impact Study (EIS) or
- Determines that the Assessment and the Study are not necessary and issue environmental permit.

If the Decision prescribes the need to carry out the impact assessment and the EIS, the second phase of the EIA begins for the project developer. If it is determined that the project location is in the area under specific protection regime, either based on the Water Law (water protection zone), or the Law on Nature Protection, the assessment is required to verify the compliance of the activities with the protection regimes and potential impacts. For projects not requiring the assessment and the Study, the Preliminary Assessment Phase is concluded with the Decision on the EIA non-necessity, and the project developer further submits the Environmental Permit Request with the evidence enclosed.

For projects requiring the EIA, prescribed obligatory by the Decision, the project developer is obliged to develop and submit the EIS to the Ministry. The scope and the content of the EIS are prescribed by the Decision of the Ministry, and the integral part of the Study must be the opinion of the interested public, received during the first phase, i.e. during the Preliminary EIA. In the process of the EIS approval, the project developer provides insight into the EIS for the interested public and organises a public discussion. Thereby, the second phase of the EIA ensures public participation. After reviewing the comments and suggestions received during the public review, and the audit of the EIS performed by the expert committee, appointed by the Minister, the Ministry shall issue the decision on approving or rejecting the EIS.

For projects defined by Regulation 109/05 that do not reach the prescribed threshold, and which may have significant impact on the environment, the project developer submits Environmental Permit Request and document of Proofs based on which Ministry issues environmental permit.

The EIA Procedure in RS is presented in Figure A1.9 below.

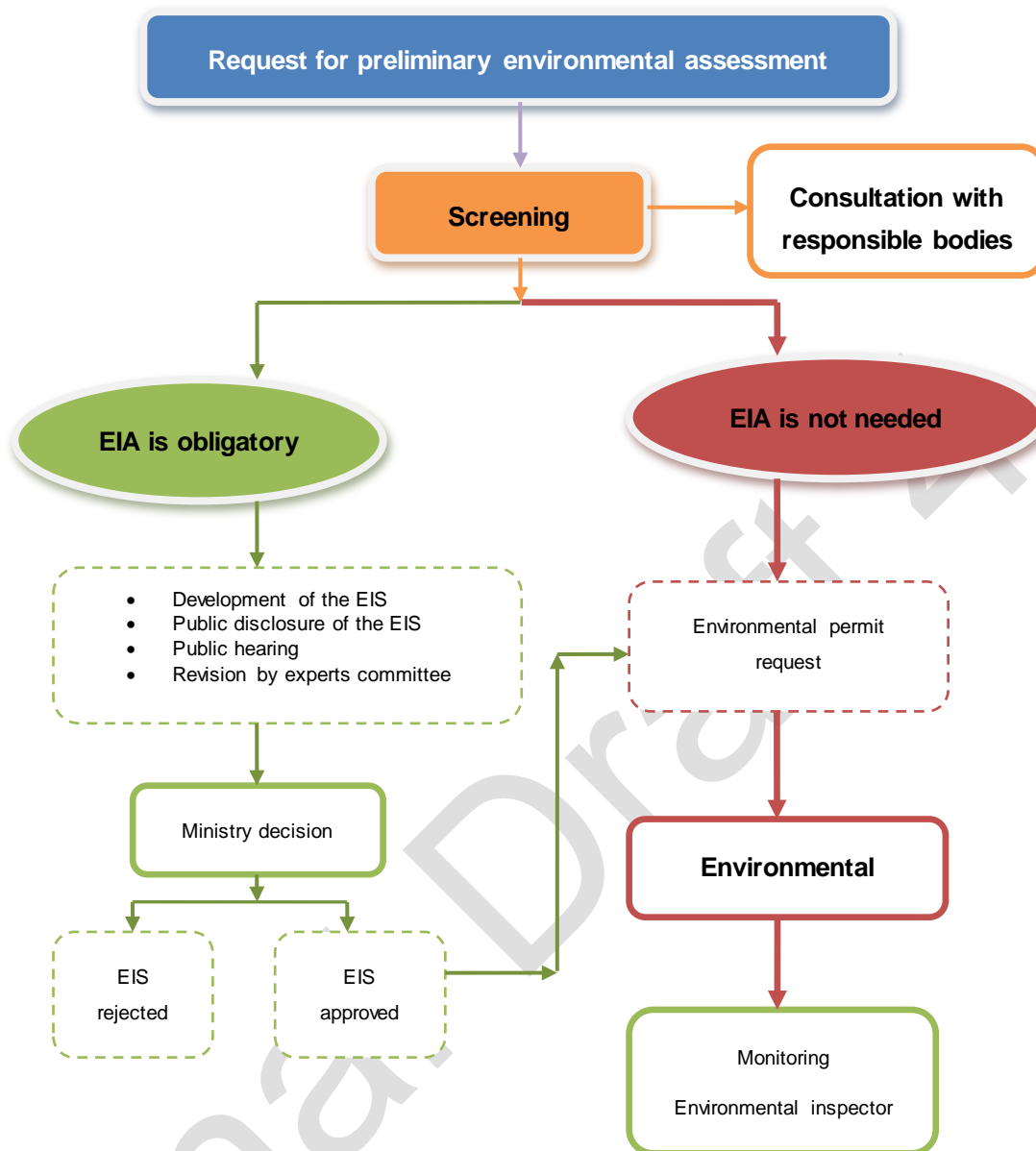


Figure A1.9 EIA procedure in RS

BD

According to the Rulebook on installations for which EIA is mandatory and installations that can be put in use only if they obtained the environmental permit of BD (OG BD no. 30/06) Environmental Impact Assessment can be conducted in two phases: Preliminary Environmental Impact Assessment and i Environmental Impact Study (hereinafter: the Study). Investor submits the request for Preliminary Environmental Impact Assessment to Department for spatial planning and property relations in BD (hereinafter: the Authorised Department). Request contains the following data:

- Description of the project with project location, purpose and capacities;
- Description of proposed measures in order to prevent, reduce or if possible recover significant negative impacts;
- Data necessary for identification and evaluation of the basic impacts on environment;

- Short review of the alternatives provided by processor/applicant of the request for the project with basic reasons for which the provided alternatives have been selected, taking into account environmental impact;
- An excerpt from the planning document;
- Non-technical resume.

The Authorised department delivers the Request to interested persons for obtaining the opinions and suggestions. The deadline for submission of the opinions and suggestions is 30 days from the day of submission of the request.

Investor and public are being informed about Preliminary Environmental Impact Assessment. Authorised department, based on Preliminary Environmental Impact Assessment, brings the decision on development and context of the Study. The investor is obliged to provide, within a period of six months from the date of receipt of this Decision, the preparation of draft Study by institution authorised for preparation of the studies and submit to the Authorised department for evaluation.

If the authorised institution for preparation of the Study has knowledge that the project will have an impact on the environment of other entity or other countries, it will prepare a special chapter on such influences in the Study. The Authorised Department will submit a notification to the entity / country that may be affected, which contains following:

- Project description with available information on possible transboundary impact;
- Information on decision which can be adopted;
- Deadline in which the country/entity on which project might have impact can express its willingness to participate in the process of Environmental Impact Assessment.

In the procedure of reviewing the draft study, authorised the Department informs and invites the public to a public hearing on the study. Suggestions and comments of the public are being submitted to the Authorised department within 30 days from the date of announcing. Authorised department prepares the record from the public hearing within three days after organisation of the public hearing.

After receipt of the suggestions and comments, Authorised department requires from the applicant to submit the final Study within 30 days.

In the period of 30 days after submission of the final Study, Authorised department approves a Study by the decision on approval of the Study. Then the investor approaches to the preparation of the request for obtaining the Environmental permit.

Authorised department is obliged to issue the environmental permit within 60 days from the day of receipt of the request. According to the article 65. of the Law on Environmental protection of BD (OG of BD, No: 24/04, 1/05, 19/07 i 9/09), environmental permits are also being issued for the significant changes in the function of the facility.

The EIA Procedure in BD is presented in Figure A1.10 below.

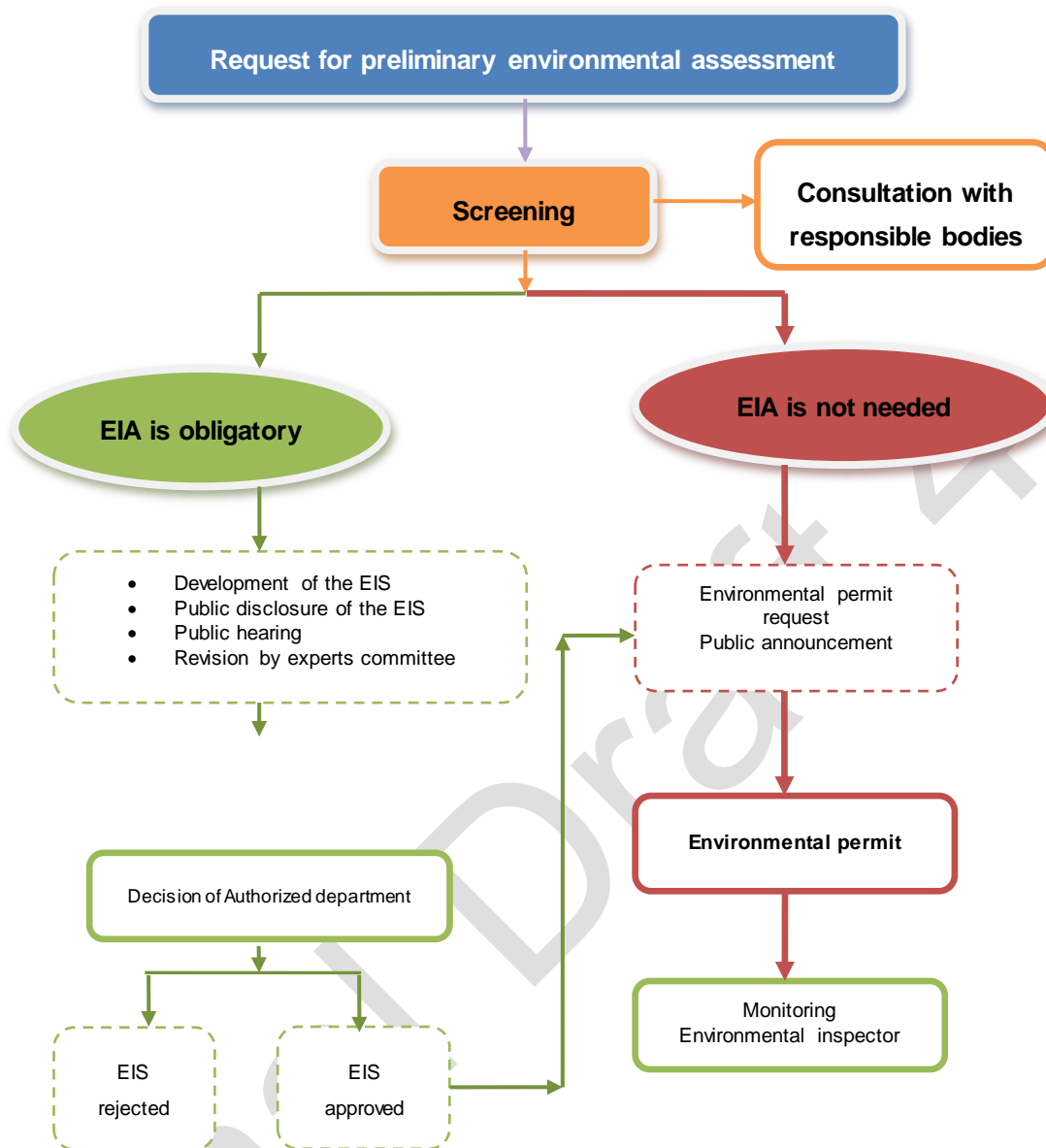


Figure A1.10 EIA procedure in BD

A.3 Kosovo

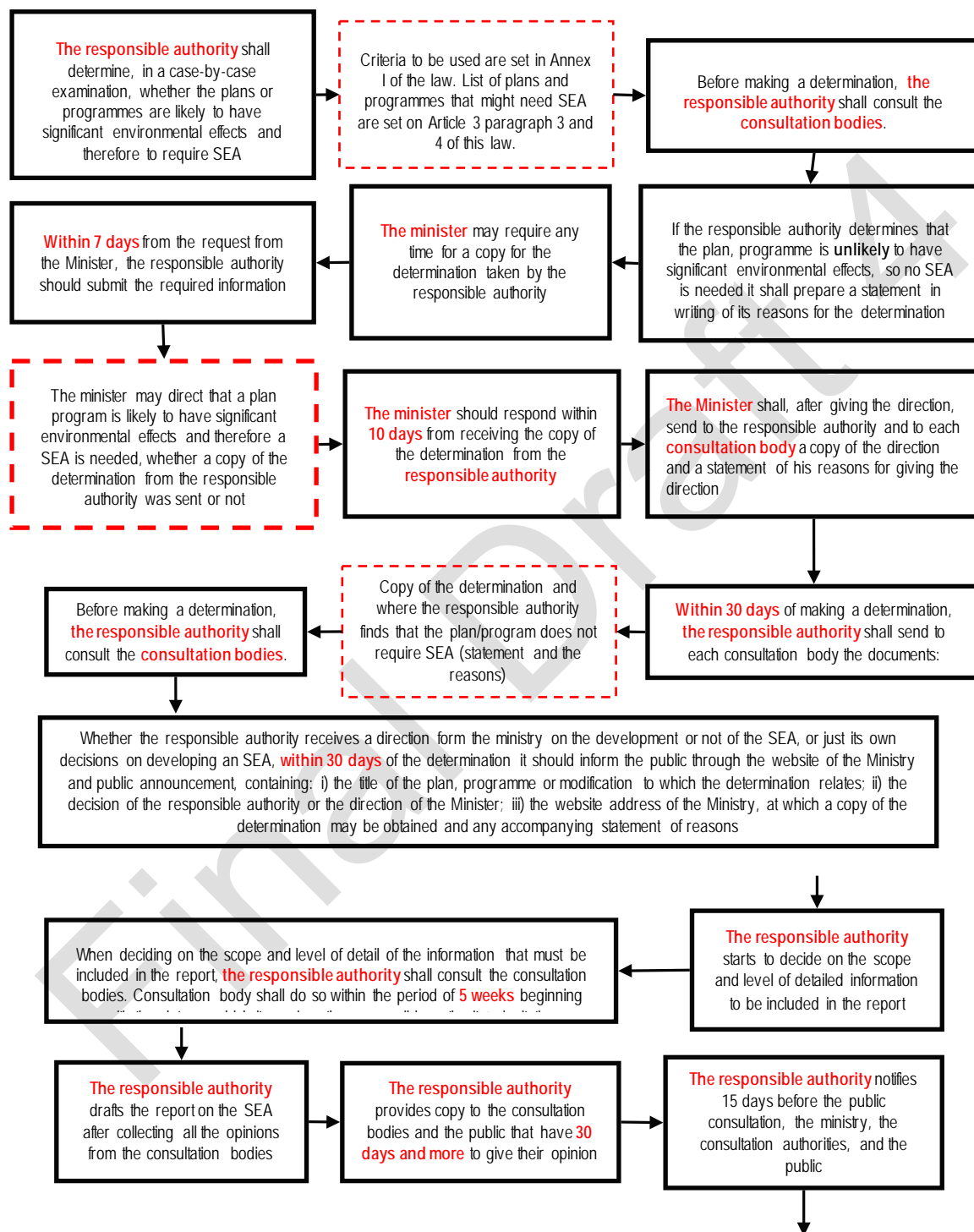
SEA – Strategic Environmental Assessment

The Government of Kosovo approved for the first time on 10 August 2011 the new law no. 03/L-230 “On Strategic Environmental Assessment”. This is the only piece of legislation the Republic of Kosovo has in place regarding SEA. The law aims to ensure a high environmental protection and human health through development of the strategic environmental assessment of plans and programmes. The law defines conditions, methods and proceedings for environmental impact assessment of defined plans and programmes through integrating principles of environmental protection in the proceedings of drafting, approving and implementing plans and programmes in order to promote sustainable development.

In one of the articles of the law (chapter II, article 3, point 2, 3, 4) it is defined the types of plans and programmes that would require an SEA: i) spatial planning and city planning field; ii) land use; iii) agriculture; iv) forestry; v) fisheries; vi) hunting; vii) energy; viii) industry; ix) mines; x) traffic; xi) waste management; xii) water management; xiii) telecommunication; xiv) tourism, which give a frame for future development projects; xv) plans and programmes which can have an effect on nature protected zones, on nature habitats and in wild flora and fauna.

Also, the law clearly states that if the SEA is not developed for all the plans or programmes undertaken for the first time or under revision, that require an SEA, these plans will not be adopted or submitted to the legislative procedure for adoption.

The process of the SEA development until the approval, based on the law, passes through the following steps, which are analysed in the flow chart below (Figure A1.11).



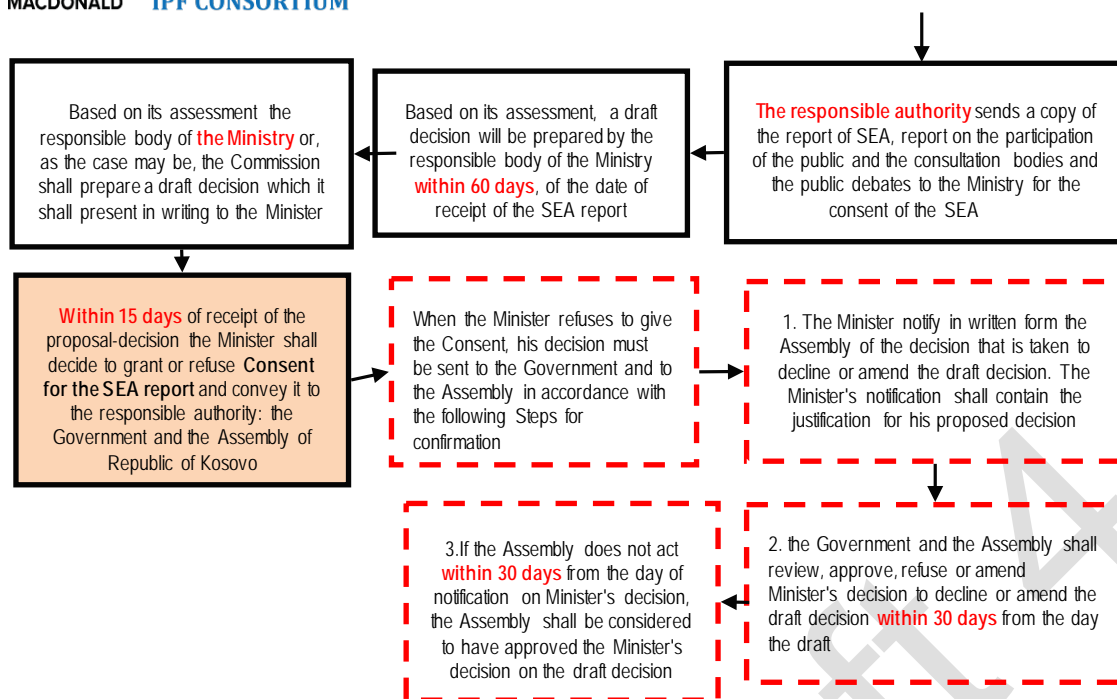


Figure A1.11 Process of SEA based on the Republic of Kosovo Law

The law provides steps that the Ministries of the respective countries should do in case a plan or program might have impacts outside the borders of the country it will take place.

The law has three annexes on: i) Criteria for determine the likely significance of effects on environment – criteria that the responsible authority and the Minister should use to define whether a plan or program is likely to have significant effects on the environment, and therefore they might need a SEA; ii) The information to be provided in SEA reports; iii) Criteria for assessment of SEA reports.

EIA – Environmental Impact Assessment

The Government of Kosovo approved for the first time on 10 August 2011 the new law no. 03/L-214 “On Environmental Impact Assessment”. After the law was approved the government of the Republic of Kosovo approved other two pieces of legislation (administrative instructions) in regard to environmental impact assessment:

3. **Administrative Instruction MESP – No.18/2015** “On Information Public Participation and Interested Parties in the Proceedings of Environmental Impact Assessment”
4. **Administrative Instruction MESP – No.08/2015** “On determine the tariff value of services related to the process of environmental impact assessment”

The law aims to prevent or mitigate adverse impacts of proposed public and private projects and thereby contribute to the safeguarding and improvement of the environment, the protection of human health, and the improvement of the quality of life. The law defines regulation of procedures for the identification, assessment and reporting of the environmental impacts of certain proposed projects and all the administrative procedure during the decision-making process by the Ministry of Environment and Spatial Planning for issuing the Environmental Consent.

The law states that all activities that are listed under Annex I are obliged to undergo EIA, and no construction permit or any other permit should not be granted to the developer until an Environmental Consent is granted by the Ministry of Environment and Spatial Planning. Instead all activities listed under Annex II of the law should be examine case by case and in accordance with the criteria set out in Annex III of the law, in order to determine whether they must undergo EIA.

The Ministry of Environment and Spatial Planning and any other Authorities related to environment shall provide upon the applicant’s request, the data and information which it holds that are significant for the identification and assessment of direct and indirect impacts of the project on the environment and their interaction. They have 15

days to respond to the applicant in written form, even if they do not possess any of the required documents. In the law there are provided rules to regulate the process of EIA in case any of the projects might have significant environmental impacts in the cross-border territories.

The law identifies 3 phases for the EIA procedure: i) Selection; ii) Scoping; iii) Review of the EIA report. In the flow chart below (Figure A1.12) it is shown step by step the procedure of EIA based on the law of the Republic of Kosovo:

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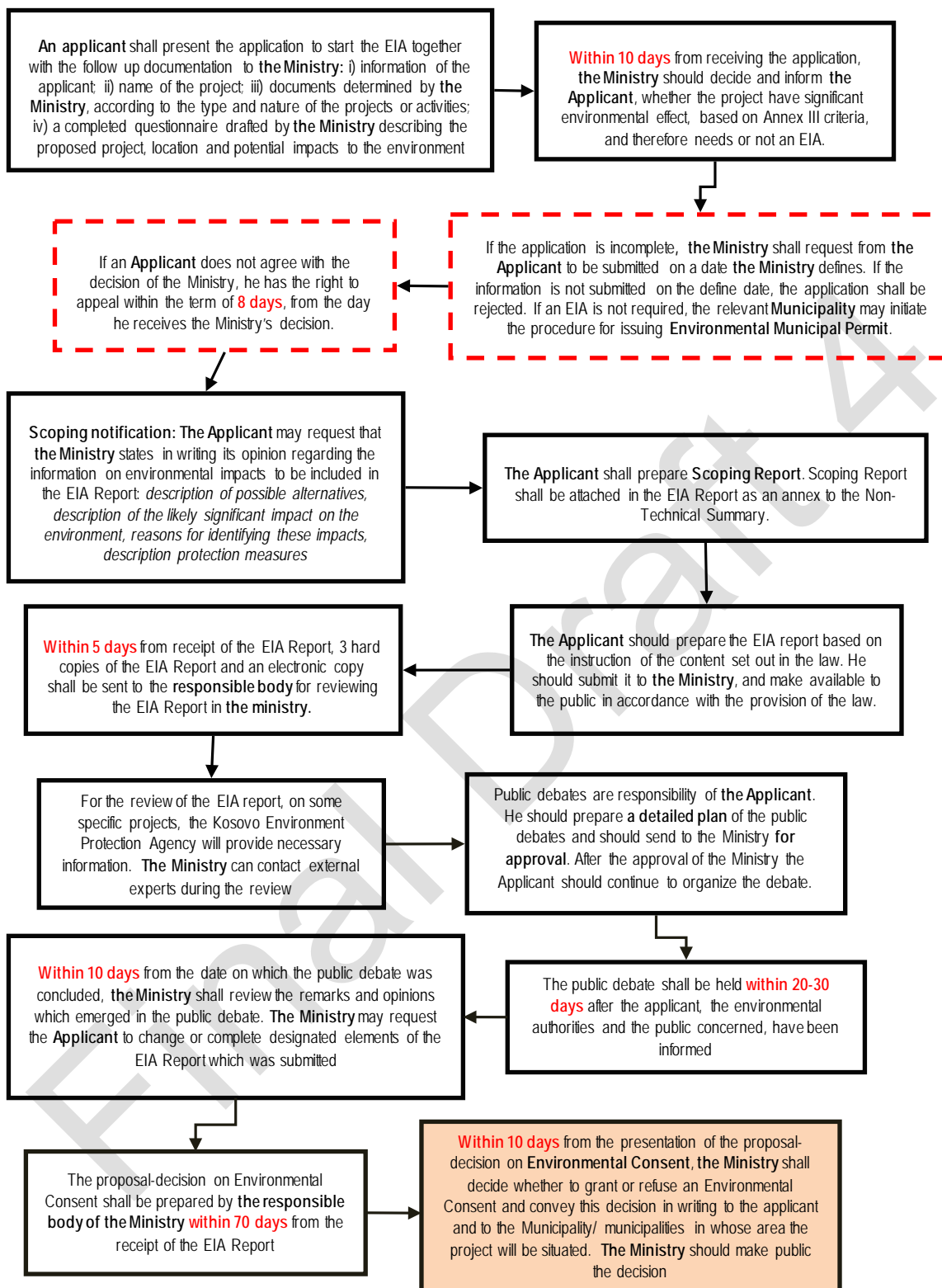


Figure A1.12 Process of the profound EIA based on the Kosovo legislation

A.4 The former Yugoslav Republic of Macedonia

Strategic Environment Assessment (SEA)

The Law on the Environment³⁶⁾ (LoE) of the former Yugoslav Republic of Macedonia stipulates the conditions, methods and procedures for undertaking strategic environmental assessment (SEA) of certain plans or programmes through the integration of environmental protection principles into the procedures of preparation, adoption and implementation of plans or programmes that are likely to have a significant impact on the environment.

The competent authority responsible for the preparation of plans or programmes cannot submit a plan or programme for further adoption procedure without having previously obtained approval for the SEA Report from the authority responsible for environmental protection issues.

The implementation of the SEA procedure starts after determining the need to conduct a SEA through screening procedure, where based on prescribed criteria and documents it is determined whether a planning document could have a significant impact on the environment and the human health. Pursuant to this, the authority that has drafted the planning document shall decide whether to implement or not implement a strategic assessment, providing a rationale of the reasons for implementing or not implementing it in accordance with the criteria set out in the regulation.

The general SEA procedure includes the following main steps:

- (i) Determining the need for implementing a SEA (Decision for implementing or not implementing a SEA)
- (ii) Determining the scope of the SEA Report and preparation of the SEA Report
- (iii) Assessing the adequacy of the SEA Report
- (iv) Decision on granting the approval for the SEA Report.

The general flowchart of the SEA legal procedure applied in the former Yugoslav Republic of Macedonia is presented in Figure A1.13.

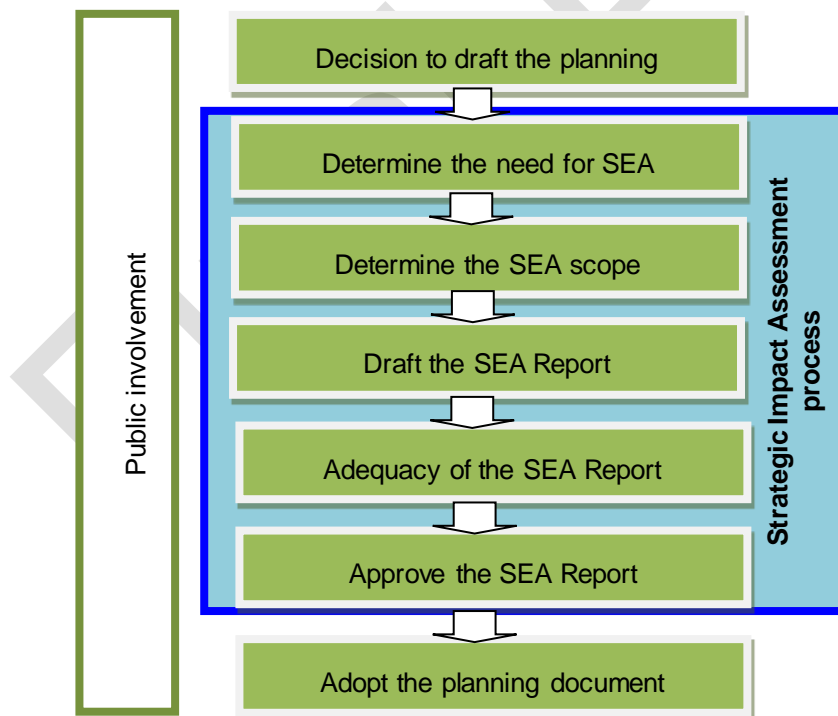


Figure A1.13 Flowchart of SEA procedure in Macedonia

³⁶⁾ Law on the Environment (Official Gazette no. 53/2005; 81/2005; 24/2007; 159/2008; 83/2009; 48/2010; 124/2010; 51/2011; 123/2012; 93/2013; 187/2013, 42/2014 and 44/2015)

Environmental Impact Assessment (EIA)

Background and Rationale

Environmental Impact Assessment (EIA) of certain projects is required to be carried out in the former Yugoslav Republic of Macedonia in accordance with the Law on the Environment³⁷⁾ (LoE) of the former Yugoslav Republic of Macedonia. This law and the associated secondary legislation set out the requirements for undertaking environmental assessments of potential environmental impacts of public and private projects which are likely to have a significant impact on the environment before development consent / construction permit is granted in the form of approval for project implementation. Hence, it is required that before development consent is granted for certain types of projects, an EIA has to be carried out.

The Ministry for Environment and Physical Planning (MEPP) is a national competent authority for the EIA procedure.

The types of projects that require an EIA are determined in the “Decree for determining projects for which and criteria on the basis of which the screening for an environmental impact assessment shall be carried out” (EIA Decree).

Under the EIA Decree, projects are classified in two groups: projects listed in Annex I are all subject to compulsory EIA while for projects in Annex II, the assessment contains an element of discretion, noting that an EIA procedure will, in any event, be required for projects with potentially significant environmental impacts. For the projects listed in Annex II, the national competent authority should determine whether an EIA is required. This is to be done through EIA screening process based on a ‘Notification of intent to implement a project’ submitted to the competent authority by the project proponent.

Legal EIA Procedure

The whole legal EIA process includes a number of administrative steps, grouped in three specific procedures:

- (1) Screening process - a process during which the competent authority determines whether an EIA is required for a certain project when a notification on the project implementation intention is made.
- (2) Scoping process - a process during which the competent authority determines the content and extent of the matters which should be covered by the EIA study.
- (3) Review process - a process of checking the adequacy of the EIA study as one of the main ‘safeguards’ built into the EIA process upon which a respective EIA decision is issued.

Detailed flowchart of the EIA legal procedure applied in the former Yugoslav Republic of Macedonia is presented below (Figure A1.14).

³⁷⁾ Law on the Environment (Official Gazette no. 53/2005; 81/2005; 24/2007; 159/2008; 83/2009; 48/2010; 124/2010; 51/2011; 123/2012; 93/2013; 187/2013, 42/2014 and 44/2015)

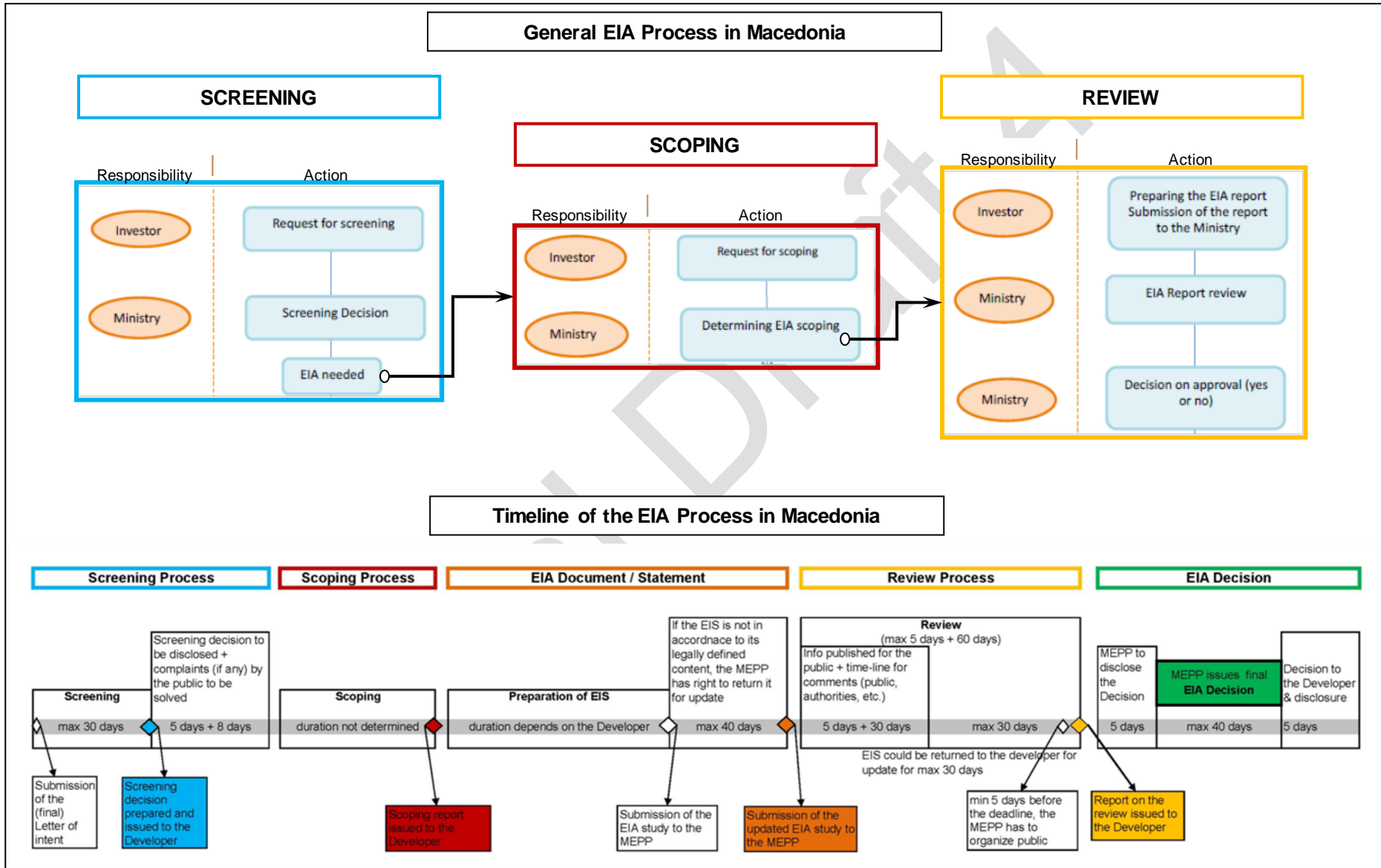


Figure A4.14: Flowchart of EIA procedure in the former Yugoslav Republic of Macedonia

Hydro Power Projects

Depending in their type and scale, hydro power projects are listed in the both Annexes of the EIA Decree of the former Yugoslav Republic of Macedonia:

- (I) Annex I listed projects (Compulsory EIA), item 12. Projects that fulfil following criteria:
 - To include hydro-technical facility (dam) by which water is retained in order to create permanent or temporary reservoir of water with a height of not less than 5 m measured between downstream foot and non-spillway crest or which can accumulate more than 100,000 m³ in the area up to the crest.
 - To include hydro-technical facility (dam) with height of not less than 10 m.
 - At least one of the following conditions:
 - (i) Length of the dike crest is more than 500 m.
 - (ii) Volume of the reservoir is bigger than 1,000,000 m³.
 - (iii) Maximum flow of the spillway is more than 2,000 m³/s.
- (II) Annex II listed projects (a case by case examination):
 - Item 3, point (h): Hydro-power plants

Transmission Lines

Depending in their scale (voltage level and length), overhead transmission lines are listed in the both Annexes of the EIA Decree:

- (I) Annex I listed projects (Compulsory EIA), item 17:
 - Construction of overhead transmission lines with a voltage of 110 kV or more and a length of more than 15 km.
- (II) Annex II listed projects (a case by case examination), item 3, point (b):
 - Overhead transmission and distribution lines (not included in Annex I).

Non-EIA projects

For projects Listed in Annex II of the EIA Decree, in a case when the competent authority determines that an EIA for a certain project is not required, the project proponent may be obliged to prepare an Environmental Assessment or Study (Elaborate) for Environment Protection in compliance with the article 24 of the Law on the Environment. The projects for which such Elaborate is required are determined by a respective decree – “Decree on projects and activities for which preparation of an Elaborate for Environment Protection is compulsory”. According to this decree, an Elaborate is to be prepared for:

- Item V, point 4: Hydro power plants with installed power up to 10 MW (for which the competent authority has decided that an EIA is not required).
- Item V, point 7: All transmission lines (for which the competent authority has decided that an EIA is not required).

Brief Summary of EIA Regulatory Context applied in the former Yugoslav Republic of Macedonia (Figure A1.15)

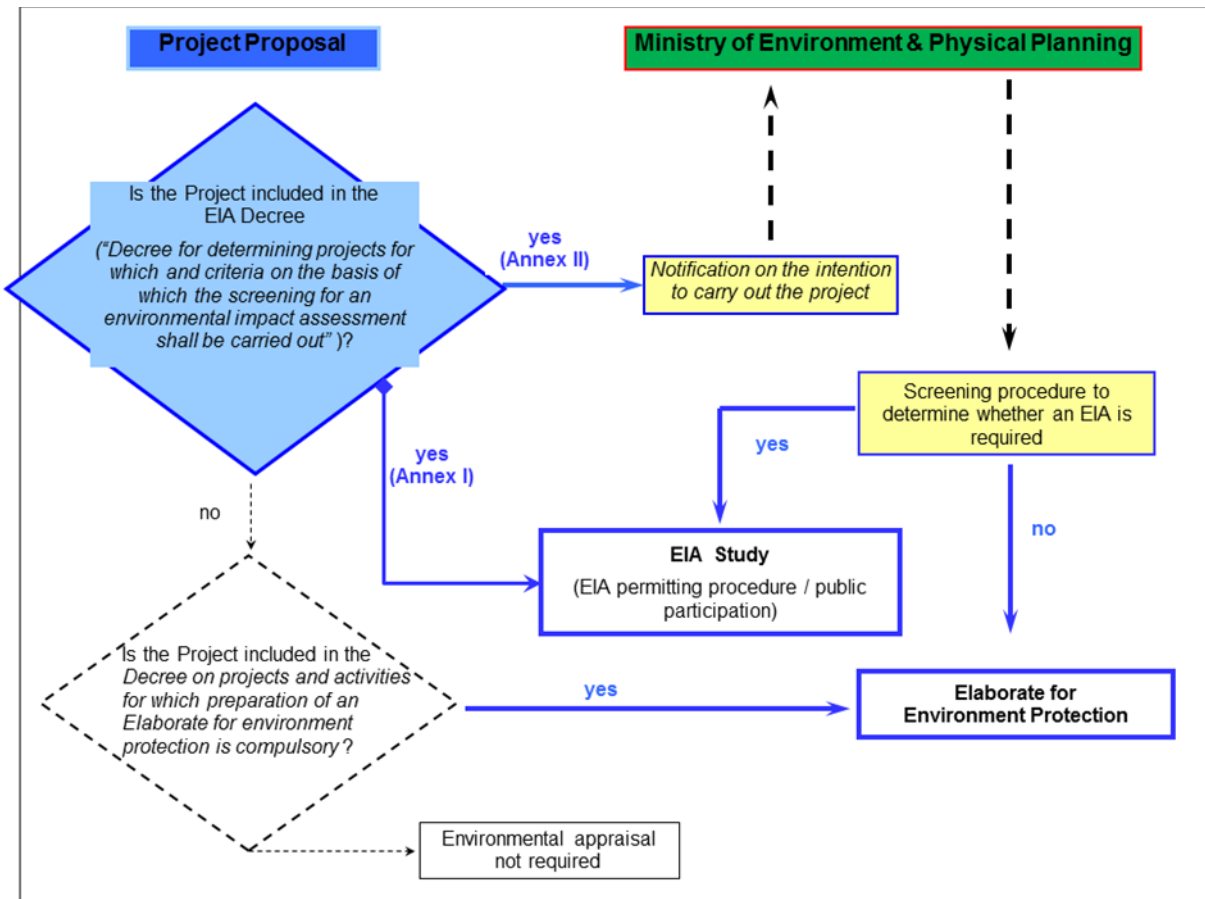


Figure A1.15: Summary of the EIA Regulatory Context applied in the former Yugoslav Republic of Macedonia

A.5 Montenegro

Strategic Environmental Assessment (SEA)

The provisions of the EU Directive on Strategic Environmental Assessment and the UNECE Protocol have been transposed in Montenegro, in the Law on Strategic Environmental Assessment (Law on SEA) ("Official Gazette of the Government of Montenegro" No. 80/05, 73/10, 40/11, 59/11 and 52/16), which entered into force on 1.01.2008.

The Law establishes the obligation of preparing SEA for plans and programmes, and other strategic documents essential to the effective environmental protection and implementation of sustainable development principles during their (plan/program) elaboration and decision-making process regarding the final solutions.

In accordance with the Law, the SEA process consists of the following phases:

- 1) Decision making:
 - On development of the SEA for plans and programmes referred to in Article 5 (2) item 1 of the Law,
 - On the need for SEA for plans and programmes referred to in Article 5 (2), item 2 of the Act,
- 2) determining the scope and content of the report,
- 3) decision on approval of the Report on Strategic Environmental Assessment.

It is further stated that SEA for plans and programmes co-financed by the European Union, must be done in accordance with the Law on SEA and the regulations of the European Union, which means in accordance with the Directive on Strategic Environmental Assessment.

Decision on the need for the SEA ("SCREENING")

The process of deciding whether a particular plan is likely to have a significant impact on the environment and requires to assess the expected impact on the environment is called "screening".

Based on legislation, SEA is mandatory for all plans and programmes in the field of spatial and urban planning and spatial development. This includes all state planning documents and local planning documents. Development of these plans practically does not require screening phase, as the decision on SEA is stated in the Law on SEA.

"Screening" is essential only for those planning documents for which SEA is not required under the Law on SEA. Subject of the screening are planning documents that cover small areas at local level or to be amended only to a lesser extent. The SEA of the aforementioned planning documents shall be determined by individual examination of each case. Law on SEA laid down criteria for determining the need for the SEA in order to verify plan's possible significant effects on the environment.

The Law on SEA stipulates that the draft decision on the SEA development is submitted to the competent authorities and organisations and the public for commenting. The competent authorities and organisations should be contacted even at the stage of the determination of the need for SEA for planning documents that are subject to screening.

Based on the undertaken steps, the final decision about SEA for the subject planning document can be made. **Even one significant negative impact** is enough for SEA development for the planning document. Contrary, not a single significant negative impact is necessary for decision that there is no need for SEA development.

The Law on SEA clearly defines the responsibility for decision on the SEA development. It is the responsibility of the institution that is competent for the preparation of the planning document. A decision on the need for SEA is an integral part of the decision on preparation of the document and shall be published in the "Official Gazette".

Determining the scope and required depth of the SEA ("determining the scope and content of the report – SCOPING")

Another important step of each SEA is "determining the scope and content of the report". The purpose of this phase is to describe the scope and level of details of the environmental impact assessment. With this actions issues related to the environment that need to be taken into account in making a decision are identified. Thus, this activity "defines the scope and content" of the environmental impact assessment. It is carried out at an early stage of the evaluation process, in order to enable the competent authority to concentrate on significant environmental problems that need to be assessed and to thereby avoid loss of time, money and effort.

Involvement in the process of determining the scope and content of the report

Law on SEA defines that in addition to the involvement of competent and concerned authorities, organisations, and public should be invited to provide comments on the draft decision on the need for SEA. Participation in this stage is organised via municipal and national websites and internet platforms (Aarhus center platform, etc.).

Determining the scope and content of the report

The competent authority is required to prepare and submit all necessary information to interested bodies and organisations such as:

- draft/outline of the starting points of the planning document,
- proposal for the scope and content of the report,
- list of existing data (previous communications with interested bodies and organisations could be helpful for obtaining any existing data).

Part of the preparatory actions for establishing the scope and content of the assessment is collection of existing data on different subjects of environmental impacts assessment. In the course of establishing the scope and content of the assessment, it must be estimated which "data gaps" cannot be tolerated, and should be supplied with further examination or measurement.

The steps in determining the scope and content of the report are:

1. Collecting necessary documents (main sources of data and information is the Environmental Protection Agency-EPA (Nature Protection Institute is integral part of the EPA) and MONSTAT),

2. Exchange with the interested authorities and organisations responsible for environmental protection,
3. Creating a concise report of the established scope and content of the assessment.

Preparation of the SEA report

Report on Strategic Environmental Assessment (SEA) is a separate document that contains information about the environmental conditions in the area of planning and assessment of potential significant impacts. In addition, it contains recommendations on how negative impacts can be avoided or mitigated, and positive ones to be enhanced. Finally, a Report on SEA includes recommendations for monitoring the actual environmental impact and indications on how to improve the database.

Report on SEA is a document for public consultation, which will undoubtedly be of interest to a wider circle of readers: decision makers, various organs, non-governmental organisations, individual experts, public interest groups. It should be made keeping in mind the extent of users.

Report on SEA is done through an interactive process that is associated with the process of preparing a planning document: findings from the report on the environment should affect the process of developing the plan in terms of minimising the negative impacts and implementation of mitigation measures.

Report on SEA can be prepared merely by the company or entrepreneur who is officially registered. Legal entity or entrepreneur who is participating in the development of plans cannot participate in the preparation of the Report. This minimises the potential conflict of interest.

The scope and content of the report

Report on SEA includes data that describe and evaluate the prospective of significant environmental impacts that may occur with the realization of plans and programmes, as well as consideration of alternative solutions, taking into account the objectives and geographical scope of the plan and program, to the extent determined by the decision referred to in Article 10 of this Law.

In addition to these data, Report on SEA includes the following information:

1. a brief overview of the content and main objectives of the plan or program and relations with other plans and programmes;
2. description of the current state of the environment and its possible development if the plan or program is not implemented;
3. identification of areas which are likely to be exposed to a significant risk and characteristics of the environment in those areas;
4. existing environmental problems in connection with the plan or program, including in particular those related to areas that are particularly important for the environment, such as habitats of wild flora and fauna and their conservation, protected areas, national parks or coastal zone;
5. general and specific environmental objectives established at the national or international level that are important for plan and program, and the way these objectives as well as all other aspects of importance for the environment were taken into consideration in the process of preparation;
6. possible significant consequences for human health and the environment, including factors such as biodiversity, population, fauna, flora, soil, water, air, climate factors that influence climate change, material resources, cultural heritage, including architectural and archaeological heritage, landscape and the relations of these factors;
7. measures envisaged to prevent, reduce or eliminate, to the best possible extent, any significant adverse impact on human health and the environment which the realization of the plan or program would lead to;
8. Review of reasons which were grounds for selection of plans and programmes in terms of considered alternatives, as well as a description of how the assessment, including possible difficulties to which occurred while formulation of requested data (such as technical data or lack of know-how);
9. of possible significant transboundary environmental impacts;
10. description of the monitoring program of environment, including human health during and after the implementation of the plan or program (monitoring);

11. conclusions that have been reached during the drafting of the Report on SEA presented in a manner understandable to the public;
12. summary.

13. Decision on approval of the Report on Strategic Environmental Assessment

Report on SEA is the subject of a broader assessment procedure and approval. This process can be divided into four stages:

- The participation of relevant institutions and organisations and the public
- Assessment of the Report on SEA
- Approval of the Report on SEA
- The exchange of information on transboundary impacts

Before starting the assessment of the Report on the SEA, the authority responsible for preparation of the planning document shall submit, in accordance with the Law on SEA, the Report on SEA to following parties to obtain their opinions:

- Interested authorities and organisations
- Public.

The competent authority responsible for preparation of the planning document shall ensure that the Report on SEA and Planning Document are available at the same time, at the same location. This location can be a website, bulletin board in the municipal offices, etc.

Recommendations from the Report on SEA and public consultation are the basis for amendments to the planning document.

According to the Law on SEA, before giving a consent to the Report on SEA its quality and correctness must be evaluated. Assessment is made by the competent authority for environmental protection on the based on the Draft Report, Report on the participation of competent authorities and organisations and the public. Furthermore, the draft planning document should be submitted to the competent authority for the assessment of the Reports on SEA for better understanding the quality of the Report.

Transboundary/cross-border consultation

In the case of potential significant impact on the area in a neighbouring country or in the event that the neighbouring country has a reasonable interest in the impacts to environment of the proposed planning solutions, the process of transboundary/cross-border consultation shall be initiated.

The procedure is described in the Law on SEA and it takes place at the stage of consultation with interested Montenegrin authorities and organisations, and public.

transboundary/cross-border consultations are obligations of the Ministry responsible for environmental protection.

Monitoring

After the adoption of the planning document, the authority competent for the plan will establish a system for monitoring.

- **Access to information**

According to the Law on SEA, the Report on SEA and the results of consultation should be available to public.

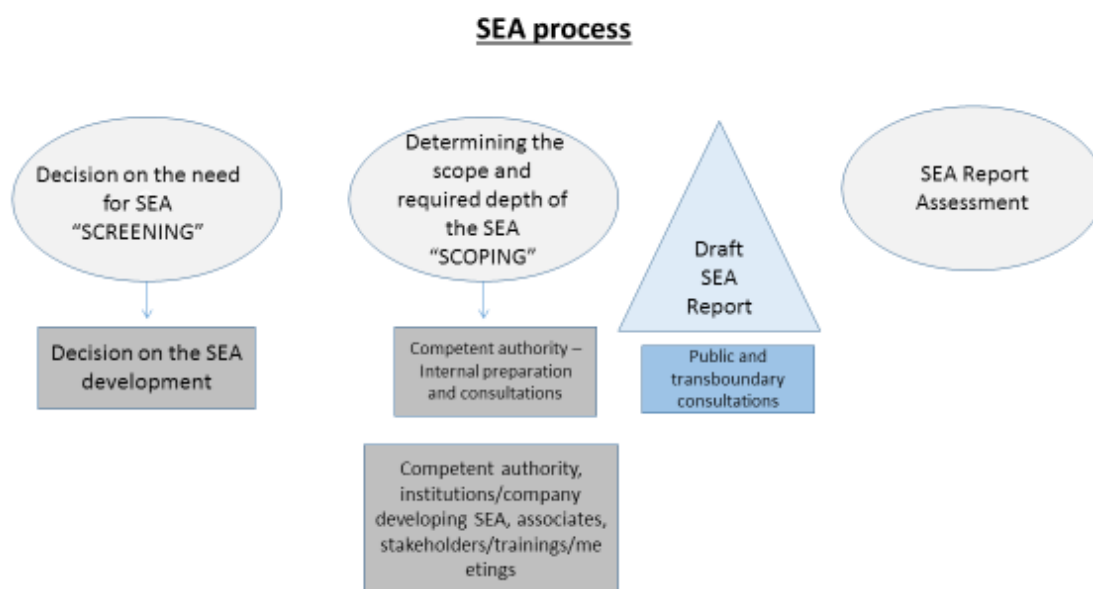


Figure A1.16: SEA process in Montenegro

Environmental Impact Assessment (EIA)

The Law on Environment "Official Gazette of the Government of Montenegro", No. 52/16 defines the basic principles and instruments to be used to protect the environment, including relating to environmental protection, sustainable development and public participation on environmental matters. The environmental legal framework within Montenegro also contains laws (and secondary legislation) covering areas summarised below some of which are aligned with the European Directives and regulations (as indicated):

- Law on EIA ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 40/10, 73/10, 40/11, 27/13 and 52/16) - harmonised with the EIA Directive 85/337/EEC (amended by Directive 97/11/EC and 2003/35/EC)
- Law on Strategic Environmental Assessment (SEA) ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 59/11 and 52/16) - harmonised with the SEA Directive (2001/42/EC)
- Law on Nature Protection ("Official Gazette of the Government of Montenegro", No. 54/16)
- Law on National Parks ("Official Gazette of the Government of Montenegro", No. 28/14),
- Law on Integrated Pollution Control & Prevention ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", No. 54/09, 42/15 and 54/16) - complies with IPPC Directive 96/61/EC (Integrated Pollution Prevention & Control (IPPC) as amended
- Law on Water ("Official Gazette of the Government of Montenegro", No. 27/07, 32/11, 48/15 and 52/16) - an effort was made in the drafting of the law to harmonise with the EU Water Framework Directive
- Law on Waste Management ("Official Gazette of the Government of Montenegro", No. 64/11 and 39/16)
- Law on Air Protection ("Official Gazette of the Government of Montenegro", No. 25/10, 40/11, and 43/15) - framework law that regulates air quality management in line with the Directive 96/62/EC
- Law on Protection from Noise in the Environment ("Official Gazette of the Government of Montenegro", No. 28/11 and 1/14)

EIA process in Montenegro

According to the Law on Environmental Impact Assessment ("Official Gazette of the Government of Montenegro", No. 80/05 and "Official Gazette of the Government of Montenegro", 40/10, 73/10, 40/11, 27/13 and 51/16) competent authority responsible for conducting the impact assessment process is the Environmental Protection Agency (EPA), the state administration body responsible for environmental protection - for projects for which approvals, permits and licenses are issued by other state administration bodies. Prior to establishment of the EPA the Ministry in charge of environment has been the state administrative body deciding on and issuing the EIA permit. For projects for which approvals, permits and licenses are issued by local government, local government authority relevant department is responsible for environmental protection.

The EIA process in Montenegro is carried out according to the following phases:

- deciding on the need for Environmental Impact Assessment (EIA); (Decree on projects subject to EIA, "Official Gazette of the Government of Montenegro", No 47/13)
- determining the scope and content of Environmental Impact Assessment; (Rulebook on content of documentation to be submitted together with request for determination on the need for EIA, "Official Gazette of the Government of Montenegro", No 14/07)
- deciding on EIA approval.

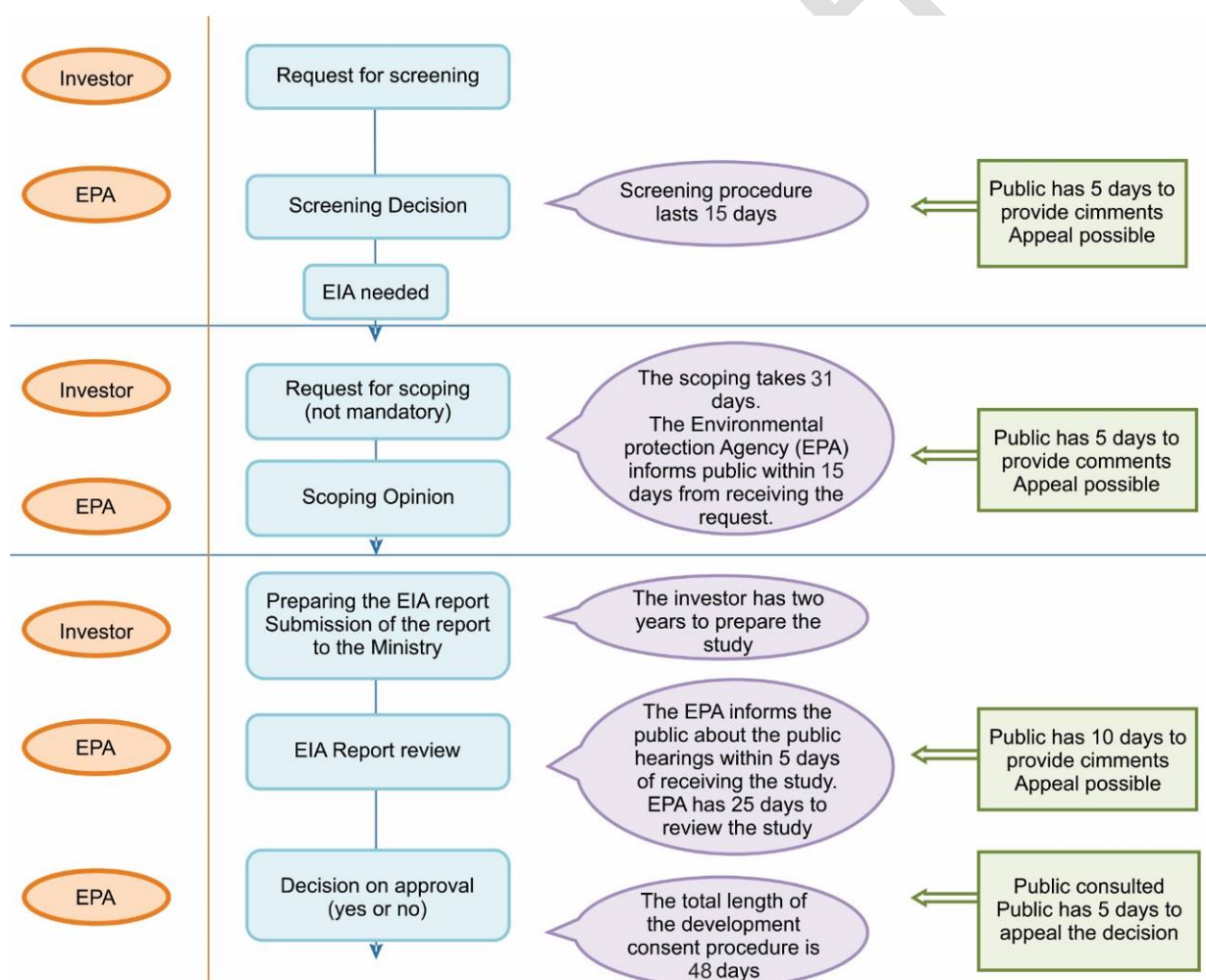


Figure A1.17: EIA process in Montenegro

The first phase is the process of deciding on the need for an assessment of impacts.

- The process begins by submitting an application for the decision to be taken by the relevant state/or local authority. Project proponent submits an application for deciding on the need for assessment of impacts to the competent authority.

- Enclosed with the application, the project proponent submits following documentation: description of the project site, description of the project, description of likely significant impacts of the project on the environment, and a filled out questionnaire on the impact of the project on the environment.
- After the submission, the application is being reviewed deciding on the need for impact assessment. The competent authority verifies whether the required documentation was enclosed with the application, and if not, it is returned to be amended and a period within which it must be submitted is determined.
- Verification of the application is followed by Notification. The competent authority informs all the concerned bodies and organisations and the public concerned about the submitted application to decide on the need of impact assessment, within five days of receiving a complete application. The notification contains: the name of the applicant; project name; location and time for reviewing the documents; the name and address of the competent authority to which the comments are provided.
- Interested bodies and organisations and the public concerned may, within seven days of receipt or publication, deliver their comments to the competent authority regarding the submitted application.
- The competent authority, within seven days from the date of expiry of deadline, decides on the need for an assessment of impacts. When deciding, the competent authority is obliged to consider the opinions delivered. Also, the right to appeal is established in this stage. An appeal against the decision on the need for impact assessment, issued by the competent local authority, may be lodged to the Chief Administrator. The Chief Administrator has the authority of an appellate authority in administrative matters within the jurisdiction of the municipality, in accordance with the Law on Local Self-Government ("Official Gazette of the Government of Montenegro", No. 42/03, 28/04, 75/05, 13/06, "Official Gazette of the Government of Montenegro", No. 88/09). For projects for which a decision on the need for environmental impact assessment was issued by the Environmental Protection Agency, an appeal may be filed with the Ministry of Sustainable Development and Tourism, through the Agency, within 15 days.

The second phase of the EIA procedure involves determining the scope and content of Environmental Impact Assessment.

- This phase starts by the submission of an application for determining the scope and content of the EIA by the project proponent. The following documentation is enclosed with the application by the project proponent: general information; site description; project description; description of alternatives considered; a description of the segments of the environment; a description of the likely significant impacts of the project on the environment; a description of measures envisaged to prevent, reduce or eliminate significant adverse environmental impacts; summary information, information about possible difficulties encountered by the project proponent in data collection and documentation; a completed questionnaire to determine the scope and content of the EIA.
- This is followed by the decision on the application. Upon receipt of an application to determine the scope and content of EIA, competent authority verifies whether all the required documentation was submitted. A properly submitted application will be delivered, within three days, to the Commission for Impact Assessment by the competent authority. The Commission considers the application and delivers to the competent authority, within 10 days of receipt, a report containing a proposed scope and content of the EIA.
- The competent authority delivers the proposal of the Commission to the project proponent and notifies interested bodies and organisations and the public accordingly within seven days of receipt of the proposal. Interested bodies, organisations and the public concerned may, within 5 days of receipt of proposal from the Commission, submit their comments to the competent authority. The competent authority, within 8 days of the deadline for submission of opinions, decides on the scope and content of the EIA. The competent authority shall, in deciding, consider the opinions of interested bodies and organisations and the public.
- The competent authority delivers the decision on the scope and content of EIA to the project proponent and notifies the concerned bodies and organisations and the public concerned about this decision, within five days from the date of enactment.
- An appeal against the decision on the scope and content of Environmental Impact Assessment, issued by the competent local authorities, may be lodged to the Chief Administrator. The Chief Administrator has the authority of an appellate authority in administrative matters within the jurisdiction of the

municipality, in accordance with the Law on Local Self-Government. For projects where the decision on the scope and content of EIA was issued by the Environmental Protection Agency, an appeal may be lodged to the Ministry of Sustainable Development and Tourism, through the Agency, within 15 days.

The EIA study can be prepared by a legal person or an entrepreneur who is registered in an appropriate register for performing planning and engineering activities and development of studies and analyses. There must be a multi-disciplinary team composed of qualified personnel to prepare a study. The EIA study is submitted by the developer to the competent authority. The developer is obliged to consider alternatives. The EIA study must contain information on impacts during the construction phase, about accidents and incidents and about the environmental management plan. The Non-Technical Summary is mandatory. The competent authority establishes a commission responsible for evaluating the content of the EIA study.

The third stage involves deciding on the approval of EIA.

- An application for EIA approval is submitted to the competent authority by the project proponent. EIA is submitted with the application by the project proponent. If the competent authority decided on the scope and content of EIA, the project proponent is required to submit a request for approval to the competent authority not later than within one year from the date of receipt of the final decision on the scope and content of the EIA. If an application for approval is submitted by the project proponent after the prescribed deadline, the competent authority will decide on the application depending on the circumstances of each specific case.
- The content of EIA is analysed and the quality of the segments of the environment is assessed, and also their sensitivity within a particular area, mutual impacts of the existing and planned activities, forecasts of direct and indirect impacts of the project on the environment, as well as measures and conditions for the prevention, removal, mitigation or remediation of harmful impacts on the environment and human health.
- EIA is an integral part of the documentation required to obtain a permission, authorisation or approval to begin implementation of the project or to obtain the use permit. Also, the EIA contains information about the organisation and the individuals who participated in the preparation of EIA and the environmental impact monitoring program. The conditions and approvals obtained from other relevant bodies and organisations may be enclosed with the EIA, in accordance with the law. A detailed content of the EIA is provided by the state authority responsible for environmental protection.
- The next stage is a public consultation on the EIA. The competent authority, within five days of receipt of the request for approval of the EIA, notifies the concerned bodies, organisations and the public concerned about the manner, time and place of the public review, submission of comments and opinions, as well as the time and place of public hearings on the EIA. A public hearing may be held not earlier than 10 days from the date of notification of interested bodies and organisations and the public. A public hearing is organised and managed by the competent authority. The public consultation is participated by the project proponent and at least one person who participated in the preparation of EIA.
- To determine the scope and content of EIA and for the purpose of EIA evaluation, the competent authority appoints a Commission to determine the scope and content of EIA and its evaluation that is the Commission for Environmental Impact Assessment. The Commission for Environmental Impact Assessment consists of the employees of the competent authority and other experts. The decision on the appointment of the committee for Environmental Impact Assessment specifies the number, composition and manner of operation of the Commission. No person who participated in the preparation of EIA or is employed by the legal entity or entrepreneur who prepared the EIA can be a member of the Commission for Environmental Impact Assessment. The competent authority, within five days from the day of public hearing, submits the EIA to the Commission for Environmental Impact Assessment, enclosed with an overview of comments and opinions provided during the public consultation and public hearing. The Commission for Environmental Impact Assessment may require the project proponent to make certain amendments to the submitted EIA. The project proponent is required to act upon the request of the Commission for Environmental Impact Assessment and submit an amended EIA within the deadline set by the Commission. If the project proponent fails to comply, the Commission for Environmental Impact Assessment will continue working on the basis of available documentation.
- The Commission for Environmental Impact Assessment is required to submit the EIA with a proposed decision to the competent authority within 25 days from the receipt of documentation. The time period

given by the Commission to the project proponent to amend the EIA is not included into the time period that was given to the Commission to decide on the EIA evaluation.

- Based on the report and the proposed decision of the Commission for Environmental Impact Assessment, the competent authority decides on either approving or rejecting the requests for approval of the EIA. The decision is made by the competent authority and submitted to the project proponent within five days of receipt of the report and the proposed decision of the Commission for Environmental Impact Assessment. The competent authority is obliged to notify the concerned bodies, organisations and the public of the decision within five days and provide to them the following, for review: the content of the decision and conditions if applicable; the reasons on which the decision is based, including the reasons for the acceptance or rejection of submitted comments, suggestions and opinions of interested bodies and organisations and the public; as needed, a description of the most important measures to be taken by the project proponent to prevent, eliminate, mitigate or repair any harmful effects.
- Against the decision of the Commission for Environmental Impact Assessment, issued by the competent local authority, an appeal may be lodged to the Chief Administrator. The Chief Administrator has the authority of an appellate authority in administrative matters within the jurisdiction of the municipality, in accordance with the Law on Local Self-Government. For projects where the decision on approval or rejection of a request for EIA approval is issued by the Environmental Protection Agency, an appeal can be lodged to the Ministry of Spatial Planning and Environment, through the Agency, within 15 days.
- An EIA approval ceases to be valid if the project proponent fails to obtain a permit or authorisation to carry out the project within two years from the date of decision on approval. The project proponent is required to implement all the measures envisaged in the EIA for which an approval was granted. For projects for which an approval of the EIA was given, the competent authority will determine whether all the measures provided by the EIA were implemented. In cases where the competent authority determines that all the measures planned by the EIA were not implemented, no use permit can be issued.
- The procedures for notifying the public are also determined by national legislation. When pursuant to this law the competent authority is obliged to notify the public, the notification is carried through at least one local daily newspaper published in an area that will be impacted by the planned project, as well as through electronic media. The concerned authorities and organisations are notified by the competent authority by mail, by fax and electronically.

Transboundary consultation

When an intended project may have a significant impact on the environment in another country, or when another state whose environment could be significantly threatened requests so, the state authority responsible for environmental protection issues shall promptly, and not later than within the deadlines set forth for informing its own public, submit to another state the information concerning:

- the project, together with all available data on its possible impacts;
- the nature of the decision that may be adopted; and
- the period within which another state can announce its intention to participate in the impact assessment procedure.

The state authority responsible for environmental protection issues shall inform the state that participated in the impact assessment procedure about the decision on granting or rejecting the approval to the EIA Study by providing information on:

- the contents of the Decision and conditions if they were set;
- the grounds for the Decision, including the reasons for accepting or rejecting the remarks, proposals and opinions of the authorities, organisations and the public concerned;
- the most important measures the project developer should undertake in order to eliminate, prevent, mitigate or remediate harmful impact.

The public is also consulted for projects with trans-boundary impact.

Monitoring

The environmental impact monitoring programme is part of the EIA study. Requirements of the monitoring are included in the development consent. The competent authority is responsible for checking if all the measures envisaged by the study were undertaken. If not all the measures were taken into account the authority may not issue the certificate of occupancy.

The Environmental Inspection is responsible for checking the compliance with elements of the EIA law and regulations. In the case where the law or related regulations are violated the environmental inspector might:

- order the project developer to obtain the decision of the competent authority on the need for EIA preparation;
- order the project developer to obtain the approval of the EIA study;
- order the project developer to undertake measures envisaged by the study;
- order the project developer to implement the programme for monitoring environmental impact; and
- prohibit the project developer to execute the works until the approval of the competent authority for the Study is obtained.

While performing the inspection supervision, the environmental inspector shall check in particular:

- whether the project developer has obtained the Decision of the Competent Authority on the need for EIA;
- whether the project developer has obtained the approval on the EIA Study;
- whether the project developer is undertaking measures envisaged by the Study that has been approved.

The developer or his agents and contractors receive a penalty if the project does not comply with EIA conditions. A legal person or an entrepreneur shall be fined between one hundred to three hundred times the minimum wage in Montenegro if they:

- start project implementation without having conducted the EIA procedure and obtained the approval of the Competent Authority for the Study;
- fail to undertake all the measures envisaged by the Study for which the approval has been granted.

The public can inform about the violations of EIA conditions and the Environmental Inspection checks the compliance with the EIA conditions.

The Competent Authority is obliged to provide access to the data relating to the EIA procedure as conducted to the authorities and organisations and public concerned within 15 days from the receipt of the written request for information.

Nature assessments (Appropriate assessment under Habitats Directive)

The Environmental Protection Agency is responsible for nature assessments. An appropriate assessment is part of the environmental impact assessment. According to the Law of nature protection (OG of GOM No. 54/16) to the screening stage will provide the main criteria to determine if a project is likely to have significant effects on Natura 2000 network. Mitigation measures are foreseen in the Law. The Environmental Protection Agency decides on compensatory measures. According to the Law consultations with the public about the NA is mandatory. The decision approving the NA is an internal decision of the competent authority. The law foresees that the Environmental Protection Agency will establish committees consisting of experts who will be giving their opinion.

A.6 Serbia

SEA procedure is applying in the process of preparation and adoption of plans and programmes at the local, provincial and national level, to ensure environmental protection and sustainable development.

EIA procedure, or impact assessment is carried out for projects that may have significant impacts on the environment. The subject of the assessment of environmental impact are projects that are planned and implemented, changes in technology, reconstruction, capacity expansion, cessation and removal of projects, that may have a important impact on the environment.

SEA and EIA procedures ensures the participation of interested organisations and the public, cross-border notification for projects that may have important effects on the environment of other state, supervision and other questions of importance for the evaluation of the impact on the environment.

Legislation which regulating the procedure for the assessment of environmental impact:

- Law on environmental protection („Official Gazette of the Republic of Serbia, no. 135/2004, 36/2009, 36/2009 - other law, 72/2009 - other law, 43/2011 - Decision of the Constitutional Court and 14/2016)
- Law on Strategic Impact Assessment on the environment („Official Gazette of RS", no. 135/2004 and 88/2010)
- Law on the environmental impact assessment („Official Gazette of RS", no. 135/2004, 36/2009)

Sectoral laws of importance for the process of assessment of environmental impact:

- Law on Waters ("Official Gazette of RS", no. 30/2010, 93/2012, 101/2016)
- Law on nature protection („Official Gazette of RS", no. 36/2009, 88/2010 and 91/2010 – corr. and 14/2016)
- Law on Forests ("Official Gazette of RS", no. 30/2010, 93/2012 i 89/2015)
- Law on Land Protection ("Official Gazette of RS", no. 112/2015)
- Law on National Parks ("Official Gazette of RS", no. 84/2015)
- Law on Agricultural Land („Official Gazette of RS", no. 62/2006, 65/2008, 41/2009 and 112/2015)

Cover law that defines the space management (procedure for building permit and implementation impact assessment procedure)

- The Law on Planning and Construction ("Official Gazette of RS", no. 72/2009, 81/2009 - corr., 64/2010 - decision of the US, 24/2011, 121/2012, 42/2013 - decision of the US, 50/2013 - making US, 98/2013 - decision, 132/2014 and 145/2014));

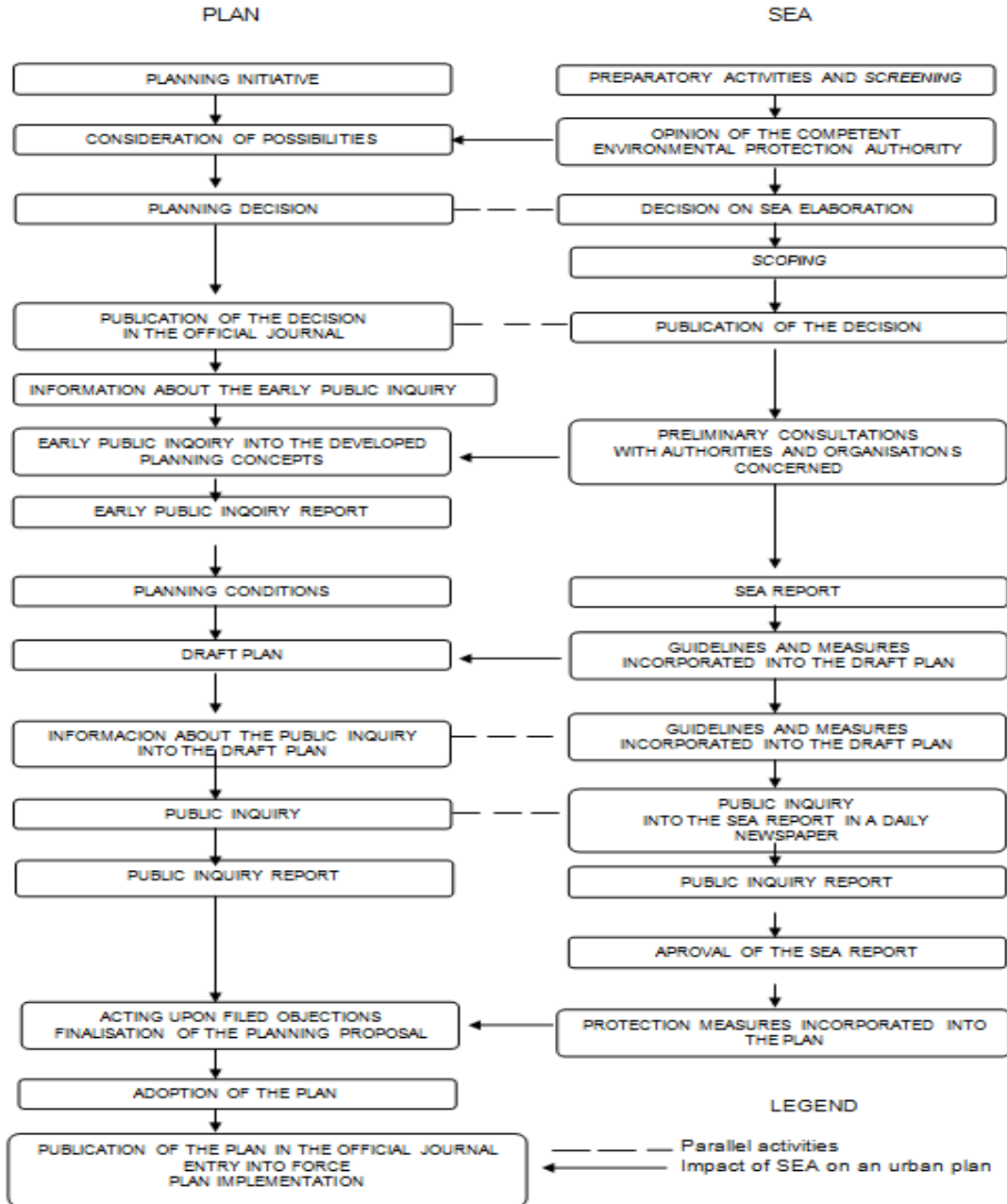


Figure A1.18: Process of the SEA based on the Serbian legislation

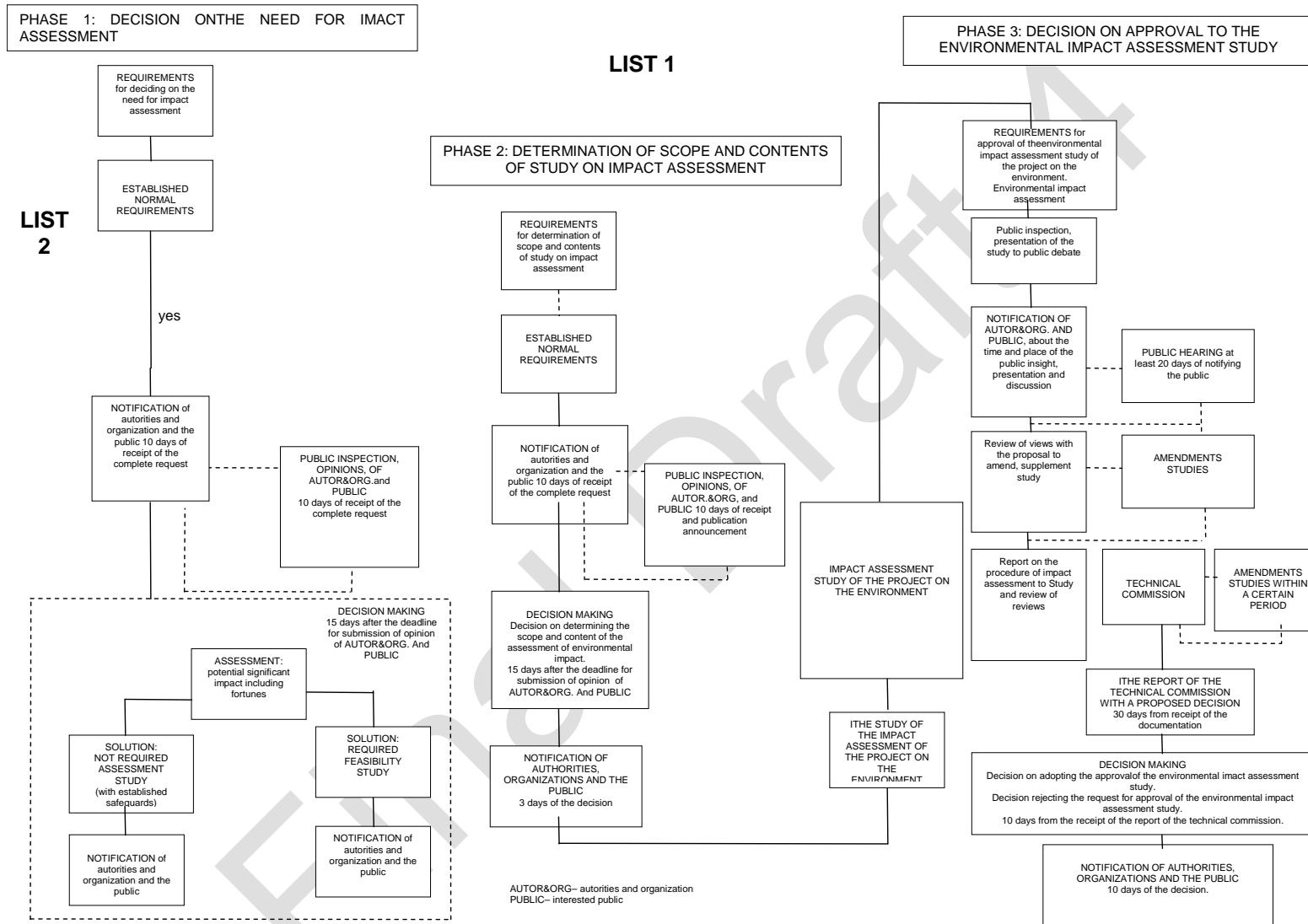


Figure A1.19: Process of the EIA based on the Serbian legislation