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Global Water Partnership

INTEGRATED RESOURCES MANAGEMENT PLAN (IRMP) FOR THE BUNA/BOJANA AREA

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

MedPartnership

Together for the Mediterranean Sea

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INTEGRATED RESOURCES MANAGEMENT PLAN (IRMP) FOR THE BUNA/BOJANA AREA

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ABBREVIATIONS

AFS	Adriatic Forecasting System
CAMP	Coastal Area Management Programme
CLC	CORINE Land Cover
CORDA	Coordinated Action
DPSIR	Driving forces, pressures, state, impacts, responses
EC	European Commission
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GWP-Med	Global Water Partnership Mediterranean
HP	Hydropower production
IBA	Important Bird Area
ICZM	Integrated Coastal Zone Management
IMF	Integrative Methodological Framework
IPA	Instrument for Pre-Accession Assistance
IWG	Integrative Working Group
IWRM	Integrated Water Resources Management
LSMS	Living Standards Measurement Survey
N	Nitrite
NUTS	Nomenclature of Territorial Units for Statistics (French: nomenclature d'unités territoriales statistiques)
P	Phosphorus
PAP/RAC	Priority Action Programme Regional Activity Centre
PE	Public enterprise
PSU	Practical salinity unit
SPA/RAC	Specially Protected Areas/Regional Activity Centre
TDS	Total dissolved solids
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNESCO-IHP	UNESCO International Hydrological Programme
WFD	Water Framework Directive
WWTP	Wastewater treatment plant

CONTEXT

The Integrated Resources Management Plan (IRMP) considers the impacts of activities upstream of the Buna/Bojana River basin on conditions in the downstream coastal zone and the Buna/Bojana basin itself, as well as the effect of tourism and agricultural and urban development on the broader coastal zone and catchment area, mainly in terms of water quality and availability. The plan also takes into account coastal impacts caused by the interaction of seawater and freshwater, influenced by marine currents and extreme meteorological episodes, which can have a profound influence on the river delta and coastal aquifers. To address these impacts, the plan combines established methodologies for Integrated Water Resources Management (IWRM) and Integrated Coastal Zone Management (ICZM) into a single "Integrative Methodological Framework" (IMF). The plan also applies an ecosystems approach to the integrated management of land, water and living resources that promotes conservation and sustainable use of resources in an equitable manner.

The plan also aims to achieve an optimal combination of these approaches within the transboundary area of Albania and Montenegro (Figure 1), therefore bringing together the administrative structures of two states and their relevant localities. The Buna/Bojana[1] River and catchment area, coastal waters and underlying aquifers constitute a common physical thread linking the two countries – a hydrological system underpinning natural and socio-economic processes. Water functions as the "bloodstream" of both nature and the economy.

The coastal zone is the space where interactions between the terrestrial and marine areas, land and sea occur. Understanding the different components of this system and the interactions between them is essential for its sustainable management.

The Legal/Institutional Framework consists of national regulations and relatively recent EU-compatible legislation, introduced by both countries (which are candidates for accession to the European Union) in an effort to approximate the EU *acquis communautaire*. In this regard, the EU Water Framework Directive (WFD) has been incorporated and used as a framework law for the management of water resources. The plan applies WFD methodology regarding water resources management planning, and can be viewed as a first effort by both countries to implement this legal requirement.

The plan therefore applies IWRM considerations using WFD requirements alongside ICZM for inter-sectoral coordination and integration, along with transboundary cooperation in the planning and management of basins and coastal areas. The driver for the ICZM component of the plan is the ICZM Protocol for the Mediterranean, which was developed as a supra-state legal instrument to provide a common legal framework for the 21 Mediterranean states and the European Union. The entry into force of the Protocol in 2011 and its subsequent ratification

1 Buna and Bojana are the respective Albanian and Montenegrin names given to the same river.

Figure 1: The Buna/Bojana Transboundary Plan area

by Albania and Montenegro demonstrate the commitment of these countries to sustainable coastal development. Furthermore, ratification of the Protocol by the European Union means that the Protocol has become part of EU law with binding effects on Member States and candidate countries.

In bringing together policy instruments and methodologies from the disciplines of IWRM (including surface water and groundwater management), spatial planning, climate change and ICZM, the plan adds value to these individual approaches, establishing an approach that is greater than the sum of the parts.

The experiences from preparing the Buna/Bojana Integrated Resources Management Plan can provide useful lessons for those seeking to replicate similar efforts elsewhere in the Mediterranean basin, as an alternative to the preparation of separate IWRM and ICZM plans.

THE INTEGRATED PLAN-MAKING PROCESS

The unique feature of this plan is its use of an Integrative Methodological Framework (IMF), which cuts across different sectoral interests and the complexities of their administration. In particular, the integrated approach combines consideration of socio-economic and physical issues and proposes unified measures and responses (Box 1).

The main benefit of this integrated approach is the potential for win-win solutions in which efforts to address issues in one sector can deliver benefits in others, generating economies of

Box 1: Integrative Methodological Framework

As part of the MedPartnership project, the Priority Actions Programme/Regional Activity Centre (PAP/RAC), the UNESCO International Hydrological Programme (IHP) and the Global Water Partnership – Mediterranean (GWP-Med) jointly proposed the use of a comprehensive Integrative Methodological Framework (IMF) for the sustainable management of the ecological continuum, comprising the coastal zone, the river basin and the coastal aquifers. The framework encourages and facilitates planners, practitioners and interested parties to make shared, efficient and effective use of the relatively limited resources. The IMF is intended to support better coordination, integration and involvement of all stakeholders at all stages of the decision-making process. It also integrates climate change as an important cross-cutting issue for planning and implementation processes in the coastal zone.

Source: GWP-Med, PAP/RAC and UNESCO-IHP, 2015.

scale through shared responses. The approach also reduces the likelihood of conflict between sectoral interests, both at the level of natural resources management and economic planning. In addition, the integrated approach facilitates consideration of "cross-cutting" issues such as climate change and the promotion of economic and social wellbeing.

The plan is also transboundary in approach, encompassing areas of Albania and Montenegro that are separated by the Buna/Bojana River but which share common features and issues. The key shared natural and physical transboundary features are the river and catchment area and underlying aquifers, along with the associated ecosystem that encompasses high-value habitats and species. The area also shares similar economic and social challenges including poor and declining agriculture, rapid but poorly controlled growth of coastal development and tourism, very low incomes, and lack of investment in infrastructure. Furthermore, the transboundary area shares common risks including catastrophic flooding, pollution and the impacts of climate change. It is on these shared issues that the plan focuses.

Combining the IMF and transboundary approaches provides opportunities to develop common understanding, identify and prioritize issues of mutual interest, and, where appropriate, coordinate efforts to address them. The transboundary approach is also timely as both countries are moving towards accession to the EU, which promotes and supports stronger cross-border cooperation.

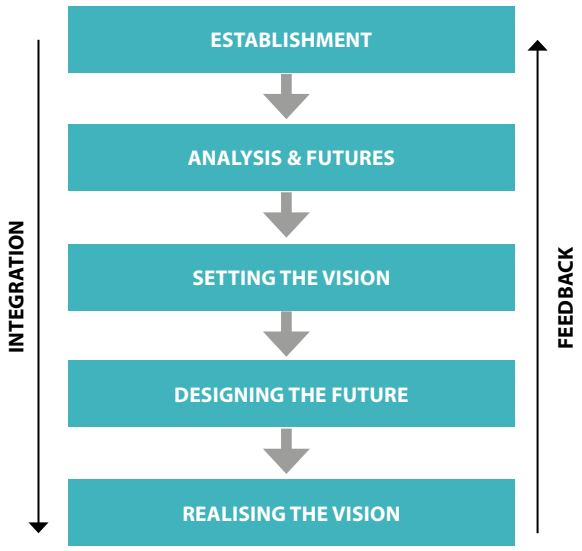
The IMF roadmap consists of five basic stages (Figure 2). It is designed to guide rather than dictate, and can be adapted to individual local circumstances.

HOW TO READ THE DOCUMENT

The following document consists of four main parts:

Part A sets out in summary form the process of plan formulation, the analysis, and the design of measures and actions to implement the plan. Each is summarized following the five-stage established by the Integrative Methodological Framework (IMF) framework (Figure 2).

Figure 2: The IMF planning process



Part A also includes the plan's measures and priority activities.

Part B sets out the detailed background data and information, along with analysis of the relevant sectors and themes for the plan. Key points are summarized in the form of bullet points.

Part C "Water Resources Management: Situation Analysis" elaborates the current state of water resources. **The results of the analysis are summarized in the respective chapters of Part B.** Part C can be read as a standalone document to meet the statutory requirements of the European Water Framework Directive.

Other data and information, such as the Stakeholder Analysis, Institutional and Legal Framework, and detailed DPSIR tables are set out in the Annexes.

THE APPROACH

The Buna/Bojana Transboundary Management Plan is a pilot – "real world" – application of the Integrated Methodological Framework (IMP).

A "DPSIR" framework has been used to structure analysis of the complex interplay between topic areas and to link it with suggested policies and measures for integration into planning. DPSIR stands for: Driving forces - Pressures - State - Impacts - Responses (see Chapter 4 for more information).

The plan also constitutes an important test of cooperative work at the transboundary level. Such transboundary work poses significant challenges both to the collection of background information and to the overall plan timeline. The initial scoping phase, which should precede preparation of the plan, must allow for a realistic period of time to harmonize data and mapping between the two countries (e.g. socio-economic data and groundwater mapping), and to collect basic data (e.g. to characterize ecological status for use as a reference point).

Part A.

THE PLAN

1. THE FOUNDATIONS OF THE PLAN: ESTABLISHING THE PROCESS

The key task at this stage is to establish the practical mechanisms for implementing the Integrated Resources Management Plan (hereafter referred to as "the plan").

1.1 Scoping

Scoping consists of a preliminary assessment of key drivers underlying the plan as well as important issues and concerns in the planning area. The former include policy drivers such as the Barcelona Convention and its ICZM Protocol. These provide a common legal framework to promote and implement Integrated Coastal Zone Management (ICZM) including in coastal zones that stretch across national boundaries, such as the Buna/Bojana area.

Both Albania and Montenegro aspire to EU membership and currently have "Candidate" status. Montenegro's case is the more advanced of the two countries, with formal membership negotiations underway. Future EU membership is a key policy driver as the process involves the adoption, application and enforcement of EU law, and the implementation of judicial, administrative, economic and other reforms necessary for the countries to meet the conditions for accession. Critically, these include reforms to the water, waste and air sectors. In addition, both countries have strong economic development aspirations, with a view to bringing quality of life closer to the European norm.

The plan is a clear indication of the political willingness of the two countries to work together on transboundary issues. Brief background information analysis and early dialogue with stakeholders was used to establish: (i) the key issues and concerns, (ii) the practicalities of plan-making, and (iii) a preliminary vision for the area.

1.1.1 Key issues and concerns

A preliminary identification of key issues for the plan area was undertaken during the scoping phase, the findings of which are summarized in a SWOT analysis (Table 1). The issues are set out in detail in Part B and are summarized under broad headings: pressures on natural values, water budget, climate change, hydro-morphological issues, pollution, and socio-economic and development challenges.

1.1.2 The practicalities of plan-making

Transboundary cooperation adds obvious practical constraints to the plan-making process, particularly when the boundary involved is a river and estuary dividing communities, cultures and nationalities. At the time of plan-making, the two countries had different legislative and administrative frameworks. Local administration in Albania consisted of small communities typically of a few hundred inhabitants within the wider county of Shkoder, which has an overall population of over 200,000 inhabitants. In Montenegro, the lowest level of administration is the municipality. The only local administration in the plan area is Ulcinj with a population of approximately 20,000 inhabitants. As of 2015, a new administrative organization has been applied in Albania, which no longer includes communes as the lowest administrative unit. However, this change was not in place during the plan preparation process and is therefore not reflected in the socio-economic assessment.

The scoping phase highlighted other practical concerns, not least the lack of new data, indicating a need to collect and/or produce such information. A notable example was the data required to conduct an Ecological Status Characterization (a first for Montenegro and Albania) to establish a reference point. Other data needs included the identification of differences in datasets between the two countries and subsequent harmonization (e.g. lack of groundwater mapping, differences in type of socio-economic data, etc.). Overcoming these issues required a significant extension of the schedule in the early stages of the plan.

1.2 The preliminary vision for the area

The preliminary working versions of the "vision" for the plan area were presented in the Scoping Report and discussed with stakeholders at a "harmonization" meeting (i.e. a multi-stakeholder participatory meeting to advise on the scope and content of the plan).

The preliminary visions proposed at the meeting were as follows:

> "Integrated planning to bring people from both sides of Buna/Bojana River together, to improve livelihoods and preserve unique ecological values and distinctiveness of the area";

> "Integrated planning for the European future of the Buna/Bojana region: connecting people – improving livelihoods – developing capacities – preserving unique ecological values and distinctiveness of the area";

> "Improve the quality of life of all citizens of the Buna River and coastal area through a clear mechanism of planning and tourism development taking into account the protection and valorisation of the biodiversity value".

Stakeholders present at the meeting expressed support for future development of the area, in particular the development of forms of tourism based upon nature conservation, such as eco-tourism. These discussions combined with the results of consultations with key national experts, and the Stakeholder Analysis (2013) resulted in the final version of the vision (see Chapter 3).

Table 1: SWOT analysis from the Scoping Report for the Buna/Bojana area

STRENGTHS	WEAKNESSES
Environment • Rich biodiversity; area of particular importance for migratory wintering waterfowl and water birds **Socio-economic factors** • Significant economic development potential in eco-tourism (and related services), agriculture • Cultural identity and traditional ways of living preserved (although under pressure) • Institutional and legal framework • Harmonization with EU legislation for a number of policy areas is ongoing • General commitment to sustainable development in policy documents **Cross-border cooperation** • Scope of cross-border cooperation is growing • Mechanisms for joint management of shared natural resources are becoming accessible • New funding sources are becoming accessible	**Environment** • Inadequate pollution control, in particular water pollution (from urban development and tourism, navigation) and waste disposal • Recorded biodiversity loss (habitat destruction and species decline) • Environment is rarely prioritized in development and implementation of spatial and other plans • Management of natural hazards (climate change, flooding, earthquakes, weather extremes, erosion) **Socio-economic factors** • Quality of tourism offer is dissatisfactory with short seasonal visitation peaks exhibiting characteristics of mass tourism **Infrastructure** • Underdeveloped transport and environmental infrastructure; some problems with energy supply networks • Capacity to attract funding and management of infrastructure remains limited **Institutional and legal framework** • Weak implementation and enforcement • Insufficient institutional capacities, including coordination among relevant institutions, sectoral policies and different levels of government **Cross-border cooperation** • Formal cooperation agreements are not always followed by operational measures • Development planning is not coordinated • Poor infrastructure connections
OPPORTUNITIES	**THREATS**
Environment • Alignment with EU standards and strengthened implementation to improve environmental quality are priorities for EU accession **Socio-economic factors** • EU and international support available for sustainable development of the area • Support is available for innovation, development of a knowledge-based economy and competitiveness • Growing interest from foreign tourists in natural and cultural values of the area **Infrastructure** • Favourable funding becoming available from a larger number of sources (e.g. IPA funds) **Institutional and legal framework** • EU integration (as a vehicle to upgrade legal and institutional systems) • Synergetic effects of integrated approaches to management of human activities • Consensus building **Cross-border cooperation** • International donors favouring cross-border cooperation, in particular in the fields of environment and transportation	**Environment** • Consequences of natural hazards (flooding in particular) exacerbated by climate change • Continued improper waste and wastewater management, decreasing the attractiveness of the area • Lack of investment in natural resource management **Socio-economic factors** • External economic shocks and potential new crises affecting local prospects • High susceptibility of the tourism sector to economic contraction • Impacts of climate change on the economy **Infrastructure** • Lack of funding hinders further development **Institutional and legal framework** • Prolonged inability to implement laws and policies, discontinuation of institutional reforms • Change in political priorities **Cross-border cooperation** • Bilateral agreements implemented in an ineffective manner • The countries do not capitalize on outcomes from internationally supported projects

1.3 Defining the boundary of the transboundary zone

The limits of the transboundary zone are defined according to the Integrative Methodological Framework (IMF), which incorporates guidelines present in the Integrated Coastal Zone Management (ICZM) Protocol and the EU WFD, as well as an ecosystem approach. These consider the natural characteristics of the area and the local conditions. A transboundary zone consists of the transboundary natural elements comprising the coastal zone, catchment, aquifers, transitional and coastal waters – up to the external limit of territorial seas – and the relevant administrations (Figure 3).

Based on the above, the planning team used the following criteria to define the planning zone:

- The area should encompass transboundary and land–sea interactions.

- Following the ecosystem approach, the boundaries of the defined area should take into consideration and coincide where possible with the boundaries of the:
  - inland natural environment systems (i.e. watershed, ecosystems, etc.);
  - marine area that interacts directly with the inland natural and built environment (i.e. the area adjacent to the land that is directly influenced by land-based activities or surface and underground freshwater flow).

- The boundaries of the defined area should take into consideration and coincide as much as possible with those of the administrative divisions for:
  - municipalities, communes, etc;
  - water resources management (i.e. watersheds).

Underlying aquifers extend beyond the boundaries of the watershed. The area beyond the boundaries of the watershed was not used for the designation of the planning zone since any measures defined for this area would fall under the responsibility of different watershed authorities.

Based on the above, the plan focused on a zone delimited by the boundary shown in Figure 4.

In practical terms, the land boundary of the plan area was defined using local administrative boundaries that broadly conform to the physical boundary of the watershed. This approach facilitated analysis of the natural and physical environment in conjunction with available socio-economic information. In Montenegro, the area includes the municipality of Ulcinj, while in Albania it includes four communes within the county of Shkoder (Ana e Malit, Berdice, Dajc and Velipoja). A small part of the municipality of Bar as well as parts of the communes of Balldreni i Ri, Bushat and Rrethine are also included, as they fall within the Buna/Bojana watershed.

The marine zone is designated according to an estimate of the primary influence of surface water flows on in-shore marine waters, as indicated by the levels of salinity (see Figures 4, 7, 33 and 34) and as a proxy measure of the main influences of land-based activities.

The plan identifies the management issues related to major challenges, as well as the causes of priority challenges at national and transboundary levels, and proposes measures to address them.

Figure 3: Nominated administrative boundaries

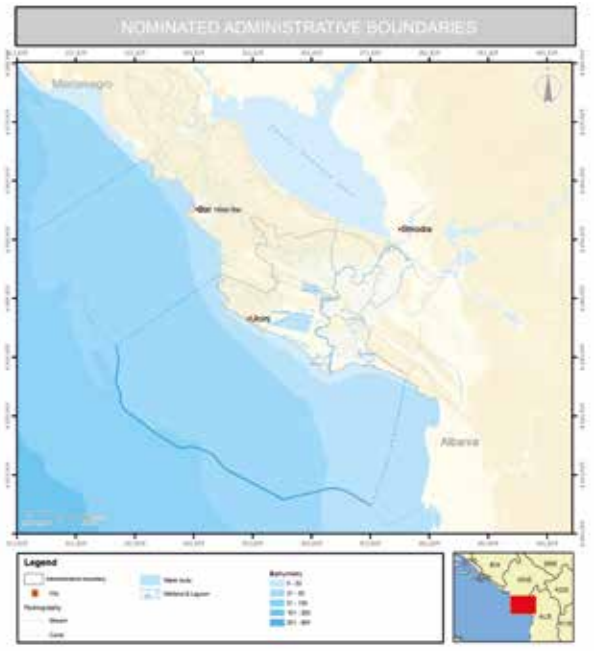


Figure 4: The plan area

1.4 Governance of the plan-making process

The key tasks of this stage are the coordination and cross-sectoral involvement of stakeholders, the provision of technical support for the process, and communication among partners. For the Buna/Bojana area these mechanisms include the following:

Establishment of the Integrative Working Group (IWG): the mission of the IMG is broader than the development of the plan; it seeks to integrate activities related to methodologies and, in particular, those related to Integrated Water Resource Management (IWRM) including aquifer management and ICWM, in order to:

- analyse respective methodologies, potential convergences and outputs;
- collaborate in the drafting of the Integrative Methodological Framework (IMF) to be piloted as part of the Buna/Bojana Integrated Resources Management Plan;
- guide and support corresponding partners (UNESCO-IHP, GWP-Med, PAP/RAC) in the implementation of Buna/Bojana basin management to achieve consolidated results;
- present the IMF, the relevant experience gained and the lessons learned; and
- achieve a universal IMF model that will facilitate its replication elsewhere in the Mediterranean and beyond.

Establishment of two teams of National (Albanian and Montenegrin) experts each led by a National Coordinator to produce the necessary background data and the respective reports.

Joint meetings of national and international experts coordinated by the Partner Organizations (PAP/RAC, GWP-Med and UNESCO-IHP), in order to:

- assess key findings;
- identify problematic aspects and emerging issues;
- agree on critical aspects; and
- define a future roadmap and modes of operation.

Local stakeholder group meetings and consultations, which comprised technical experts, representatives of local and national administrations, local communities and NGOs. Two stakeholder workshops at transboundary level were organized:

- a the beginning of the process to:
  - validate the baseline situation with regard to the main common issues identified in the river basin and the coastal zone through the Scoping Report; and
  - discuss the shared vision for management of the area.
- at the end of the process to:
  - discuss the findings of the management plan and agree on future measures and priority actions necessary for improving the environmental, ecological and socio-economic state of the area by 2030; and
  - agree on best modes of operation for improving transboundary governance and cooperation between the two countries.

A number of focus group discussions with local communities were also organized in the two countries to map and explore/analyse the perceptions of stakeholders related to management issues in the area and ways to address them.

2. ANALYSIS AND FUTURES

The key tasks of this stage are to gather evidence for future actions, substantiate the issues and problems through more rigorous analysis and review, and describe the present state of the area and likely future trends.

Combined with the coordination mechanisms set out above, this stage lays the foundations for future cooperation and implementation.

2.1 Analysis

A detailed analysis of the current state, problems and issues of the area is structured around topic areas elaborated in detail in Part B, "The Background". The limitations of these data and information are highlighted above in Chapter 1.1.

2.2 Analysis summary

In general, deficiencies exist in the level of data and information for virtually all policy areas due to lack of monitoring capacity. This situation is compounded by the political geography of the area, which spans two national administrations.

However, a number of issues arise from the analysis, which are elaborated in Part B of this document. These fall under the following categories and are summarized further below:

1. Social and administrative characteristics
2. Economic potential
3. Natural environment and resources (including biodiversity and protected areas, hydrology, hydrogeology, coastal and marine processes and designation of water bodies)
4. Major issues and problems including:
   a. Natural and hydro-morphological issues (including climate change)
   b. Pollution and the status of the water bodies
5. Socio-economic and development issues
6. Institutional and legislative frameworks.

The analysis identified the following key characteristics important for management of the area:

2.2.1 The importance of water

The hydrological system of the area is of key importance to its natural and socio-economic processes and functions. Water can be understood as the "bloodstream" of nature and the economy, and the hydrological system as the vascular means through which positive and negative effects are "transported", thus allowing interaction between the natural – economic – spatial components, including the marine area. In turn, functions and processes in the marine area affect the terrestrial area.

The Buna/Bojana River is short, stretching only 44 km; however, its relatively short length belies its importance. With a mean annual discharge of approximately 20 km3/year, the flow of

the Buna/Bojana represents the third greatest discharge in the European Mediterranean after the Rhone and the Po.

Understanding the different components of this hydrological system and the interactions between them is central for their sustainable management.

Assessment of groundwater hazards and risks poses a particular challenge. Overall assessment of groundwater bodies is not currently possible due to the almost complete absence of necessary data. However, groundwater levels seem to be decreasing with a concomitant deterioration in quality.

The lack of continuous and systematic monitoring is also an impediment for effective planning and management.

Assessment findings related to standards to meet the European Water Framework Directive are as follows:

- The status of the Buna/Bojana River is poor. The status of Lake Šasko and Viluni Lagoon is lower than moderate and moderate, respectively.
- Heavy metal pollution was recorded in a few cases and the mean concentrations of some metals are above Environmental Quality Standards at one or more sampling stations.
- The chemical-physicochemical quality of the river ranges from good to moderate, but deteriorates from its sources to the river mouth.
- Special attention must be paid to addressing the issue of invasive species.
- The status of the Coastal Marine Zone is classified as poor.

It should be noted that the data used for the characterization of water bodies were generated mostly by the project and that the available data series are not sufficient to establish quality trends.

2.2.2 The relationship between the plan area, the wider catchment and the marine zone

The Buna/Bojana River is an outflow of Lake Skadar/Shkoder – the Balkan's largest lake – and receives the waters of the Drin Basin, which has a total area of about 21,000 km^2. The hydrological regime of the Drin Basin has been significantly altered by the construction of a cascade of dams. As a result, during high-water periods and "favourable" meteorological conditions Drin water enters Lake Shkoder/Skadar or restricts outflow from the lake, often resulting into floods. In addition, disturbance to the sediment distribution regime and sediment balance – the combined effect of sediment retention in the dams and increased erosion phenomena downstream – results in complex changes to coastal dynamics. Furthermore, economic activities and natural processes (e.g. currents) in coastal waters result in interactions with marine areas north, south and west of the plan area.

Unsustainable solid and liquid waste management also exerts pressures on the natural system. According to the available literature, industry and mining seem to result in pollution of the Drin River and Lake Skadar/Shkoder watersheds and subsequently affect the Buna/Bojana River watershed.

2.2.3 Climate change and hazard risks

Potential climate change risks include sea level rise, which will have significant effects on coastal lagoons and estuaries. Increasing salinity may provoke shifts in the nature of ecosystems. Extreme events resulting in damage are likely to increase. There is also a heightened probability of flood risks. The frequency and intensity of floods has risen in recent years – two flood incidents in 2010 were the most severe in the last 80 years and caused significant damage to buildings and agricultural land.

2.2.4 Impact of socio-economic trends

Superficially, demographic data show contrasting trends in the two countries – namely, a decline in Montenegro compared to growth in Albania. However, Albanian voter registration-based statistics may disguise a trend of outward migration following national trends of migration to urban areas or overseas in search of better educational and economic opportunities.

The relatively high population density in the plan area reflects a general pattern of decline in inland rural areas. Within the plan area itself there is a clear trend of movement towards the coastal strip away from inland rural areas. Unless there is a significant change in economic and educational opportunities these trends are unlikely to reverse.

Outward migration combined with reduced industrial activity, due largely to the transition to a market economy, has resulted in reduced anthropogenic impacts on the environment. However, more recent political and economic stability has led to the re-opening of many potentially polluting industries upstream including mining, fertilizer production and tanning, and population increase in urban centres. While some of these facilities are equipped with wastewater treatment plants, many of these have fallen into disrepair.

A major pressure in the Buna/Bojana catchment is seasonal population increase. Approximately 400,000 tourists visit the plan area annually with a major peak during summer when the population of the area increases almost 6.5 times.

2.2.5 Urbanization and planning

Urbanization in coastal areas intensified from the 1960s onwards, especially after the 1990s. Urbanization in the plan area is characterized by the recent rapid development of a narrow strip within 5 km of the coast, generally linear in nature, running along the coast and highways (litorization).

In Montenegro, there is a considerable over-supply of land designated for building, with urban plans allocating sufficient land to accommodate a population several times the existing population. One result of such unsustainable planning is heavily dispersed construction, leading to landscape degradation.

Albanian development has been characterized by a lack of formal planning and informal development. The recent boom in construction boom, dating from the 1990s, has affected in particular the coastal region and urban centres. Enforcement of building controls and slow implementation of adopted spatial plans is inadequate.

The absence of a strong and effective planning system and the reduction in developable land are expected to lead to wide fluctuations in the rate of urbanization, influenced by tourism and speculative market factors rather than demographic trends.

2.2.6 The natural environment and wildlife biodiversity

The scarcity of data and information on biodiversity, the low level of research, and lack of continuous and systematic monitoring constitute significant problems for planning and management. However, the plan area is of international importance and faces significant threats. Nearly half of the waterfowl species in the Buna/Bojana delta are included on the lists of endangered species at local, regional and international level.

The combined Buna/Bojana and Lake Skadar/Shkoder wetlands support 900 to 1,000 plant species and large populations (about 25,000) of wintering waterbirds.

Over 76% of the bird species in the Buna/Bojana delta are migratory. The area forms an important part of European bird migration flyways that pass over the Balkans, underlining its international importance.

The mouth of the Buna/Bojana River constitutes a rare example of a natural delta on the east Adriatic coast. The combined Buna/Bojana and Drin rivers are also of outstanding importance as migration routes for fish, linking Lake Skadar/Shkoder with the Adriatic Sea.

Pressures on wild species in the area include non-sustainable and illegal fishing using destructive fishing and hunting methods. Wood harvesting and the expansion of pastures are contributing to continued deforestation. There has also been serious deterioration of the Skadar Oak forest. Concerning agricultural biodiversity, the introduction of new animal and plant species and varieties (cattle, crops, vegetables, etc.) is causing a decline in traditional local varieties.

Semi-natural habitats such as coastal dunes and wetlands are subject to considerable erosion and fragmentation, respectively. Wetlands on the Albanian side are threatened by over-pumping of surface and groundwaters for irrigation.

In general, aside from the above pressures there is a low level of public awareness regarding environmental issues.

2.2.7 Tourism

Although the overall economic impact of tourism in the area is growing, it is still considered inadequate, primarily due to the under-utilization of available accommodation capacity, the dominance of residential forms of tourism, and the concentration of tourism activities in the summer months of July and August.

Unsustainable tourism activities combined with other related coastal developments have had a number of adverse impacts on the plan area including:
the loss, degradation and fragmentation of natural habitats, particularly coastal and wetlands habitats;
the degradation of the landscape through the construction of new tourism installations and infrastructure;
the pollution of marine and freshwaters due to increased discharge of polluted and untreated wastewaters; and

- the disturbance especially of wilderness areas, particularly in the peak summer season.

2.2.8 Infrastructure

The already inadequate infrastructure throughout the plan area has not kept pace with rapid spatial transformation. In Albania, in particular, this trend has resulted in the partial or even complete absence of infrastructure services.

Roads are in poor condition due to inadequate maintenance. Severe congestion is a frequent occurrence during the summer months, notably in Montenegro.

Potable water systems are of particular concern. Potable water sources are insufficient to meet peak demand in summer and are at risk of contamination.

Wastewater management is currently unsustainable leading to water pollution and subsequent degradation of ecosystems, as well as contamination by harmful micro-organisms of both inland and marine environments, with consequent risks to human health.

Solid waste collection and disposal systems are also of major concern throughout the plan area. The ecological and aesthetic quality of riverbanks and water bodies has deteriorated, mainly due to heavy litter disposal throughout the river system. Local collection services are inconsistent, ranging from the well organized, notably in Montenegro, to the almost non-existent in Albania, where illegal dumping along roads, drainage and irrigation ditches is common. Existing landfill sites are inadequate to meet demand efficiently and constitute a significant source of pollution in their own right. Albania lacks a system for the safe management of hazardous waste, not just in the plan area, but throughout the country as a whole.

Lack of investment in recent decades has been exacerbated by uncontrolled development, a trend that is likely to continue. In Montenegro, EU accession and compliance with the *acquis communautaire* may drive improvement in solid and wastewater systems. The EU accession process is considerably less advanced in Albania than in Montenegro, but can nevertheless be considered an important driver of investment in the country.

2.2.9 The institutional and legal context

Policies, laws and institutions in both Albania and Montenegro are changing rapidly, partly in response to the requirements of the EU accession process.

Cross-border high-level coordination mechanisms have been established for decision-making processes related to management of the Drin basin including the Buna/Bojana area. The Drin Coordinated Action (CORDA) is based on a Memorandum of Understanding (MoU) signed by the Drin riparian countries including Albania and Montenegro in November 2011.

Following the successful implementation of the Coastal Area Management Programme (CAMP) Montenegro project, coastal zone management is gaining in political relevance, with the organization of a governance framework for ICZM (adoption of the ICZM strategy and establishment of a coordination mechanism). In addition, the coastal area in both countries is covered by arrangements under the Drin CORDA. Nevertheless, coastal management *per se* requires additional attention in Albania – in line with the ICZM Protocol – possibly through integrated structures.

There is also a need to upgrade capacities at both national and local levels, and to introduce awareness-raising campaigns and other initiatives to improve current law enforcement and implementation of integrated approaches for managing coastal and marine ecosystems.

The main area of the institutional framework in need of reinforcement is local government.

3. SETTING THE VISION

Beyond the analysis stage it is necessary to establish a widely accepted vision for the plan area, which will shape the detailed measures that follow.

The vision below is based on stakeholder meetings held during the early stages of the plan process, consultations with key national experts and the Stakeholder Analysis (2013).

The future challenge for the success of the plan lies in real and meaningful integration; in other words, in creating synergies and critical linkages between stakeholders, and transcending administrative barriers to deal with global, regional and local issues, with the ultimate aim of achieving a sustainable development path.

The analysis and consultations to date have helped to identify key goals around which the vision could be formulated. These goals are listed below and together represent a vision for a sustainable Buna/Bojana transboundary area 15 years from the present time.

Resources and procedures have been put it place so that:

- management of natural resources at the national level becomes more integrated.
- the Buna/Bojana area of Montenegro and Albania becomes an example of successful transboundary cooperation within South-East Europe, encompassing:
  - effective institutional coordination in the form of a mechanism/body for integrated planning and management of the Buna/Bojana area, with adequate support capacities. The issues under its mandate could include all or a part of the following: water and other natural resources management, biodiversity protection, pollution reduction and climate change adaptation;
  - enhanced transboundary cooperation with a view to building coordinated economic development programmes that make use of shared resources.

These in turn will help to ensure that:

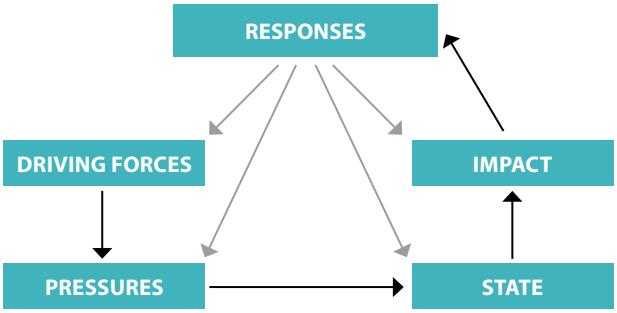
- infrastructure is of the highest appropriate standard to ensure sustainable water supply and waste management, with a view to improving ecosystem health and water quality;
- the conditions have been created to protect and enhance the area's high biodiversity value;
- the competitive advantages of the region, in terms of natural and cultural values, are utilized in a sustainable manner to support high-value tourism;
- overall, the economic and social wellbeing of communities in the area converges towards EU norms;
- development is well-planned and regulated, and respects natural and landscape values; and
- the area is resilient to the impacts of climate change.

The measures set out in the next chapter are designed to set a course to achieve the above vision.

4. DEVELOPING THE PLAN: IDENTIFYING DRIVERS, PRESSURES AND IMPACTS

A DPSIR framework has been employed to structure analysis of the complex interplay between topic areas and responses, which is directly linked to the measures and priority activites. The DPSIR provides a systemic insight into the ways in which, for example, social and economic **driving forces**, such as the attractiveness of coastal zones, act in conjunction with weak institutional capacities leading to the creation of **pressures** on the environment such as unplanned urbanization. The **state** refers to the quantification of that issue (e.g. widely dispersed unserviced development and number of illegal constructions). This in turn leads to **impacts** on ecosystems, landscapes and water pollution or the cost of infrastructure services. The **responses** (or lack of) might include, for example, measures to improve regulation or financial instruments to deter such development. In turn, these responses affect the driving forces, pressures, state and impacts. In reality, the relationships are not so linear and the driving forces, pressures, state and impacts interrelate in complex and overlapping ways (Figure 5).

Figure 5: The DPSIR cycle



The broad picture that emerges from this background analysis for the Buna/Bojana transboundary area is summarized below. (The DPSIR framework table for the Buna/Bojana area is presented in Annex 1.)

4.1 Driving forces

The main driving forces behind conditions in the plan area can be grouped under 13 broad categories. All such drivers are applicable to both Albania and Montenegro; however, there may be differences regarding the intensity and scale of each category in the two countries:

1. The attractiveness of the coast/growing development
Natural capital, in particular the attractiveness of the coast, has been a major driver for development. The coastal areas of both Albania and Montenegro have been subject to intense market pressure by residential and tourism development over the past two decades. Development has taken place at rates that exceed the capacity of administrations to adequately regulate or provide essential services.

2. Climate variability and change
According to all models, the area is among those highly vulnerable to climate variability and change. Sea level rise will likely have significant effects particularly on coastal lagoons and estuaries. With increasing salinity, there may be shifts in the nature of the ecosystems. Extreme precipitation events are also likely to increase.

The Buna/Bojana River and the upstream Lower Drin – Lake Shkoder/Skadar watersheds are presently subject to a high risk of flooding. This risk is subject to increase depending on the extent of climate change impacts in the area.

3. Structural economic weaknesses and market transition
The area is characterized by some of the lowest incomes in Europe.[2] This functions as a disincentive for the sustainable use of natural resources. Furthermore, the economies in the area have undergone a transition from socialism to free markets. Investment in infrastructure such as roads, sewage networks and treatments, flood protection, waste and water has reduced considerably since the socialist era.

4. Structural issues in the agricultural sector
In Albania, the agricultural sector is characterized by under-development, with underlying structural issues ranging from field fragmentation to ownership problems and the transition to a market economy, while the irrigation system is in a state of disrepair as a result of lack of investment. In Montenegro, the sector is characterized by field abandonment and changes in land use category, from agriculture to development.

5. Demographic changes
Despite rapid urbanization in the area the predominant demographic trend is one of outward migration to urban areas or overseas for better economic opportunities. Unless there is a significant change in economic and educational opportunities these trends are unlikely to reverse.

6. Development planning and prioritization
Development planning does not take into account the interlinkages present in natural systems, resulting in conflicts. Intense requirements for urban and tourism development are not in accordance with the need to preserve natural and landscape values, undermining the potential for high-value forms of tourism that enable sustainable growth.

7. Upstream drivers
Upstream urbanization and land use management result in a series of pressures. Hydropower production infrastructure upstream focuses on maximizing electricity production, however the rules and practices governing dam operation do not take into consideration the risk of downstream flooding incidents in the event of extreme meteorological conditions.

8. Policy and legal framework
The current policy framework is inadequate to properly address sustainability issues. Regarding urbanization, the weak policy framework is characterized by a lack of financial (tax) and land policy instruments to discourage over-urbanization, conversion of agricultural into buildable land and similar. In addition, property titles are unclear in Albania, which further disables policy decisions towards regulated urbanization.

9. Weak institutional and technical capacity
Implementation of legislation is impeded by overlapping competences or even lack of clear delegation and fragmentation of responsibilities among different institutions and agencies responsible for the management of different spatial units (e.g. municipalities, river basins, protected areas) and natural resources (land, water, forests, etc.). Ineffective communication and coordination among the different ministries and bodies is also a major issue.

Administration capacity is low in terms of human, financial and technical resources – for flood warning, hydro-meteorological, water quality and biological monitoring – particularly at the local level.

In addition, territorial planning is not informed appropriately by science, due to lack of data and/or lack of data in an appropriate form, as well as the inability of planners to interpret available data and incorporate these into the planning process.

2 Per capita GDP (2011) in the area is low, compared to the EU average of €25,200 (Eurostat), at €5,211 in Montenegro and estimated at €2,175 in Shkoder County – among the lowest in Albania.

10. Outdated or inadequate infrastructure
Basic infrastructure such as road networks, sewage systems and waste disposal are outdated, badly maintained or absent. Maintenance of drainage channels and flood prevention structures in Albania and embankments in Montenegro is poor. Roads are in a poor condition and suffer from inadequate maintenance.

11. Lack of awareness
People in the region lack adequate education and awareness to support development towards sustainability.

12. Transboundary nature of the area
The Buna/Bojana area is a single natural system that extends across two countries. Transboundary coordination at the moment is *ad-hoc*, and aims to address flood-related issues.

13. EU accession
The last, and maybe the most important, driver is the accession process and eventual EU membership. The process drives considerable change as the countries seek to comply with EU environmental legislation and gain access to support for infrastructure, economic and other EU investment opportunities. Albania has been granted EU "Candidate" status and Montenegro is in the process of EU accession negotiations.

4.2 Pressures

These drivers combine to create the following pressures:

1. Unsustainable territorial/spatial development including:

a. Insufficiently regulated urban development
The area is characterized by recent rapid development, particularly along a narrow strip within 5 km of the coast, running along the coastline and highways. A construction boom, dating from the 1990s, was followed by increased informal (illegal) development. There is inefficient control and inadequate mechanisms for the sanctioning of illegal buildings. In addition, development is characterized by a lack of respect for natural and landscape values.

b. Over-allocation of land for building in Montenegro
In Montenegro, there is a considerable "over-supply" of land designated for building, with urban plans allocating sufficient land to accommodate a population several times the existing population. This situation often results in scattered development without adequate municipal services (due to over-excessive infrastructural costs).

c. Lack of territorial plans in Albania
Lack of planning for development and construction has resulted in "anarchy", with urbanization taking place spontaneously and with few restrictions.

2. Unsustainable solid waste management
Solid waste collection and disposal systems are inadequate, ranging from relatively organized in Montenegro to problematic in Albania. In Montenegro, waste from urban centres is deposited into a sanitary landfill. In Albania, illegal dumping of solid waste is common along roads, drainage and irrigation ditches. This practice could have an impact on river, groundwater and seawater quality. Unsustainable solid waste management in upstream areas also impacts the Buna/Bojana area.

3. Unsustainable wastewater management
Significant nitrite (N) and phosphorus (P) loads derive from wastewaters, in particular from municipalities in the Buna/Bojana area and Shkodra city. The input of Drin in terms of nutrients seems comparable or higher than that generated in the Buna/Bojana area, however additional research in this field is necessary. A potential source of nutrients for groundwater is infiltration from leaky septic systems.

4. Unsustainable agricultural practices
There is indication of unsustainable use of fertilizers and pesticides. There is also evidence of unsustainable use and disposal of material utilized in agricultural production, such as plastic in greenhouse-related cultivation. In addition, there are indications of over-pumping of water for irrigation. Based on expert assessment, agriculture ranks first among the pollution sources examined in the Buna/Bojana watershed in terms of total P loads. Water from small lakes and wetlands are used for irrigation on the Albanian side.

5. Stockbreeding
There are indications that a main source of total N in the Buna/Bojana watershed is free grazing/non-farmed stockbreeding, predominantly in the Albanian part.

6. Water flow regime in the Drin.
The hydrology of the Buna/Bojana is affected by the Drin's water flow regime, which is regulated by a cascade of dams operated in a manner to ensure maximum hydropower production.

7. Over-extraction of groundwater resources
There is no systematic monitoring of groundwater levels or extractions in the plan area. However, it is likely that some coastal aquifers (alluvial and karstic) are being overexploited, as indicated by anecdotal evidence from observations of abandoned wells. Furthermore, there is evidence of the presence of saline water in springs discharging from karstic aquifers (e.g. the Gac spring) and in groundwater extracted for irrigation in Ulcinj and Bar. As the geophysical structure of the Buna/Bojana River favours salinization phenomena, increased groundwater extraction may have severe adverse effects on coastal aquifers.

Furthermore, projections of future needs for irrigation and drinking water in the coastal zone indicate that groundwater resources will be increasingly exploited in coming years.

In addition, such development increases water use needs during summer months, which exert pressure on potable water sources (primarily groundwater) that are insufficient to meet these "peak" demands. In Albania, potable water is used for irrigation in some cases.

8. High sediment input
Increased sediment loads are entering the Buna/Bojana system through tributaries of the Drin, downstream from the dams, due to erosion caused by gravel extraction and loss of plant coverage.

9. Bad maintenance of flood/drainage infrastructure
Natural secondary channels of the Buna/Bojana River that once existed in the delta area have been blocked. As a result, peak flows now exceed the capacity of the main (existing) channel. Furthermore, drainage channels and flood prevention constructions on the Albanian side and embankments on the Montenegrin side are poorly maintained.

10. Unsustainable forests management
Illegal and abusive logging, extensive firewood collection and uncontrolled grazing, coupled with poor forest management in Albania, have resulted in the deterioration of forests. Alterations in land use also affect directly forests, while the natural forests along the seashore are threatened or already damaged by construction.

11. Unsustainable fisheries management
Inadequate enforcement and regulation has led to illegal fishing and the use of fishing practices that are destructive for ecosystems. Furthermore, these practices impede fish migrating routes in the Buna/Bojana River.

12. Unsustainable legal as well as illegal hunting
Unsustainable legal as well as illegal hunting is also an issue, the latter due mainly to low enforcement capacity. There are violations with regard to: (i) the protection status of certain areas (i.e. those with hunting bans such as the Ulcinj salina – a site of utmost importance for migrating species); (ii) species that are forbidden to hunt (e.g. rare and endangered breeding birds such as the oyster catcher during breeding season, the pygmy cormorant, the common redshank, the avocet, etc.); and (iii) hunting ban periods.[3]

4.3 Key statistics: the current state

In general, lack of capacity for monitoring has resulted in deficiencies in available data and information for virtually all policy areas. However, the following indicators provide an outline of the current state of the area:

- Significant areas are degraded with unplanned (in particular in Albania), informal (illegal), low quality (aesthetic and construction) development. In Albania, at least 60% of all buildings are illegal (80% in Velipoja). In Montenegro, 12.7% of all illegal buildings are located in Ulcinj.
- Urbanization is dispersed over arable land and land with high natural value.
- 7.5% of land within 1 km of the coastline of the Ulcinj coastal zone and 10% of the Albanian coastline zone has been developed.
- 12% of the coastline frontage is urbanized in Montenegro.
- Communal infrastructure is insufficient. Potable water distribution systems are insufficient to meet peak needs in summer and are at risk of contamination, sanitation infrastructure is problematic and solid waste infrastructure is insufficient. Transportation is insufficient and the road system is of poor quality and badly maintained.
- The natural sediment flow regime has been disturbed. There has been a 13-fold reduction in sediment loads, simultaneous with periodic high sediment inputs into the tributaries of the Drin, downstream from the cascade of dams and upstream of the Buna/Bojana area.
- The regime of coastal dynamics has altered with erosion in some parts of the Buna/Bojana delta and sand deposition in other areas. The coastline has receded along parts of the coast at the Buna/Bojana mouth by up to about 500 m since 1936 and by about 50 m over the last 20 years.
- There is also erosion of the land adjacent to the river.
- The natural water flow regime of the Buna/Bojana has been disturbed.
- The biological status of surface water bodies has been assessed as "poor" in all sampling stations for which data were available (according to analysis of samples from three sampling periods using bio-indicators), except for the Villuni Lagoon in Albania, which was assessed as "moderate".
- The physicochemical quality of the Buna/Bojana River, assessed in accordance with the WFD, ranges from good to moderate, but deteriorates from the river sources to its mouth, due to elevated ammonium, nitrite and BOD concentrations.
- The chemical status of the Buna/Bojana River, assessed in accordance with the WFD, is "moderate". There is heavy metal pollution (according to analysis of samples from three sampling periods, although the data series are insufficient to establish trends), with different elements above limits set by EU legislation in different sampling stations (see Chapter 10.5.4.3).
- There are elevated mercury concentrations in Lake Šasko in Montenegro. The mercury concentration is also above set limits in Viluni Lagoon.
- The overall status of the Buna/Bojana River, assessed in accordance with the WFD, is poor. The status of Lake Šasko and Viluni Lagoon is lower than moderate and moderate, respectively.
- Eutrophication is present in transitional and coastal waters within the plume.

3 Albania took an important step by instituting a complete ban on hunting from March 2014 to March 2016.

- The ecological status of the coastal zone waters, assessed in accordance with the WFD, is classified as "poor".

- There is a possible decrease in groundwater levels and corresponding deterioration in quality. There are limited data on groundwater pollution but some field investigations suggest that nitrate levels in groundwater in some areas far exceed that of the Buna/Bojana River.

- There is evidence of saltwater intrusion in coastal aquifers. Related data are limited due to the absence of regular and coordinated monitoring at national and transboundary levels.

- The landscape quality of the area is degraded. The ecological and aesthetic qualities of riverbanks are badly deteriorated, mainly due to heavy litter disposals along and in the river.

- There is degradation (fragmentation) of coastal habitats, primarily affecting the dunes at Velika Plaža and the Rrjolli area. There has also been serious deterioration (in 1994) of the Skadar Oak (Quercus robur scutariensis) forest in Štoj to the rear of the Velika Plaža.

- Smaller wetlands zones (in Albania) are shrinking.

- Loss of rare species is occurring in the halophyte vegetation belt.

- Decrease in bird populations is estimated at 10-20%. However, no monitoring programme exists to verify this figure. The suitability of the Buna/Bojana delta for breeding migrating birds has been impaired. The exact level of impact cannot be assessed since data are limited due to the absence of regular and coordinated monitoring at national and transboundary levels.

- Fish migration in the Buna/Bojana River is impeded.

- Fish catches have decreased over the past 25 years by 20-80% depending on the species (according to the Albanian fisheries association).

- Some local (agricultural) varieties and breeds are declining and disappearing.

- Flood risks are increasing. The frequency and intensity of floods have increased – two flood incidents recorded in 2010 were the most severe in the last 80 years. Floods are resulting in severe damage to households and agricultural land.

- Considerable progress has been made in drafting new legislation related to the management of natural resources, in accordance mainly with the EU *acquis communautaire*. Nevertheless, in some cases even new laws lack fundamental elements, such as definitions (in compliance with EC requirements), precise rights and obligations for legal and natural persons, setting of standards to be achieved, and thresholds to be complied with. Many new horizontal laws are framework laws. These require a number of specific and detailed subsidiary laws and regulations to make them applicable and enforceable in practice. Some steps regarding the preparation and adoption of secondary legislation have been made.

4.4 Impacts on the area

- There is general degradation of the landscape due to unplanned, dispersed and rapid development.

- The high cost of infrastructure provision due to dispersed, uncontrolled and rapid development (often along the coast and highways) has resulted in partial or even full absence of essential infrastructure services.

- Current solid waste management results in the visual pollution of riverbanks, drainage and irrigation ditches, beaches and the sea, as well as considerable pollution risks. Liquid waste management is leading to the pollution of both land/freshwater and marine environments. There are indications of reduced groundwater quality resulting in threats to human health. Reduced sanitary bathing quality has also been recorded in some areas.

- The natural capital and resources of the area have deteriorated. Ecosystems are degrading in the Buna/Bojana delta as well as in wetland zones resulting *inter alia* in the deterioration of ecosystem services. Significant biodiversity loss – concentrated in the coastal area – has occurred. For example, a considerable number of waterfowl species in the Buna/Bojana delta are threatened and are now included on the lists of endangered species at local, regional and international level. The number of fish species in the river has declined. There is also erosion of land adjacent to the river.

- There are indications of declining groundwater levels and seawater intrusion in the aquifers. Should this prove correct there are risks to agriculture associated with the use of groundwater for irrigation purposes.

- The economy and potential developments are affected. Some commercial species are no longer harvested. The loss of attractive natural areas threatens the potential for high-value tourism development and is therefore detrimental to the economic potential of the wider area.

- The deterioration of natural resources and the disturbance of natural processes have introduced a high level of uncertainty into local economic development planning. Examples include disturbed coastline dynamics that lead to erosion of parts of the coastal area and jeopardize infrastructure as well as tourism-related investments. In addition, intense urbanization often spreads across arable land leading to its overall reduction.

- Increased flooding risks due to anthropogenic pressures and the increased potential for extreme events due to climate change threaten infrastructure, property and human safety.

5. DEVELOPING THE PLAN: THE OBJECTIVES

The plan objectives set out below represent a key stage in integrating the IMF planning process to the Buna/Bojana context. While the preceding stages in the process identified a comprehensive set of issues, the interactions and overlaps between them are numerous and complex, as are the range of potential policy responses and measures.

The eight broad objectives presented here distill these issues into a single set of priorities that best meet the overall integrated vision of the plan. More specific objectives and measures can be derived from these objectives to respond to the multiple, overlapping issues identified during the process. The objectives acknowledge that no single sector or policy type can achieve the vision by itself.

5.1 Plan objectives

1. **Improve transboundary governance and cooperation.** Although the Buna/Bojana area is divided by a national frontier, the ecosystem functions largely as a single entity. As the analysis indicates, many of the challenges and issues can be better remediated through transboundary cooperation. Similarly, efforts to maximize opportunities, for example, the development of tourism, can benefit from such cooperation. The following specific objectives are envisaged to improve transboundary cooperation and governance:

   1.1 *Establish an appropriate mechanism to ensure that relevant issues of transboundary importance* (e.g. tourism based on cultural and natural heritage, sustainable use of natural resources, environment protection, climate change adaptation and mitigation, risk prevention and management) *are considered and acted upon bilaterally*. Establishment of the mechanism shall be based on a formal transboundary cooperation arrangement, negotiated and agreed between the two countries. The role of the coordination management mechanism shall be to:

   a. Coordinate cooperation in the transboundary area in the fields of sustainable development, environmental protection and water management;
   b. Facilitate collaboration with other initiatives and projects in the area;
   c. Identify important needs with the aim of improving the overall status of the transboundary area;
   d. Facilitate consultations among relevant authorities with a view to defining cross-border programmes and projects aimed at resolving commonly agreed problems;
   e. Coordinate implementation of the plan's objectives;
   f. Provide technical assistance to local and national stakeholders to improve capacities necessary for the improvement of transboundary cooperation and meeting plan objectives;
   g. Support the development and implementation of cross-border programmes and projects under all bilateral agreements of relevance for the transboundary area; and
   h. Improve visibility of the transboundary area and increase relevant stakeholder participation in all relevant national, regional and international forums and organizations.

   1.2 *Strengthen cooperation through joint actions for the management of the transboundary area*, in particularly through the increased use of appropriate EU (or other) funding programmes, such as the Instrument for Pre-accession Assistance (IPA II) 2014-2020 with the objective of contributing to economic development and reducing regional imbalance.

   1.3 *Raise awareness and improve communication of the natural and cultural values of the plan area, including potential threats and development opportunities.*

2. **Support policy changes at the national level.** Although the main focus of the plan is improvement of local (transboundary) natural values and development opportunities, many issues fall within the remit of national and local authorities, in particular spatial planning. Both countries are engaged in the EU candidacy and accession process, which creates opportunities for policy reform. Specific policy-related objectives of the plan include:

   2.1 *Change and/or improve national regulation(s) including better enforcement,* with priority accorded to sectors linked to water use and consumption, protected areas, coastal management, fisheries, hunting, waste management, sand extraction and similar.

   2.2 *Improve the spatial planning system.*

3. **Develop and make better use of the knowledge base for management of the transboundary area.** The lack of current and comparative data has proved an obstacle to identifying sustainable management options and monitoring the impacts of policy options. Specific objectives in this area include:

   3.1 *Establish an observation mechanism to assess and regularly update information on the built and natural environment.* The mechanism should take the form of two mutually cooperating separate national-level monitoring systems using commonly agreed parameters and techniques for the collection and analysis of information. An agreed (in terms of characteristics and volume) a minimum set of data should be defined according to international standards (e.g. WFD, Barcelona Convention, UNECE, EEA) and shared between the two countries.

   3.2 *Support the integration of scientific data into the (spatial) planning process.*

3.3 *Improve the human and technical capacities of local administrations to implement the plan.*

4. **Improve the ecological and chemical status of water bodies.** Water has already been described as the "bloodstream" of both nature and the economy, and the quality of groundwaters, rivers, streams and marine waters is of central importance to the future of the area. Specific objectives include:

   4.1 Improve the quality of inland surface and marine waters.

   4.2 Secure the availability of good quality water for all uses, including ecosystems and sustainable water use and consumption.

   4.3 Maintain the natural quality and hydrological conditions of small wetlands.

   4.4 Improve groundwater status in terms of quality and maintain the function of coastal aquifers to prevent or reverse salinization trends.

   4.5 Decrease eutrophication and improve the ecological quality of transitional and coastal waters.

5. **Protect and enhance the area's high biodiversity value.** The high biodiversity value of the area is unchallenged, but faces many challenges. Its protection and enhancement is a major national and international responsibility. Specific objectives include:

   5.1 Protect and enhance the biodiversity and natural values of the transboundary Buna/Bojana area.

   5.2 Improve the management of protected areas.

   5.3 Reduce and/or eliminate the impacts of hunting on biodiversity.

   5.4 Promote sustainable fisheries.

6. **Help raise the economic and social wellbeing of the area's communities**. The area has some of the lowest levels of economic wellbeing in Europe. Economic problems are compounded by poor infrastructure and environmental problems. Opportunities to improve both the economy and the wellbeing of the local population, either directly or through environmental improvements, should be central to the planning process. Economic activities that support protection of the natural environment should be encouraged, taking into consideration the natural values of the area. Specific objectives include:

   6.1 Support the greening of economic activities.

   6.2 Promote sustainable economic development of the plan area through tourism that respects the area's high natural values and valorizes its natural and cultural heritage – maximizing its economic value to local communities. Realizing this objective requires the implementation of objectives and related measures to improve sanitation, water quality, biodiversity, protection and waste management that influence tourism development. The area's ability to accommodate visitors to acceptable standards should be developed in parallel.

   6.3 Improve waste management in the area.

7. **Increase the plan area's resilience to climate change and natural disaster impacts.** The location, topography and outdated infrastructure of the Buna/Bojana area makes it particularly vulnerable to climate change impacts and natural disasters such as flooding. Specific objectives include the following:

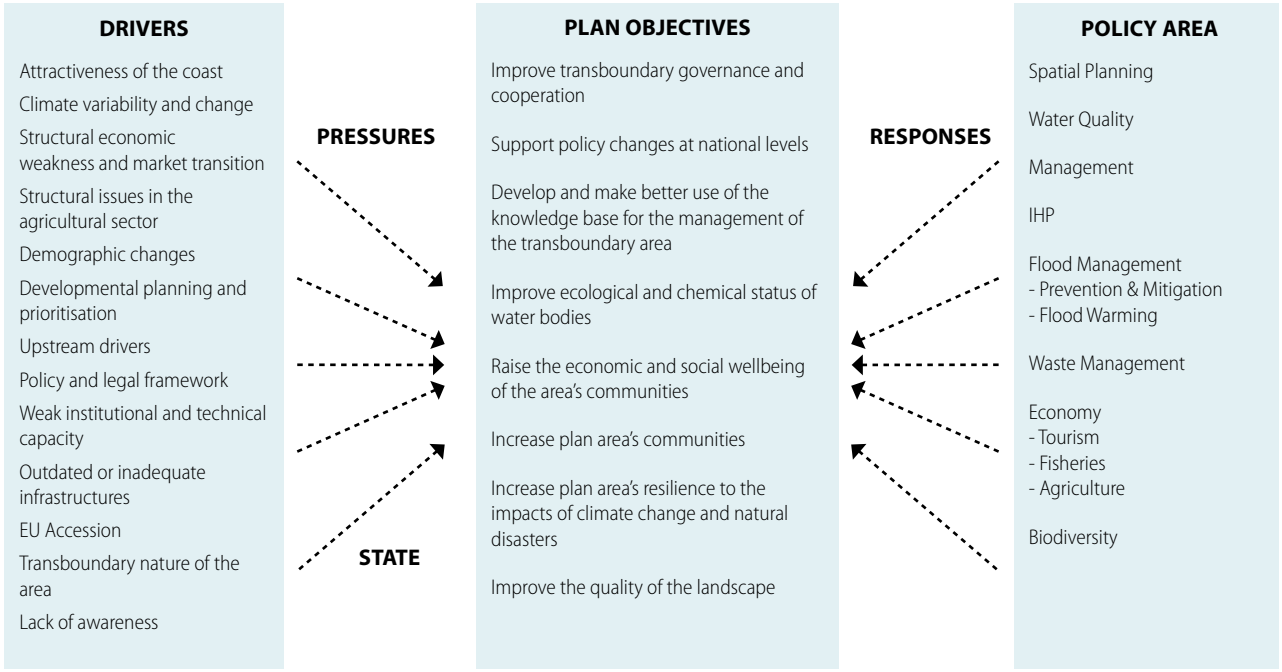
   7.1 Decrease flood risks.

   7.2 Protect the coastline from climate change impacts and natural hazards resulting from unsustainable development.

8. **Improve the quality of the landscape.** The area is renowned for its scenic beauty, which can be a resource for future economic development. However, lack of effective spatial planning, and poor waste management, undermine the possibilities this quality presents. Therefore systemic efforts to improve the landscape quality are needed, beyond the lifespan of this plan.

Figure 6 shows the integration of measures with drivers and various policy areas.

Figure 6: Integration of drivers with policy areas and corresponding objectives and measures for their achievement



6. REALIZING THE VISION

This is the critical phase where policy design shifts to facilitating change, and the plan deploys a combination of policy instruments, management processes and actions. The strengths of ICZM and IWRM lie in their flexibility, adaptability to local circumstances, and operability across a range of sectors and issues, with a representative governance structure. The IMF takes this flexibility a stage further by integrating the ICZM and IWRM approaches into a single set of measures.

6.1 The measures

Measures are the proposed actions derived from the objectives presented in Chapter 5. In most cases the proposed measures are designed in an integrated way to meet multiple objectives. Measures include performance indicators, so as to ensure constant feedback on implementation.

The measures are proposed for the period up to 2030 and implementation is envisaged at three main levels:

- Supranational: setting the joint management framework;
- National: support necessary policy changes to enable implementation of measures at the local level; and
- Local implementation.

The measures are presented in table form in the following pages.

OBJECTIVE	1.	IMPROVE TRANSBOUNDARY GOVERNANCE AND COOPERATION
SPECIFIC OBJECTIVE	1.1	Establish an appropriate mechanism to ensure that relevant issues of transboundary importance are considered and acted upon bilaterally
MEASURES BY 2030	1.1.1	Establish a commonly acceptable transboundary arrangement on cooperation in the fields of sustainable development, environmental protection and water management
	1.1.2	Put into force a transboundary coordination management mechanism for implementation of the transboundary arrangement on cooperation, including the objectives of the plan
SPECIFIC OBJECTIVE	1.2	Strengthen cooperation through joint actions for the management of the transboundary area
MEASURES BY 2030	1.2.1	Develop joint transboundary programmes and related projects based on the Buna/Bojana area management plan
SPECIFIC OBJECTIVE	1.3	Raise awareness and improve communication of the natural and cultural values of the plan area, including potential threats and development opportunities
MEASURES BY 2030	1.3.1	Develop common material on the natural and cultural heritage and development potential of the entire Buna/Bojana area
	1.3.2	Organize awareness-raising campaigns on the natural values and development potential of the area

OBJECTIVE	2.	SUPPORT POLICY CHANGES AT THE NATIONAL LEVEL
SPECIFIC OBJECTIVE	2.1	Change and/or improve regulation(s) including better enforcement
MEASURES BY 2030	2.1.1	Review national legislation of relevance to management of the Buna/Bojana area and identify areas for improvement, with priority accorded to the following fields/sectors: - water use and consumption - protected areas - fisheries - hunting - waste management - property rights (Albania) - extraction of gravel and sand from the riverbed
	2.1.2	Introduce a coastal setback zone along all coastal frontages through appropriate regulation (in Albania)
SPECIFIC OBJECTIVE	2.2	Improve the spatial planning system
MEASURES BY 2030	2.2.1	Define standards for the preparation of spatial planning documents and monitoring of their implementation
	2.2.2	Support the rehabilitation of illegally built areas with poor environmental and landscape quality
	2.2.3	Prevent future actions that may derogate the quality of built areas
	2.2.4	Support the introduction of land policy instruments to discourage unsustainable land conversion for real estate

OBJECTIVE	3.	DEVELOP AND MAKE BETTER USE OF THE KNOWLEDGE BASE FOR MANAGEMENT OF THE TRANSBOUNDARY AREA
SPECIFIC OBJECTIVE	3.1	Establish an observation mechanism to assess and regularly update information on the built and natural environment
MEASURES BY 2030	3.1.1	Improve and harmonize monitoring systems between the two countries related to: - Soil quality - Water, including surface and underground freshwaters - Marine waters - Air quality - Biodiversity and nature, including habitats and species of importance for the establishment of national Natura networks - Erosion processes and sediment transport, and - Natural hazards. - Incorporate climate change elements into all components of the monitoring system
	3.1.2	Put in place a harmonized observation system on land transformation
	3.1.3	Assess (using harmonized methodologies) the vulnerability of the area in relation to: - Aquifers (land-based pollution, sea water intrusion, porosity of rocks, soil composition, etc.) - Ecosystems (habitats), protected areas, etc. - Floods - Soils/fertility - Land stability - Forests - Climate change impacts
SPECIFIC OBJECTIVE	3.2	Support the integration of scientific data into the (spatial) planning process
MEASURES BY 2030	3.2.1	Promote the utilization of vulnerability assessments as a tool for optimization of land use
SPECIFIC OBJECTIVE	3.3	Improve the human and technical capacities of local administrations to implement the plan
MEASURES BY 2030	3.3.1	Organize capacity-building programmes for local officials and technical staff to enable achievement of the plan objectives
	3.3.2	Obtain the necessary equipment and infrastructure

OBJECTIVE	4.	IMPROVE THE ECOLOGICAL AND CHEMICAL STATUS OF WATER BODIES
SPECIFIC OBJECTIVE	4.1	Improve the quality of inland surface and marine waters
MEASURES BY 2030	4.1.1	Provide/improve sanitation infrastructure by constructing wastewater treatment systems in the plan area and Shkodra town
	4.1.2	Apply eco-remediation methods complementary to wastewater treatment plants (WWTPs) to improve water quality. These may include the following (the list is not exhaustive): constructed wetlands, restoration of riparian vegetation, bio-engineering methods, etc.
	4.1.3	Apply best agricultural practices
	4.1.4	Carry out environmental impact assessments on activities that may affect water quality
SPECIFIC OBJECTIVE	4.2	Secure the availability of good quality water for all uses, including ecosystems and sustainable water use and consumption
MEASURES BY 2030	4.2.1	Support policy changes towards rational and sustainable water use and consumption, primarily for irrigation
SPECIFIC OBJECTIVE	4.3	Maintain the natural quality and hydrological conditions of small wetlands
MEASURES BY 2030	4.3.1	Reduce water abstraction and consumption. Reduce water losses in distribution systems.
	4.3.2	Explore the usefulness and feasibility of usage of good quality non-conventional water for wetland restoration and recharge of aquifers, such as the use of floodwaters and grey waters
	4.3.3	Reduce heavy metal concentrations in Lake Šasko and Viluni Lagoon
SPECIFIC OBJECTIVE	4.4	Improve groundwater status in terms of quality and maintain the function of coastal aquifers to prevent or reverse salinization trends
MEASURES BY 2030	4.4.1	Designate and enforce groundwater sanitary protection zones
	4.4.2	Eliminate uncontrolled solid waste disposal and dumping, including measures related to objectives 4.2 and 4.3
SPECIFIC OBJECTIVE	4.5	Decrease eutrophication and improve the ecological quality of transitional and coastal waters
MEASURES BY 2030	4.5.1	Reduce nutrient loads entering the Buna/Bojana area from the Drin River
	4.5.2	Develop WWTP infrastructure for the plan area (see also above under other objectives)

OBJECTIVE	5.	PROTECT AND ENHANCE THE AREA'S HIGH BIODIVERSITY VALUE
SPECIFIC OBJECTIVE	5.1	Protect and enhance the biodiversity and natural values of the transboundary buna/bojana area
MEASURES BY 2030	5.1.1	Improve the status of biodiversity in ecologically sensitive areas (including protected areas)
	5.1.2	Assess and value ecosystem services in the area and ensure their proper integration into sectoral policies
	5.1.3	Assess the degree to which ecosystems are dependent on groundwater resources and enable a sustainable level of water extraction
SPECIFIC OBJECTIVE	5.2	Improve the management of protected areas
MEASURES BY 2030	5.2.1	Establish new protected areas in Montenegro, as identified in relevant spatial planning documents (including the preparation of relevant studies) and appoint management structures for new protected areas to provide an effective and functional management system
	5.2.2	Improve mechanisms and capacities for monitoring and control of biodiversity and nature
	5.2.3	Harmonize management objectives and measures across protected areas in the two countries
SPECIFIC OBJECTIVE	5.3	Reduce and/or eliminate the impacts of hunting on biodiversity
MEASURES BY 2030	5.3.1	Support actions related to the prevention of illegal hunting
	5.3.2	Promote birdwatching in the area as part of harmonized ecotourism schemes in both countries
	5.3.3	Restore riparian forests along the Buna River in Albania
SPECIFIC OBJECTIVE	5.4	Promote sustainable fisheries
MEASURES BY 2030	5.4.1	Improve fish stock monitoring and control
	5.4.2	Stop illegal fishing along the river on the Albanian side
	5.4.3	Introduce sustainable fishery practices
	5.4.4	Introduce tourism options for fishers during the period of species migration into the lake

OBJECTIVE	6.	HELP RAISE THE ECONOMIC AND SOCIAL WELLBEING OF THE AREA'S COMMUNITIES
SPECIFIC OBJECTIVE	6.1	Support the greening of economic activities
MEASURES BY 2030	6.1.1	Assess the potential for green businesses in the area
	6.1.2	Raise awareness of green business opportunities
	6.1.3	Launch and continually enforce the exchange of experience and knowledge transfer on greening schemes among local producers
SPECIFIC OBJECTIVE	6.2	Promote sustainable economic development of the plan area through tourism that respects the area's high natural values and valorizes its natural and cultural heritage – maximizing its economic value to local communities
MEASURES BY 2030	6.2.1	Recognize the Buna/Bojana as a single tourism destination, and promote it bilaterally under the 2014 bilateral agreement between the responsible ministries of the two countries in the field of tourism
	6.2.2	Develop the capacity of the area to become a sustainable tourist destination based on its natural and cultural assets
SPECIFIC OBJECTIVE	6.3	Improve waste management in the area
MEASURES BY 2030	6.3.1	Improve technical capacities for regular waste collection and management services on the Albanian side
	6.3.2	Remove derelict construction, dumped demolition waste and inert material

OBJECTIVE	7.	INCREASE THE PLAN AREA'S RESILIENCE TO CLIMATE CHANGE IMPACTS AND NATURAL DISASTERS
SPECIFIC OBJECTIVE	7.1	Decrease flood risks
MEASURES BY 2030	7.1.1	Establish a coordinated flood forecast and early warning system among countries
	7.1.2	Prepare a transboundary flood contingency management plan
	7.1.3	Maintain existing infrastructures including dykes, embankments and natural protective structures such as riparian and coastal forest
	7.1.4	Restore riparian vegetation and apply bioengineering methods to enhance appropriate retention and detention areas, such as heathlands
	7.1.5	Albania to review the operation of the dams as multifunctional systems (energy, irrigation, retention and detention of hydrological peaks) applying EU standards for e-flows
SPECIFIC OBJECTIVE	7.2	Protect the coastline from climate change impacts and natural hazards resulting from unsustainable development
MEASURES BY 2030	7.2.1	Determine zones for setback extension to improve adaptation to climate change impacts, especially sea level rise
	7.2.2	Reduce coastal erosion

OBJECTIVE	8.	IMPROVE THE QUALITY OF THE LANDSCAPE
MEASURES BY 2030	8.1	Map the landscape character of the area according to European Landscape Convention requirements
	8.2	Promote landscape improvement schemes and standards
	8.3	Improve electricity distribution networks

6.2 Formulating the priority activities

The plan includes short-term priority activities, with a provisional budget range and indicators for delivery. It contains a mix of infrastructure-based activities and "concrete" actions, as well as "soft" tasks such as changes to laws and procedures, regulations, pricing, institutional development, training, awareness raising and other "soft" interventions. The activities formulated with the plan do not represent an exhaustive list of all possible activities necessary as part of a related measure. They include only selected, priority activities whose implementation is possible in the short-term and that are key to overall implementation of selected measures. A number of measures for the five-year period are not envisaged as priorities (and are therefore not indicated), while some other activities are envisaged but are listed under other related measures. An initial budget range has been envisaged for each activity based on expert evaluations from Albania and Montenegro.

The starting point is to initiate the process to adopt the cooperation agreement and establish a coordination mechanism. National ministries for environment and water management should take the lead in this process, in collaboration with local authorities. Initial funding and technical support for this action could come from international organizations or existing international programmes and projects.

Based on the agreement, project proposals to ensure further funding (including national allocations) should be prepared, highlighting the plan priorities. A detailed programme of work, along with the institutions to be involved, should be elaborated as part of the project proposal preparation process.

Similarly, national ministries for environment and water management, as well as local authorities, should lead the process, with possible technical support provided by national and international organizations. However, upon approval of the projects, it is recommended that the coordination mechanism coordinate implementation of the activities, with the support of local and technical bodies.

The initial list of priority activities is provided in table form in the following pages.

MEASURE 1.1.1 ESTABLISH A COMMONLY ACCEPTABLE TRANSBOUNDARY ARRANGEMENT ON COOPERATION IN THE FIELDS OF SUSTAINABLE DEVELOPMENT, ENVIRONMENTAL PROTECTION AND WATER MANAGEMENT

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
1.1.1.1 Organize consultations for negotiating and agreeing a transboundary arrangement on cooperation (Agreement). The initial draft of the Agreement is presented in Annex 2. 1.1.1.2 At the final stage of consultations undertake necessary official steps to formally approve a bilateral arrangement on cooperation (Agrement) between the two countries.	3 500 – 8 000	Consultation meetings organized Transboundary arrangement on cooperation (Agreement) for the plan area is formally approved

MEASURE 1.1.2 PUT INTO FORCE A TRANSBOUNDARY COORDINATION MANAGEMENT MECHANISM FOR IMPLEMENTATION OF THE TRANSBOUNDARY ARRANGEMENT ON COOPERATION, INCLUDING THE OBJECTIVES OF THE PLAN

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
1.1.2.1 Organize a consultation process including local authorities in both countries to consist of the following steps: • Conduct a feasibility study to determine options for establishing a governance framework in the Buna/Bojana transboundary area (the plan area). The aim is to define and establish a coordination management mechanism taking into account the need to provide links or synergies with existing coordination mechanisms in both countries (e.g. the Skadar/Shkoder Commission; the ICZM coordination mechanism in Montenegro, etc.). • Prepare a detailed roadmap to establish the most appropriate transboundary coordination management mechanism. Envisage the involvement of local authorities in operation of the mechanism. • If appropriate, and agreed to by the countries, the feasibility study should consider a scenario to revitalize and extend the Skadar/Shkoder agreement between Albania and Montenegro to include the Buna/Bojana area, as well as to extend the mandate of the Skadar/Shkoder Commission to include the Buna/Bojana area, encompassing a wider set of transboundary cooperation priorities. Undertake necessary steps to launch the process to formally establish an operational and financially viable coordination mechanism.	46 500 – 110 000	Consultation meetings organized Coordination management mechanism is in place

MEASURE 1.2.1 DEVELOP JOINT TRANSBOUNDARY PROGRAMMES AND RELATED PROJECTS BASED ON THE BUNA/BOJANA AREA MANAGEMENT PLAN

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
1.2.1.1 Prepare and submit transboundary project proposals for the Buna/Bojana area for joint approval. 1.2.1.2 Provide technical support to the institutions that will undertake implementation of transboundary projects for the area. Ensure the necessary financial contributions of the countries are in place.	85 000 – 100 000	Transboundary project proposals developed

MEASURE 1.3.1 DEVELOP COMMON MATERIAL ON THE NATURAL AND CULTURAL HERITAGE AND DEVELOPMENT POTENTIAL OF THE ENTIRE BUNA/BOJANA AREA		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
1.3.1.1 Develop promotional material. Develop and maintain a shared website for the whole area. 1.3.1.2 Develop a communication strategy.	22 000 – 40 000	Promotion materials produced Communication strategy prepared

MEASURE 1.3.2 ORGANIZE AWARENESS-RAISING CAMPAIGNS ON THE NATURAL VALUES AND DEVELOPMENT POTENTIAL OF THE AREA		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
1.3.2.1 Prepare in both languages communication and awareness-raising material on the importance of the area and the coordination management mechanism (which may be established in the area). 1.3.2.2 Organize joint, local transboundary celebrations, building on existing celebrations such as Lake Skadar Day, Mediterranean Coast Day[4] celebrations, etc.	50 000 – 90 000	Number of people involved in the events Relevant campaigns/events organized

MEASURE 2.1.1 REVIEW NATIONAL LEGISLATION OF RELEVANCE TO MANAGEMENT OF THE BUNA/BOJANA AREA AND IDENTIFY AREAS FOR IMPROVEMENT		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.1.1.1 Undertake an analysis of national legislation and a related consultation process to identify gaps related to the implementation of plan objectives for the Buna/Bojana area, primarily in regard to the requirements of the ICZM Protocol and WFD. 2.1.1.2 Propose necessary changes in the legislation and, if possible, changes in the operation of enforcement mechanisms (especially inspection control).	20 000 – 50 000	Gaps in regulations and policies are identified and addressed Consultation process among relevant stakeholders on proposed changes to the regulations is held

MEASURE 2.1.2 INTRODUCE A COASTAL SETBACK ZONE ALONG ALL COASTAL FRONTAGES THROUGH APPROPRIATE REGULATION (IN ALBANIA)		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.1.2.1 Undertake setback assessment and provide a guidance document for Albania (a similar document for Montenegro already exists) 2.1.2.2 Propose necessary changes related to coastal setback in the legislation, and undertake necessary consulations with stakeholders. 2.1.2.3 If appropriate, propose necessary changes related to the determination of a no-construction zone in the relevant spatial plans.	20 000 – 50 000	Setback assessment prepared, with related proposals for Albania Consultation process realized

4 See www.coastday.org

MEASURE 2.2.1 DEFINE STANDARDS FOR THE PREPARATION OF SPATIAL PLANNING DOCUMENTS AND MONITORING OF THEIR IMPLEMENTATION		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.2.1.1 Prepare technical guidelines on the obligatory contents, criteria and procedures for preparing spatial plans particularly adapted to the specific conditions and needs of Albania and, where applicable, Montenegro. The guidelines should provide instructions on the use of vulnerability assessment as a tool for integrating nature and landscape values into spatial planning. The guidelines shall be tested through pilot application (see action 3.2.1.1) 2.2.1.2 Organize training for national (and local) authorities responsible for spatial planning regarding the implementation of guidelines and the utilization of information technologies in spatial planning processes.	30 000 – 45 000	Albanian and Montenegrin technical guidelines are prepared Training programmes are organized on a continual basis

MEASURE 2.2.2 SUPPORT THE REHABILITATION OF ILLEGALLY BUILT AREAS WITH POOR ENVIRONMENTAL AND LANDSCAPE QUALITY		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.2.2.1 Prepare guidelines for the rehabilitation of illegally built areas and areas with degraded landscape due to inappropriate building practices (taking into account action 2.2.1.1); include possible rehabilitation models. 2.2.2.2 Undertake at least one rehabilitation pilot project at a location within the planned construction areas (within the project zone).	50 000 – 120 000	Guidelines are prepared Pilot project implemented

MEASURE 2.2.3 PREVENT FUTURE ACTIONS THAT MAY DEROGATE THE QUALITY OF BUILT AREAS		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.2.3.1 Organize awareness-raising events to strengthen the involvement of civil society in the prevention of illegal building.	5 000 – 30 000	Number of awareness events organized

MEASURE 2.2.4 SUPPORT THE INTRODUCTION OF LAND POLICY INSTRUMENTS TO DISCOURAGE UNSUSTAINABLE LAND CONVERSIONS FOR REAL ESTATE		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
2.2.4.1 Analyse the utilization and efficiency of existing land policy instruments both in Albania and Montenegro. 2.2.4.2 Based on the results of the analysis, prepare proposals and technical guidelines for improvement of land policy. 2.2.4.3 Demonstrate at selected locations in the Buna/Bojana transboundary area the utilization of appropriate land policy instrument(s), in order to contribute to the sustainability of spatial planning systems in Albania and Montenegro.	40 000 – 100 000	Proposals for land policy instruments are prepared. Consultation process among relevant stakeholders is organized Utilization of land policy instruments for the purpose of national spatial planning systems is demonstrated

MEASURE 3.1.1 IMPROVE AND HARMONIZE MONITORING SYSTEMS

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.1.1.1 Prepare a water quality monitoring programme. Review existing monitoring systems and address present gaps.	75 000 – 500 000	Appropriate monitoring infrastructure and programmes are in place
3.1.1.2 Engage competent national institutions for chemical and biological analyses, and where appropriate, research institutions in inter-laboratory exercises using reference materials and standardized inter-calibration and monitoring methods.		Staff is trained Training courses are organized
3.1.1.3 In collaboration with competent and relevant national institutions, develop and implement experimental local indices and/or metrics for the classification of the ecological status of surface waters.		Local metrics for the classification of the ecological status of surface waters are in place
3.1.1.4 Update and harmonize detailed habitat maps.	40 000 – 50 000	Habitat map produced
3.1.1.5 Undertake baseline surveys (inventory) for forest area quality and type.		Inventory for forest area quality and type is in place

MEASURE 3.1.2 PUT IN PLACE A HARMONIZED OBSERVATION SYSTEM ON LAND TRANSFORMATION

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.1.2.1 Define responsibilities in coordination mechanism structures for management of spatial data of the area.	55 000 – 100 000	Land transformation observation system is in place, including a set of indicators
3.1.2.2 Agree on compatible GIS systems and protocols for the exchange of spatial data.		
3.1.2.3 Agree on the format and content of the priority GIS layers for land transformation monitoring. This should include, preferably: built areas; planned urbanization zones (urban areas, tourism areas and industrial zones); urbanized natural land (agricultural and forest) and land take.		
3.1.2.4 Undertake a baseline analysis of built areas, planned land uses and land take.		
3.1.2.5 Define and use a system of indicators for monitoring land transformation processes, including percentages of: built areas, areas planned for urbanization, built coastline, 1000-metre zones planned (for building), 1000-metre zones built, and natural areas (agricultural, forest and other) planned for building and built.		

MEASURE 3.1.3 ASSESS (USING HARMONIZED METHODOLOGIES) THE VULNERABILITY OF THE AREA

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.1.3.1 Based on data availability agree a common methodology for vulnerability assessment, including selection of the priority themes.	30 000 – 50 000	Vulnerability assessment is completed
3.1.3.2 Undertake a vulnerability assessment of the Buna/Bojana transboundary area.		

MEASURE 3.2.1 PROMOTE THE UTILIZATION OF VULNERABILITY ASSESSMENTS AS A TOOL FOR OPTIMIZATION OF LAND USE		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.2.1.1 Demonstrate the utilization of vulnerability assessment in at least one spatial planning document (adapt its results to the needs of the spatial plan). Preferably, this could be applied in the detailed territorial plan for the Buna Protected Area in Albania. 3.2.1.2 Raise awareness among spatial planners and local authorities of the benefits of using this tool. 3.2.1.3 Exchange experiences of using this tool in Montenegro as part of the preparation of the Coastal Area Spatial Plan.	30 000 – 50 000	Technical guidelines are prepared Utilization of vulnerability assessment is demonstrated in the selected spatial plan Trainings with spatial planers and local authorities are organized

MEASURE 3.3.1 ORGANIZE CAPACITY-BUILDING PROGRAMMES FOR LOCAL OFFICIALS AND TECHNICAL STAFF TO ENABLE ACHIEVEMENT OF THE PLAN OBJECTIVES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.3.1.1 Conduct a training needs analysis. 3.3.1.2 Based on the analysis, organize a series of trainings and workshops. Among others, organize trainings on: the use of GIS and other planning tools; spatial planning methodologies, processes and alike (see related action), and participatory planning.	30 000 – 50 000	Training needs are identified Training courses are organized

MEASURE 3.3.2 OBTAIN THE NECESSARY EQUIPMENT AND INFRASTRUCTURE		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
3.3.2.1 Ensure the availability of at least one high-capacity broadband node point in each commune/municipality. 3.3.2.2 Secure the necessary computer hardware. 3.3.2.3 Ensure the availability of a server based centrally or at the appropriate higher administrative level (see related actions).	55 000 – 100 000	Equipment is in place

MEASURE 4.1.1 PROVIDE/IMPROVE SANITATION INFRASTRUCTURE BY CONSTRUCTING WASTEWATER TREATMENT SYSTEMS IN THE PLAN AREA AND SHKODRA TOWN		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
4.1.1.1 Undertake necessary activities for the construction of priority wastewater treatment systems for major point pollution sources such as Shkodra town. Undertake an EIA.	200 000 – 400 000	Agreed priorities for introduction of WWTS Documents prepared for their installation Funds allocated for their implementation EIA undertaken Improvement (annual) in the ecological and chemical status parameters at each water body

MEASURE 4.1.2 APPLY ECO-REMEDIATION METHODS COMPLEMENTARY TO WASTEWATER TREATMENT PLANTS (WWTPS) TO IMPROVE WATER QUALITY

MEASURE 4.1.3 APPLY BEST AGRICULTURAL PRACTICES	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
4.1.2.1 Provide funding support and advice to farmers to apply eco-remediation methods to address diffuse pollution. 4.1.3.1 Work with farmers (capacity building), among others, on: use of compost from household waste as fertilizer; application of eco-remediation measures; sustainable and eco agricultural practices; understanding services obtainable from the authorities, etc. 4.1.3.2 Improve management of stockbreeding waste, etc.	100 000 – 150 000	Workshops organized Funds allocated for farmers' sustainable practices Concentrations of pollutants are below statutory (mandatory) levels.

MEASURE 4.2.1 SUPPORT POLICY CHANGES TOWARDS RATIONAL AND SUSTAINABLE WATER USE AND CONSUMPTION, PRIMARILY FOR IRRIGATION

MEASURE 4.3.1 REDUCE WATER ABSTRACTION AND CONSUMPTION. REDUCE WATER LOSSES IN DISTRIBUTION SYSTEMS		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
4.3.1.1 Establish a cadastre of water use. 4.3.1.2 Establish a water consumption monitoring system for surface water and groundwater. Install water-metering systems for consumption and abstraction. 4.3.1.3 Analyse current and expected water use and consumption needs in both countries in the Buna/Bojana area, with a focus on irrigation needs. 4.3.1.4 Identify unsustainable water consumption practices and propose intervention measures. Where necessary, propose relevant changes in national legislation and relevant policies. 4.3.1.5 Promote irrigation-saving measures such as the restructuring of agricultural products and dripping irrigation systems.	200 000 – 250 000	Cadastre of water use and monitoring of consumption is in place Water consumption analysis is done, and unsustainable practises are identified Relevant national legislation and policy changes are initiated Consultation process of relevant stakeholders with regard to proposed policy and legislative changes is organized

MEASURE 4.3.3 REDUCE HEAVY METAL CONCENTRATIONS IN LAKE ŠASKO AND VILUNI LAGOON		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
4.3.3.1 Conduct a survey to track heavy metal pathways entering Lake Šasko and Viluni Lagoon.	50 000 – 100 000	Survey undertaken Water quality in Šasko Lake is improved

MEASURE 4.4.1 DESIGNATE AND ENFORCE GROUNDWATER SANITARY PROTECTION ZONES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
4.4.1.1 Conduct an aquifers vulnerability assessment. 4.4.1.2 Define areas for the establishment of sanitary protection zones, and integrate them into the relevant legal documents.	20 000 – 40 000	Vulnerability assessment undertaken All sanitary zones included into spatial plans and other relevant legal documents

MEASURE 5.1.1 IMPROVE THE STATUS OF BIODIVERSITY IN ECOLOGICALLY SENSITIVE AREAS (INCLUDING PROTECTED AREAS)		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.1.1.1 Assess the status, zoning, category of protection and borders of existing protected areas, and revise as appropriate. 5.1.1.2 Analyse the status of habitats and species in the area, and propose protection measures for ecologically sensitive habitats and species. 5.1.1.3 Define and undertake actions aimed at improving the inter-connectivity (e.g. through corridors) of protected areas and other ecologically sensitive sites (EMERALD, IPA, IBA, Natura 2000) and valuable landscapes.	50 000 – 90 000	Status of protected areas assessed Indicator species selected Population of indicator species is increasing

MEASURE 5.1.2 ASSESS AND VALUE ECOSYSTEM SERVICES IN THE AREA AND ENSURE THEIR PROPER INTEGRATION INTO SECTORAL POLICIES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.1.2.1 Conduct a study for the valuation and valorization of ecosystem services. The study should include proposals for the use of findings for the improved management of the area. 5.1.2.2 Pilot a management scheme proposed through the study in one of the countries or both countries.	50 000 – 100 000	Ecosystem services are valued and the findings of the study are used to pilot a management scheme

MEASURE 5.2.1	ESTABLISH NEW PROTECTED AREAS IN MONTENEGRO, AS IDENTIFIED IN RELEVANT SPATIAL PLANNING DOCUMENTS (INCLUDING THE PREPARATION OF RELEVANT STUDIES) AND APPOINT MANAGEMENT STRUCTURES FOR NEW PROTECTED AREAS TO PROVIDE AN EFFECTIVE AND FUNCTIONAL MANAGEMENT SYSTEM		
PRIORITY ACTIVITES 2020		PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.2.1.1	Initiate the necessary steps for the establishment of a protected area in Solana Ulcinj (Montenegro). Maintain the operation of the Solana area as it provides important ecological services as a feeding and reproducing ground for migratory birds.	20 000 – 30 000	All relevant studies, background and policy documents necessary for the establishment of protected areas are prepared
5.2.1.2	Support the establishment of a Saško Lake protected area.		

MEASURE 5.2.2	IMPROVE MECHANISMS AND CAPACITIES FOR MONITORING AND CONTROL OF BIODIVERSITY AND NATURE		
PRIORITY ACTIVITES 2020		PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.2.2.1	Prepare management plans and annual operational plans for protected areas in Montenegro.	20 000 – 50 000	Management plans for protected areas in the Montenegrin part of the plan area are prepared A background study on payment fee options is prepared A payment fee in Velipoja is introduced Number of regular rangers and trained guides is increased Training programmes and transfer of knowledge and best practices are maintained on a continuous basis
5.2.2.2	Introduce an entry payment fee for visitors in the Velipoja protected area to assist with maintenance costs and build other environmental protection measures on a trust fund model.	20 000 – 30 000	
5.2.2.3	Increase the human and technical capacities of existing rangers/guards and environmental inspectors, in particular in protected areas.	10 000 – 30 000	

MEASURE 5.2.3	HARMONIZE MANAGEMENT OBJECTIVES AND MEASURES ACROSS PROTECTED AREAS IN THE TWO COUNTRIES		
PRIORITY ACTIVITES 2020		PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.2.3.1	Prepare a feasibility study on the harmonization of protection status for the respective areas across the border, including the designation of a transboundary protected area (e.g. Regional Park).	30 000 – 40 000	Feasibility study prepared

MEASURE 5.3.1	SUPPORT ACTIONS RELATED TO THE PREVENTION OF ILLEGAL HUNTING		
PRIORITY ACTIVITES 2020		PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.3.1.1	Undertake an analysis of existing hunting practices and regulations with the aim of identifying irregularities and sustainable trends. If necessary, propose relevant changes in national legislation and relevant policies (see measure 2.1.1).		Unsustainable hunting practices are identified Relevant national legislation and policy changes are initiated

MEASURE 5.3.2 PROMOTE BIRDWATCHING IN THE AREA AS PART OF HARMONIZED ECOTOURISM SCHEMES IN BOTH COUNTRIES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.3.2.1 Develop a birdwatching programme to include sites in both countries and a joint team of guides. 5.3.2.2 Ensure transfer of best-available practices in the field of birdwatching through capacity-building events and study visits to foreign sites with relevant experience on the subject.	30 000 – 80 000	Birdwatching programmes prepared Number of visits of birdwatchers is increased Capacity-building programmes organized

MEASURE 5.4.1 IMPROVE FISH STOCK MONITORING AND CONTROL

MEASURE 5.4.2 STOP ILLEGAL FISHING ALONG THE RIVER ON THE ALBANIAN SIDE

MEASURE 5.4.3 INTRODUCE SUSTAINABLE FISHERY PRACTICES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.4.1.1 Assess the feasibility of establishing first lending and first sale places in each country to enable better inspection of fish harvesting in Lake Shkoder/Skadar, covering also the Buna/Bojana area. 5.4.3.1 Determine and establish a common approach to river fish catch monitoring. Based on the results, explore the need and possibility of applying spatial and temporal restrictions to the fishing of specific fish species.	30 000 – 90 000	Feasibility study prepared Fishing monitoring system established Commercial fish stocks have increased

MEASURE 5.4.4 INTRODUCE TOURISM OPTION FOR FISHERS DURING THE PERIOD OF SPECIES MIGRATION INTO THE LAKE		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
5.4.4.1 Promote and support sport-fishing practices and schemes with the participation of local fishers as tourist guides.	5 000 – 20 000	Analysis prepared to determine legal options for fishers to participate in tourism activities Fishers are allowed to provide tourism services

MEASURE 6.1.1 ASSESS THE POTENTIAL FOR GREEN BUSINESSES IN THE AREA		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
6.1.1.1 Undertake a feasibility study on the state and potential for development of green businesses in the area.	20 000 – 35 000	Feasibility study prepared

MEASURE 6.1.2 RAISE AWARENESS OF GREEN BUSINESS OPPORTUNITIES		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
6.1.2.1 Organize promotional activities for local entrepreneurs and authorities on the benefits of green development.	6 000 – 20 000	Number of awareness raising events organized

MEASURE 6.1.3 LAUNCH AND CONTINUALLY ENFORCE THE EXCHANGE OF EXPERIENCE AND KNOWLEDGE TRANSFER ON GREENING SCHEMES AMONG LOCAL PRODUCERS		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
6.1.3.1 Organize capacity-building training for local entrepreneurs on available funding schemes for green businesses.	7 000 – 10 000	Number of trainings organized Number of local entrepreneurs participating in training Number of local entrepreneurs applied (received) green business funding
6.1.3.2 Organize pilot demonstration with a selected number of local entrepreneurs to increase the quality of local products through greening of activities	50 000 – 100 000	Pilot project implemented

MEASURE 6.2.1 RECOGNIZE THE BUNA/BOJANA AS A SINGLE TOURISM DESTINATION THROUGH TOURISM THAT RESPECTS THE AREA'S HIGH NATURAL VALUES, AND VALORIZES ITS NATURAL AND CULTURAL HERITAGE – MAXIMIZING ITS ECONOMIC VALUE TO THE LOCAL COMMUNITIES

MEASURE 6.2.2 DEVELOP THE CAPACITY OF THE AREA TO BECOME A SUSTAINABLE TOURIST DESTINATION BASED ON ITS NATURAL AND CULTURAL ASSETS		
PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
6.2.1.1 Prepare project proposal(s) under the IPA Cross-Border Programme Albania – Montenegro; see action 1.2.1.1 Projects should include (some of) the following: • Define the local "tourist product" and its characteristics: it should provide "added value" to the tourist, be of "local character" and be based on the sustainable use of resources. Among others (e.g. hiking, biking, sport fishing, bird watching, etc.), it could include agro-tourism and farm-based ecotourism activities. • Identify and engage key local stakeholders including community leaders, businesses and organizations in developing the sustainable tourism strategy for the area. • Identify, provide and improve small-scale infrastructure in terms of access to natural values/ecosystem services, such as visitor centres, footpath/cycle-ways and parking, and information required on key natural sites and beaches to accommodate tourists. • Build relationships across the wider tourism industry, in particular with major tour operators in the both countries, and lobby to become part of the national tourist offer targeting markets through national schemes. • Implement incentives, advice and training schemes at community level to upgrade establishments and private properties to current standards, especially with regard to tourist accommodation and retail facilities. • Implement appropriate incentives for the development of outdoor recreation activities, including water sports, walking, cycling, recreational fishing and others. • Prepare and advertise a "local cuisine offer" for visitors. • Design and implement a "buy local" campaign for local food/artisan/cultural produce. • Organize trainings for rangers/guards to appropriately guide visitors. • Encourage visitors to choose environmentally sustainable options.		Project proposal prepared and submitted for adoption

MEASURE 7.1.1 ESTABLISH A COORDINATED FLOOD FORECAST AND EARLY WARNING SYSTEM AMONG COUNTRIES

Priority actions already undertaken as part of the GIZ-supported project "Climate change adaptation in the Western Balkans" (www.giz.de/en/worldwide/29000.html)

MEASURE 7.2.1 DETERMINE ZONES FOR SETBACK EXTENSION TO IMPROVE ADAPTATION TO CLIMATE CHANGE IMPACTS, ESPECIALLY SEA LEVEL RISE

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
7.2.1.1 Conduct a vulnerability assessment on climate change impacts, including modelling of sea level rise. Based on the results of the vulnerability assessment propose setback extension and appropriate measures to improve adaptation for the population, coastal infrastructure and nature to climate change impacts.	20 000 – 30 000	Climate change vulnerability assessment undertaken Extended setback in vulnerable areas introduced

MEASURE 7.2.2 REDUCE COASTAL EROSION

PRIORITY ACTIVITES 2020	PROVISIONAL BUDGET (USD)	PROCESS INDICATORS
7.2.2.1 Conduct a sediment transport and coastal dynamics study.	60 000 – 80 000	Sediment transport and coastal dynamics study in place
7.2.2.2 Prepare beach management plans aimed at the restoration of eroded areas, enhancing natural retention and accretion of sand dunes.		Beach management plan in place
7.2.2.3 Monitor sediment loads.		Link with actions under measure 3.1.1

PART B.

BACKGROUND INFORMATION: THE TRANSBOUNDARY AREA IN DETAIL

7. THE TRANSBOUNDARY PLANNING ZONE

The limits of the transboundary planning zone have been defined to appropriately address issues affecting the coastal zone, river basin and aquifer management, using criteria described in Chapter 1.3.

The terrestrial part of the transboundary coastal zone includes the Buna/Bojana sub-basin, underlying coastal aquifers and the coastal zone, with an approximate surface area of 500 km^2. Definition of this area is based on administrative boundaries and the boundaries of the watershed. Determination of the marine area within the plan is based on the direct effect of outflow from the Buna/Bojana River, approximated through the use of maximum sea surface salinity isolines with an average threshold of 35 PSU (Figure 7; see Chapter 9.4).

Understanding the different components of this system and the interactions between them is central for their sustainable management.

The Buna/Bojana River is the outflow of Lake Shkoder/Skadar and receives the waters of the Drin Basin[5] Its catchment, with a total area of 20,585 km^2, comprises the catchments of Lakes Prespa, Ohrid and Drin River to the south, the White Drin River to the east, and Lake Shkoder/Skadar to the north and north-east (Figure 8). The hydrological regime of the Drin has been significantly altered by the construction of a cascade of dams. During high-water periods and favourable winds, Drin water enters Lake Shkoder/Skadar, often resulting into floods. In addition, economic activities and natural processes (e.g. currents) in coastal waters enable interactions with marine areas to the north, south and west of the main area of focus.

In this regard, it is evident that the plan area is affected by natural and anthropogenic processes and managing regimes occurring in a geographical zone well beyond its boundaries. The plan also considers the effects of processes beyond its boundaries as inputs to the Buna/Bojana system.

Sustainable management of the Buna/Bojana area, over the medium to long term, is therefore only possible through a coordinated and integrated scheme implemented across the Drin Basin and the adjacent marine area.

7.1 Physical characteristics

The Buna/Bojana River is short, stretching only 44 km, with a mean annual discharge of about 20 km^3/year, of which approximately 50% originates from Lake Shkoder/Skadar. Combined with the flow of the Drin River, this discharge constitutes over half of Albania's total river runoff. The hydrological and ecological character, aquatic quality and sediment regime of the Buna/Bojana River represent a continuation of the Drin River and Lake Shkoder/Skadar. The Buna/Bojana (sub) basin covers 508 km^2 with an average altitude of 105.5 m (and a maximum altitude of 909 m).

Box 2: Lake Shkoder/Skadar

Lake Shkoder/Skadar (basin area: 5,180 km^2) is the largest lake in terms of area in the Balkans, and is shared between Albania and Montenegro. It receives the majority of its waters from the 99 km-long Moraca River – which accounts for about 62% of its inflow (Bushati, Neziri and Hysko, 2010) – small streams and karstic inflows, and it drains into the Buna/Bojana River. The lake surface varies from 372 to 542 km^2 and the maximum depth exceeds more than five times the mean (8 m). The flora and fauna biodiversity of the lake is protected under the RAMSAR Convention and includes 80 species of aquatic higher plants, some of which are endemic or endangered.

The lake harbours about 49 species of fish, including six species of trout. About 20% of fish species from Lake Shkoder/Skadar migrate towards the sea.

The lake is threatened by inflows from the industrially polluted Morača River and the municipal liquid and solid wastes of the capital of Montenegro.

The Buna/Bojana starts as the southern outflow of Lake Shkoder/Skadar (see Box 2) situated close to the city of Shkodra (less than 3 km downstream from the old Skadar fort). From this source the river meanders in a south-westerly direction to the Adriatic (a direct distance of only 25 km), dividing into channels to form a marshy delta and the island of Ada Bojana where it enters the sea. The presence of beaches to the south of the delta has encouraged the development of the Albanian resort of Velipoje.

The average width of the Buna/Bojana is 200 m and its depth varies from 2 m to 4 m. The river, below its mid-portion, forms the natural border between Albania and Montenegro.

The Buna/Bojana River is navigable by small vessels, which can sail through its mouth. At lower water levels navigation can be carried out as far as the village of Bori on the border between Montenegro and Albania, while at higher water levels the river may be navigable up to the lake.

The river basin is composed of limestone, sandstone, shales and recent deposits. The Buna/Bojana riverbed curves and meanders over long distances through three limestone cliffs. The first occurs at Shkoder in the Taraboš–Rosaf reef in the main structure of Rumija, the second at Fraskanjel in the ridge of Šas Hill, and the third at Rečka Gora. With these exceptions, the bed of the Buna/Bojana River cuts through alluvial, mainly loamy, deposits.

Sections from the mouth of the Drin to Obotia are characterized by sporadic crumbling riverbanks, composed of gravel-sandy material. The sections most vulnerable to erosion stretch from Lisna Bore and Paratuk Mahala, downstream of Rec. The banks are more stable at locations where the bed slopes are covered by vegetation, especially willow.

5 The Drin Basin is described in Part C "Water Resources Management: Situation Analysis".

The immediate banks of the Buna/Bojana River are high in relation to the surrounding area. In fact, the banks are raised above ground level by up to 2 m along almost the entire flow of the river as a flood protection measure, with the exception of the sections that cut through limestone cliffs.

The Buna/Bojana delta region comprises a recently developed small delta, several different lagoon complexes and freshwater lakes, as well as typical riverine and coastal landscapes. The growth of the delta by 1 km to 1.5 km over the last 100 years is relatively slow compared to other Mediterranean deltas such as the Rhone and Po (about 4 km in 100 years). The deltaic landscape, in particular the lagoon and the coastline, has been formed by high flood events linked to the river and the sea.

Ada Bojana (Montenegro) is an island located in the delta, which was formed after a major storm in the mid-nineteenth century. The ship *Merito* became stranded between two small islands, leading to deposits of river sediment which adhered to her sunken hull and the islands. The long-term deposition of sediment and uplift of the sandbar led to the formation of a triangular island, with two narrow branches of the Buna/Bojana River separating Ada Bojana from the mainland. The left branch forms the border between the two countries.

The Buna/Bojana River is an important source of sediment that defines coastal morphology in the transboundary zone and contributes to the creation of beaches in the river delta. The total length of beaches in the delta area reaches 20 km. In addition to Ada Bojana (2.9 km), the most important beaches are Velika Plaža (Montenegro), which is approximately 13 km long and 100 m (average) wide, and Velipoja beach (Albania), which is 4 km in length.

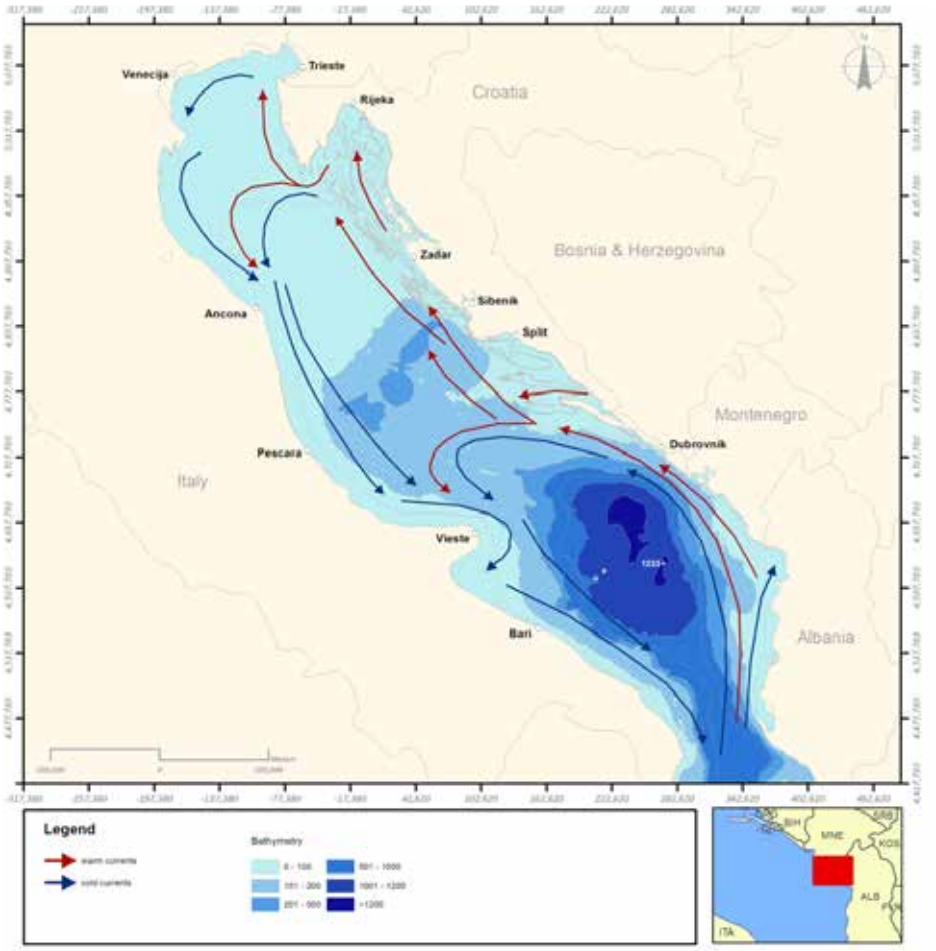
Figure 8: The extended Drin river basin including the Lake Skadar basin

Source: adapted from the Drin River Basin map.

Figure 7: Transboundary zone: sub-basin, aquifer and marine zone

Figure 9: Physical characteristics of the area

Figure 10: Adriatic bathymetry with currents



Source: adapted from http://proleksis.lzmk.hr/28692/

The marine zone in front of the Buna/Bojana delta is characterized by a generally extended continental shelf that reaches its maximum extension at about 60-80 km from the coastline. Although outside the plan area, the furthest of these (80 km) is also the deepest point in the Adriatic, at 1,223 m (Figure 10).

There are no precise datasets on tidal regimes in the area. However, application of modelling simulations[6] indicates that the difference between mean high waters and mean low waters (within a year) at the Buna/Bojana River mouth is approximately 30 cm, while the amplitude between the highest and lowest waters is approximately 50 cm. The amplitudes of the most energetic tidal constituents are estimated to reach above 10 cm (Pinardi et al., 2012).

Similarly, there are few available observed data on wind waves in the area. However, based on some specific studies and projects,[7] it is clear that the majority of waves come from the south-west, and that the average significant wave height is 2 m with highest values of 4m (Pinardi et al., 2012).

The interactions of river flow and sediment transport, currents, tides and wave activity constitute the morphology of the riverbed and determine the intrusion of saline water upstream. In the marine part of the river delta, underwater thresholds of sediment layers are created and cut through by freshwater flows. During the summer low-water level period – at a water flow of 100 m^3/s – a lake may form upstream of the threshold in the riverbanks.

As the bottom slope of the Buna/Bojana riverbed is quite flat, under conditions of high tide, seawater may intrude into the river and reach Reč, or even further upstream. The impact of this intrusion may be observed during dry periods when the flow of freshwater is reduced.

6 The Adriatic Forecasting System (AFS) numerical model for the year 2003; see the Adricosm-Star project.

7 Adricosm-Star project.

8. SOCIAL AND ECONOMIC CHARACTERISTICS

KEY HIGHLIGHTS

- Superficially, demographic data show contrasting trends in the two countries – namely, a decline in Montenegro compared to growth in Albania. However, Albanian voter registration-based statistics may disguise a trend of outward migration following national trends of migration to urban areas or overseas.
- Population density is significantly higher in the plan area than the average for each of the partner countries, reflecting a general pattern of decline in inland rural areas. Unless there is a significant change in economic and educational opportunities these trends are unlikely to reverse.
- Key political and economic-related parameters affecting the area include the EU accession process and the transition to a market economy.
- Procedures and scales of data collection and processing differ in some cases for the two countries, rendering direct comparison of data difficult.
- Per capita GDP (2011) in the area is low, compared to the EU average of €25,200 (Eurostat), at €5,211 in Montenegro and estimated at €2,175 in Shkoder County – among the lowest in Albania.
- Agriculture dominates the economy in the Albanian part of plan area. The area is rich in fertile soil and has a very high productive potential.
- In Montenegro, the plan area is extremely favourable for agricultural development, but its contribution to overall GDP is low.
- Tourism constitutes an important economic activity in the area. In Albania, tourist activities have developed only in Velipoja, with an estimated 20,000 overnight visitors and an additional 50,000 day visitors per year. In Ulcinj, 878,305 overnight visitors and 120,548 day tourists were recorded in 2011 (representing a twofold increase on 2001).

Data on socio-economic issues in this section are sourced from the two national jurisdictions of Montenegro and Albania. The range (categories) of demographic data collected in the two countries is broadly compatible. However, the local statistical units – generally based on local administrative areas – vary considerably in scale. Data have been aggregated or disaggregated to the plan area where possible.

8.1 Population distribution

Data are shown according to the respective administrative structures, as presented in Figure 11.

Albania has a four-tier administrative system including: national government, counties (Albanian: *qark or prefekturë*), districts (*rreth*), municipalities and communes (*bashki and komunë*). Municipalities and communes constitute the first level of local government, and are responsible for local needs and law enforcement (Ligj, Nr. 8652, 2000). However, as of 2015 communes no longer have administrative power, and are instead integrated within municipalities as the lowest level of government in the national organizational structure.

The plan area in Albania falls under the County of Shkodra (*Shkodër*) as well as the District of Shkodra. The landward part of the plan area in Albania includes the territory of four communes: the Commune of **Ana e Malit,** the Commune of Bërdice, the Commune of **Dajç** and the Commune of **Velipojë** with their respective villages within Shkodra District. In addition, the area includes a small part of the Bushat, Balldreni i Ri and Rrethine Communes; however, these were not included in the assessment as their territory belongs largely to another watershed.

Montenegro's administrative system has only two main levels: national and municipalities (Montenegrin: *opštine*). In addition, each municipality has a number of settlements (*naselja*) that also constitute statistical reference units (Figure 12).

The landward part of the plan area in Montenegro primarily includes the territory within the administrative boundary of the Municipality of **Ulcinj**, and some settlements of the Bar municipality.

The plan area had a total population of over 53,000 in 2011 with an average density of 107 people per km^2 (Figure 13).

The plan area population in **Albania** is **32,382** (SRC, 2011),[8] and the territory accounts for **61%** of the plan area. The average density of inhabitants is 153 inhabitants/km^2 (higher than the Albanian average of 98.5/km^2) (INSTAT, 2012).

The plan area population in **Montenegro** is **20,575**, and the territory accounts for 39% of the plan area. The average population density is 72 inhabitants/km^2 (significantly higher than Montenegrin average of 44.9 habitants/km^2) (MONSTAT, 2011a).

On the Albanian side, four communes from part of the plan area with three more partially included. On the Montenegrin side, the municipality of Ulcinj forms part of the plan area, in addition to three more settlements from the municipality of Bar (Table 2).

8 It should be noted that different official sources use different data. For example, official INSTAT data for 2011 show a difference of 94 people. Shkodra Regional County data for 2012 show an increase of 461 people (in Berdice and Dajc communes). For the purpose of this plan, mainly data from Shkodra Regional County were used.

Figure 11: The administrative boundaries of the plan area

Figure 12: The administrative boundaries with settlements in Montenegro

Figure 13: Population density in the plan area

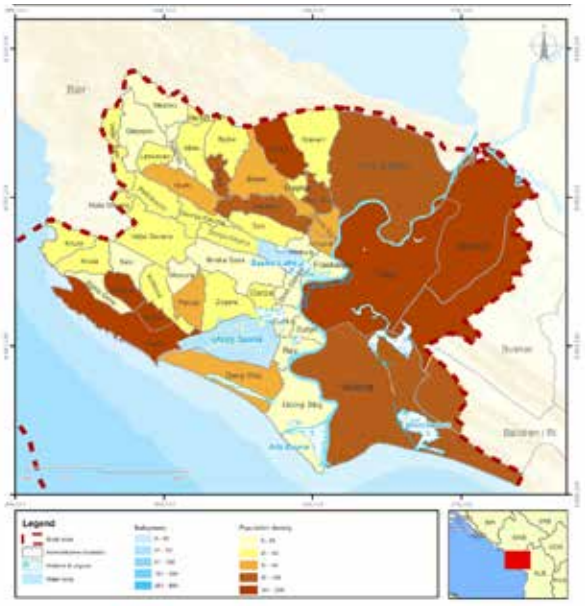


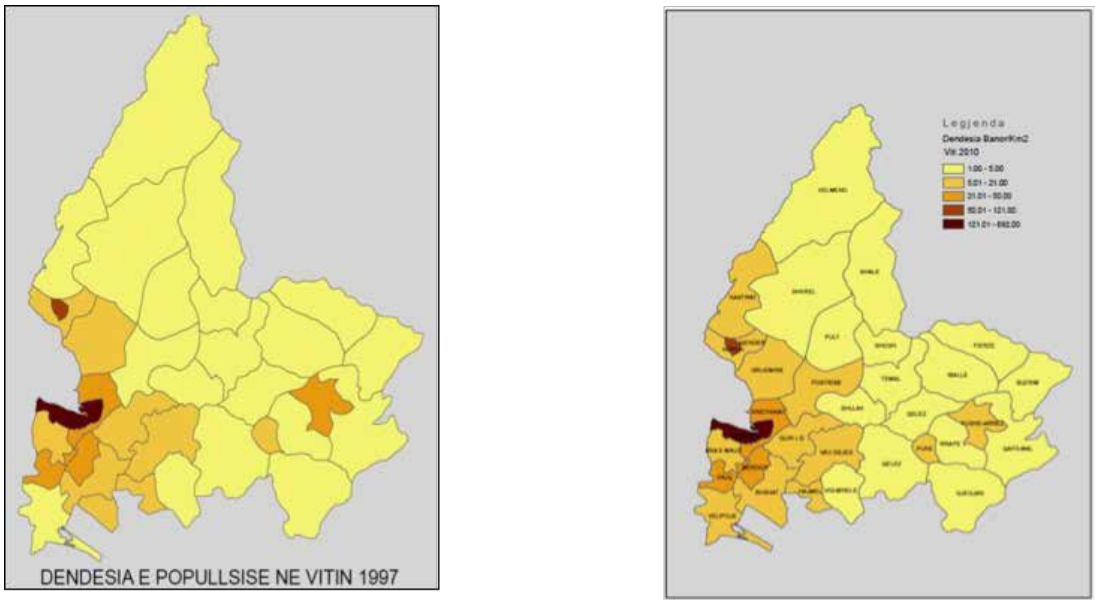
Figure 14: Increase/decrease of population in the plan area

Table 2: Municipality/commune coverage and population in the extended plan area

Country	Communes/municipalities	Area (km²)	% of total	Population (2011)	% of total
Albania	Ana e Malit	41.8	8.4	5 859	11.1
Albania	Balldren i Ri	9	1.8		
Albania	Berdice	31	6.2	9 172	17.3
Albania	Bushat	26	5.2		
Albania	Dajc	30.2	6.1	8 633	16.3
Albania	Rrethine	2	0.4		
Albania	Velipoje	72.4	14.6	8 718	16.5
Montenegro	Dabezici (Bar)	9.3	1.9	160	0.3
Montenegro	Pelinkovici (Bar)	6.1	1.2	141	0.3
Montenegro	Velja Gorana (Bar)	13.7	2.8	353	0.7
Montenegro	Ulcinj	255	51.4	19 921	37.6
	Total	496.5	100%	52 957	100

Sources: Monstat, 2011a; SRC, 2011.

Figure 15: Population density change in Shkodra County in 1997 and 2010



Source: SRC, 2010.

8.2 Population change

Significant changes in the number of citizens in both parts of the watershed were recorded between two censuses taken in 2001-2003 and 2011 (Figure 14).

The Montenegrin part of the area is largely characterized by a decrease in population. However, population increase is evident in narrow coastal areas, in particular towards the northern Montenegrin coastline (Bar). In contrast, population increase is evident in part of the Albanian area, which has experienced dynamic changes and transformations over the past two decades. However, it should be noted that while official figures for the Albanian part show increases in population, in reality the area may be suffering from outward migration. While many residents may still be registered in their original administrative unit (mainly for voting purposes), they may have in fact moved away from the area. Therefore, all Albanian population data should be considered with caution as it may not reflect the demographic reality of the area.

Rural-urban and overseas migration in Albania has been widespread over the last decade, and is particularly evident among youth seeking educational and employment opportunities. Migration towards rural settlements has decreased due to lack of basic infrastructure (water, electricity, road communications) and lack of employment opportunities outside of fishing, agriculture and (to some extent) tourism, as well as minimal support for commercial endeavours and start-ups. Population migration towards the coastline area still occurs (Figure 15), but outward migration predominates.

Migration trends in Montenegro are characterized mostly by internal migration, especially from the northern to the southern (coastal) part of the country. Although rural areas are attracting an increasing population, people are still drawn mainly to urban areas.

8.3 Age and gender structure

Gender structure is quite similar in both parts of the watershed, with the female-male population ratio almost evenly divided (the female population is slightly predominant at 51%). The only significant difference is found in the commune of Ana e Malit, where the female population accounts for almost 60%.

The age structure in the Montenegrin part of the watershed indicates a relatively negative trend. The predominant groups are those aged 10-24 and 50-54 (Figure 16). In addition, the aging population index (elder-child ratio)[9] highlights growth among the elderly population (103 compared to 87.5 in 2003). Albanian data on age structure at the level of communes are not available; however, some general conclusions can be drawn from available data at the prefecture level. Albanian age structure is diverse, with the 15-19 years age group predominant, followed by 10-15 years – highlighting a relatively young population structure – and an aging population index of 79.

Statistical data on education in Montenegro highlight a general reduction in illiteracy. Over the last eight years, the number of highly educated people in Bar and Ulcinj has risen from 6.65% to 10.22%, with a corresponding reduction in the percentage of people with no education from 5.21% to 2.64% (MONSTAT, 2004, 2011a). In Albania, official data for Shkodra County (CeSPI, 2010; INSTAT, 2012) show an increase in primary and secondary school enrolment, with 8% of people having received higher education (or currently attending higher education schools). These positive trends indicate an increase in education opportunities for younger generations.

8.4 Economic potential

The key economic and political-related parameters dominating development of the plan area are the transition to a market economy and the EU accession process.

Transition to a market economy was initially marred by periods of political, social and economic instability characterized by extensive migration of people from rural to urban areas. During this period, production at many former state-controlled industrial facilities was either drastically reduced or suspended completely, particularly after the 1990s. As a result, anthropogenic impacts on the environment, in general, decreased.

Both Albania and Montenegro are **Candidate Countries for the EU**. Montenegro is currently undertaking detailed negotiations, whereas Albania has not yet arrived to this stage of the process. Accession to the EU would open up economic opportunities and eligibility for the Cohesion Fund and other forms of funding, which could be used for development and infrastructure within the plan area.

Athough it can be concluded that both countries are following similar development paths, direct comparison on all economic components is not feasible as there is no unique statistical data collection standard for both countries. The socio-economic (statistical) data collected according to the EU NUTS standard[10] for Montenegro are only available at the national level (Montenegro as a single NUTS region with a population of 620,000), while statistical data in Albania are collected for three NUTS levels. The plan area within Shkoder County forms part of the "North" region (population 926,000).

Albania

After the 1990s, Albania experienced significant macroeconomic growth, averaging around 6% between 2004-08, but declining to about 3% in 2009-11. Remittances, mainly from Albanians resident in Greece and Italy, declined from 12-15% of GDP before 2008 to 8% of GDP in 2010. Tourism is underdeveloped compared to Montenegro.

Shkodra County, and the Buna area in particular, fall under the category of less developed areas. Velipoje Commune has the highest income among the four communes of the Buna area, with Lek 467 per capita/day (less than €3.5). These figures

9 Although most developed countries use the age of 65 and above (associated with the age at which one can begin to receive pension benefits) to refer to the older population, the index follows a UN-agreed cutoff point of 60+ years.

10 NUTS refers to the Nomenclature of Territorial Units for Statistics, the EU's standard statistical subdivision of countries.

Figure 16: Age pyramid for the Albanian and Montenegrin areas

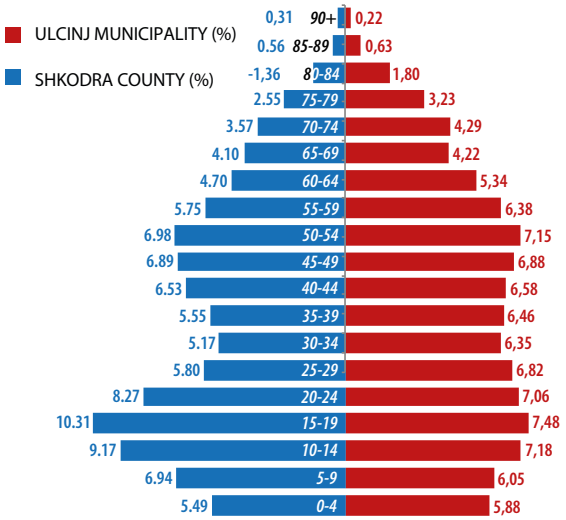
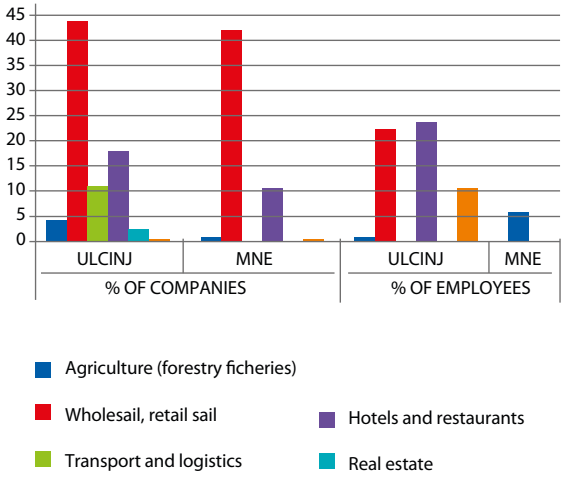


Figure 17: Structure of companies, employees and revenues in Montenegro



Source: MONSTAT, 2011a.

indicate that GDP in the Buna area is even lower than in Shkodra County (€2,175, compared to €3,016 at the national level). Unemployment is the main reason for the high poverty coefficient in this zone (60% – 81%), which is significantly higher than the poverty coefficient at national level (58%) (Golder Associates, 2010).[11] However, official data show that a relatively low number of people are receiving economic aid (approximately 2% of households). According to data provided by Shkodra Regional Council (SRC, 2011), a total of 370 households (out of 8,649) receive financial assistance**.** In addition, many families receive remittances from abroad,[12] which are used mainly for house construction.

The active working age population of the area amounts to 41%. A large share of the labour force of Shkodra County is engaged in the agricultural sector, accounting for approximately 47% of the active population, and approximately 65% of total employment (CESPI, 2010). In addition, private business activities include retail trade, with a limited number of production businesses and small dairy companies. In four communes of the Buna area, 95% of all employed people (9,092 people) are employed in the private sector, while agricultural enterprises account for 97% of all (mainly small-scale or self-employed) private enterprises.

However, as is the case with other statistical data for Albania, this information should not be considered absolute. It should be noted that Albania is characterized by economic informality with many businesses (especially within the small enterprise sector) not formally licensed or recorded (Rustja, 2011). In particular, this trend relates to manufacturing, trade, transport, construction, retailing and other small business services sectors, where it can be assumed that informal production is about 40% larger than formal production (OECD, 2004).

Montenegro

From 2006-08, following independence, Montenegro was one of the fastest growing economies in Europe, with GDP growth rates of up to 10.7% in 2007. However, Montenegro's economy is characterized by a lack of diversification, rendering it vulnerable to international crises, and GDP growth fell back to 2.5% in 2011 (Monstat, 2011a). Tourism revenue is of increasing importance and has out-performed other sectors in recent years. Per capita GDP in 2011 in Montenegro was €5,211 compared to the EU average of €25,200.

The coastal zone is the most economically developed area on the Montenegrin coast. However, the municipality of Ulcinj is less economically developed than some other municipalities (Bar) and depends greatly on tourism and seasonal duration, with this sector having the highest number of employees (24%) (Figure 17). Despite significant resources for agriculture development (362 ha), there are only four agricultural enterprises in Ulcinj, with only 0.8% of the total number of all employees in the municipality. The public sector employs a significant number of people, with 10.6% working in public administration and 10.1% in education. Finally, it should be emphasized that this municipality is also known for its substantial grey market, thus all registered revenues are low compared to the actual situation.

After a decrease in economic activity and a drop in the number of employed in 2010 (mainly due to the economic crisis) a slight recovery was recorded, resulting in an unemployment rate of 10.7% (2011) –a share still lower than the Montenegrin average (11.5%).

Average net earnings recorded constant growth from 2006. However, compared to the overall Montenegrin average (€484 per month), they were significantly lower, with average net earnings of

11 At the same time, it is important to stress that, according to LSMS (2008), the poverty headcount rate (the percentage of the population whose per capita incomes/expenditures are below the poverty line; i.e. USD 49.56 per month) was 14.6% for rural areas, compared to 12.4% for the urban areas (INSTAT, UNDP, World Bank, 2009).

12 End-of-year balance of payments data for 2011 (at the country level) suggest that remittances from Albanian migrants accounted for about 8% of GDP (wiiw, 2012).

€375. According to 2011 statistical information, 15.2% of people in coastal municipalities of Montenegro are considered poor,[13] with 3.9% of people in Ulcinj receiving social aid in 2011.

8.4.1 Agriculture and fishery

Albania

The agricultural sector accounts for almost half of employment but only about one-fifth of GDP in Albania. Agriculture is the biggest contributor to the economy in the plan area. Although no figures on agriculture's share of GDP in the area are available, the number of agricultural enterprises and number of employed people in the agricultural sector indicate a high dependence on agricultural production. Out of 8,269 agricultural producers (technically registered as enterprises but actually self-employed individuals), few can be considered as commercial producers with fields larger than 2 ha.

Agricultural land is very fertile with high productivity yields, and accounts for most of the commune's territory. In four communes of the Buna area, agricultural land represents 42% (Velipojë) to 90% (Dajç) of the entire commune area. Figures for Shkodra County (REC, 2006) indicate that cultivation of animal fodder (51%), cereals (28%) and vegetables (16%) account for the greatest share of cultivated area (in Shkodra fields). The remainder are used for fruits (a long-standing tradition in the area), olives, vineyards and so on. However, production is not large-scale or commercial, and villagers use the land mostly to meet their daily needs.

The rearing of cattle, sheep, goats, pigs, horses and donkeys is a traditional way of life for local communities and there are several breeds of domestic animal in the area, including some rare breeds such as Siska pig, Busha cattle, Zackel sheep, domestic Balkan donkey and so on (Schneider-Jacoby et al., 2006).

Local authorities are currently launching a consulting service that provides useful advice to farmers on profitable and sustainable production. Dajc commune has launched an initiative to raise the awareness and capacity of local farmers to produce and utilize compost as fertilizer.

Fishing is an important activity and represents a significant source of income for several villages along the Buna riverbank (Obot, Samrisht, Reç and Pulaj), Velipoja coast and Viluni Lagoon. Fishing supports many livelihoods both in a commercial capacity and for subsistence use.

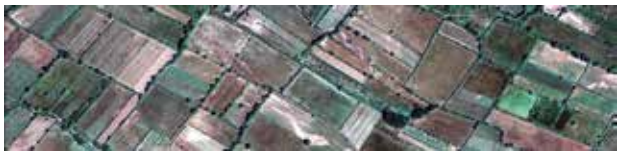
Montenegro

Agriculture has consistently been acknowledged as the second most important economic priority of Montenegro. However, the share of the agriculture sector (including fisheries and forestry) in GDP at the national level is only 7.7% (2010), representing a decrease of 1.3% compared to 2009. In addition, only 6% of the population (mainly outside the coastal area) is involved in agricultural activities. Trends at the national level indicate that the number of farms has decreased by almost 20%, compared to the 2003 census.

13 The absolute poverty line in Montenegro for 2011 was €175.25.

Figure 18: Important agricultural areas in the municipality of Ulcinj

Figure 19: Šasko field, a highly attractive area for agriculture



Source: Google Earth, 2009.

Figure 20: Fishing with kalimera nets near Ulcinj saltworks

Furthermore, when analysing available resources (mainly the share of companies and employees per sector), in the municipality of Ulcinj agriculture is far from being considered an important economic sector, accounting for less than 5% of companies and less than 1% of employees (Figure 16). At the same time, although only 3.4% of all agricultural land is located in the coastal area of Montenegro, some of the most attractive areas for agriculture development (based mainly on soil quality, but also sun and relief) are located in the municipality of Ulcinj, which is characterized by alluvial and colluvial-alluvial soil. This area is already home to some of the most important agricultural areas (Figure 18), such as Ulcinjsko field, Štoj, Šasko (Figure 19) and Anamalsko field. In total, 41% (9,153 ha) of the most attractive areas for agricultural development are located in Ulcinj municipality.

Production in these areas relies on the cultivation of citrus fruits, olives, viticulture and beekeeping. In Ulcinj, there are large areas covered by olive groves. The area is favourable for irrigation and intensive agriculture.

Out of the total economically active population in Ulcinj (6,207) less than 30% (1731) are involved in agriculture. Out of those, 63% have agriculture as the only or primary activity (Monstat, 2011a).

In order to support agricultural development, in particular in rural areas, local municipalities are introducing different instruments to encourage agricultural production, such as the formation of Agrobudget measures. After 2006, Agrobudget was financed through the state budget. Analysis of the amount and structure of Agrobudget from 2006 onwards shows that agriculture is receiving more funds on a yearly basis, most of which focus on market-pricing policies, rural development policy, and specialist and agricultural services – the three basic columns of agricultural policy. However, Agrobudget funds in Ulcinj municipality amounted to only 0.02% of the total municipality budget in 2014. In addition, a number of EU organizations (and other international organizations and donors such as FAO, etc.) fund schemes supporting agricultural development. However, the local population (as well as public institutions) do not have adequate capacity to fully make use of the available resources.

Fishing used to be an important traditional activity in the villages of Reč, Sutjel and Sveti Đorđe. The coastal area at the mouth of the Bojana River and Port Milena was identified as an important spawning and feeding area for economically important fish species (eel and mullet). Traditional fishing activities with "kalimera" nets in Port Milena (i.e. former outfall of Zoganjsko Lagoon and the current drainage of Ulcinj Salina) are of particular importance (Figure 20). However, due to the construction of dams on the Drini and pollution increase, among other factors, river fishing has declined significantly. Illegal fishing with dynamite has also been observed in Port Milena (Dömpke, 2008).

Fishing on Lake Šasko became an important economic activity after the Second World War. Fishing was mainly seasonal, with limited equipment and conducted during the spawning, feeding and wintering of salmon, whitefish and carp. Local fishers from nearby villages (Saša, Ambule, Fraskanjela, Svetog Đorđa, Briske gore i Donja Klezne) fished intensively on the lake – an activity that constituted an important source of additional income. Despite the lack of professional fishers in the area, fishing was very prevalent, with no controls or compliance with regulations, resulting in excessive overfishing of economically important fish species (eel, sea bass, carp, trout and salmon). Nowadays, fish production is insignificant due to lack of investment (Dömpke, 2008).

Marine fishery mainly takes the form of small-scale coastal fisheries along beach areas (Ada Bojana, Mala Plaža and Velika Plaža), mainly to support local restaurants. In addition to fish species, fishing of commercially important, high-quality species of cephalopods, such as *Lorge vulgaris, Sepia officinalis*, *Sepiola rondeleti and Eledone mostchata*, also takes place in the area (Dömpke, 2008).

Large-scale and more profitable industrial fishing on the high seas is largely conducted by Italian companies (Dömpke, 2008).

8.4.2 Tourism

Albania

The direct contribution of tourism to Albanian GDP was 4.8% in 2013. The indirect contribution is significantly higher reaching 16.7% of national GDP. In addition, data show that in 2013 tourism employed 4.3% of the poopulation (15.2% of total employment indirectly supported by the industry) (WTTC, 2014a). In 2011, nearly 3 million foreign visitors were recorded, mainly from Kosovo (46%), Macedonia (12%), Montenegro and Greece (6%) (WTTC, 2012).

The Buna River protected area is rich in natural sites (e.g. the sandy coastal area, forests, lagoons, agricultural landscapes and mountains) and cultural attractions (e.g. ruins of ancient habitats in Luarzi Mountain and Black Top, fifteenth-century archaeological finds, etc.) making tourism a priority area for economic development.

However, tourism is practised only in Velipoja commune which, according to the Shkodra Regional Centre (SRC, 2011), has tourist areas covering around 300 ha (compared to 1,180 ha for the entire Shkodra County). There are no exact data on accommodation capacities, but these are estimated at around 2,500 units (hotels and private accommodation). Similarly, there are no official records on visitor numbers, but these are estimated at around 20,000 overnight visitors during a few weeks in July and August. In addition, there are many more day visitors in the entire area (up to 50,000 visitors). Tourists visiting the area come mainly from within the country itself or from Kosovo and Macedonia; other foreign tourists visiting the area come mainly for the purpose of business.

Table 3: Beach carrying capacity in Ulcinj

Municipality	Tourism "unit"	Beach type	Surface (m^2)	Range (m^2/person)	Capacity	
ULCINJ	Ulcinj	Hotel and resort	950	10 - 30	32	95
		Public beach, limited natural value	27 404	5 - 10	2 740	5 481
		Total	**28 354**		**2 772**	**5 576**
	Štoj (Velika Plaža)	Hotel and resort	58 850	10 - 30	1 962	5 885
		Public beach, with natural value	405 500	10-20	20 275	40 550
		Total	**464 350**		**22 237**	**46 435**

Bearing in mind that the total Velipoja beach area covers approximately 190 ha, the estimated physical carrying capacity of the beach ranges from 95,000–380,000 people. It can therefore be concluded that the economic and recreational potential of the beach is underutilized.

Montenegro

The share of tourism in national GDP has increased constantly since 2001. The direct contribution of the travel and tourism industry to overall national GDP for 2013 was 9.8% (20% of total GDP, indirect contribution). In addition, tourism directly supported 8.8% of total employment with €208 million of investments (WTTC, 2014b), underlining the significance of tourism for the Montenegrin economy.

The share of tourism in the local economy of the plan area follows a similar pattern. The municipality of Ulcinj recorded 120,548 tourists and 878,305 overnights visitors in 2011 (represnting a twofold increase compared to 2001) with an average stay of 7.3 days. The predominant accommodation types are private apartments, rooms, secondary homes and alike (i.e. complementary tourism resources). Hotel capacities are thus underutilized (%) and of lower quality (over 60% of hotel capacity is in one and two-star hotels).

The key resource for tourism development in Ulcinj is the beaches, which represent 90% of the total tourism product (offer). In addition, sandy beaches in Ulcinj are the most important natural and tourism resource in the coastal area of Montenegro. In order to preserve and adequately utilize these resources, the public enterprise (PE) Morsko Dobro has been given a mandate to manage beach areas.

Bearing in mind the absolute dominance of beaches as a tourism resource in Montenegro, the concept of tourism carrying capacity in the plan area (and in the total coastal area of Montenegro) should be based largely on the physical limits (including ecological)[14] of the beach resources. Infrastructural limits[15] should also be taken into consideration, although these limitations are not fixed and, with certain infrastructural investments, could easily be changed (improved). Rapid assessment of tourism carrying capacity indicates that it has not yet been exceeded in the wider Ulcinj area (Table 3). However, planned tourism development in the area indicates even greater growth of tourism capacities, which would exert significant pressures on over-utilized beach resources, leading to degradation of the tourism offer in the area, unless serious action is undertaken towards tourism diversification.

8.4.3 Green business

Green business could be defined as a business model based on sustainable production, consumption and saving practices, and represents a response to a variety of emerging challenges over recent decades. There are three main aspects of green entrepreneurship: environmental protection and resource conservation, social wellbeing and equity, and economic prosperity and continuity.

Since 1991, Montenegro has declared itself to be an ecological state. However, support for green business concepts in line with this ecological orientation is almost inexistent. Some individual, small-scale activities, in line with green entrepreneurship concepts, could be found in Ulcinj.

Based on available information, there are no green economy initiatives in the Albanian area. Bearing in mind the natural values of the Buna area and the quality of the agricultural land, the area presents good preconditions for green development. However, lack of certain basic sanitary conditions, leading to environmental degradation, should receive adequate treatment.

Stronger support and actions for the promotion and development of green business, especially entrepreneurship, should be the focus of policies at the national and local administration level, in particular those related to the development of rural areas.

14 Physical and ecological elements include all components related to physical space/environment (i.e. the spatial area, coastline, etc. It also includes all the elements related to biodiversity preservation).

15 Infrastructural elements include all components related to infrastructure (traffic, water supply, sewage, waste, etc).

9. NATURAL ENVIRONMENT AND RESOURCES

this chapter provides information and describes – to the extent possible given the available data – the components of the natural environment in the plan area and the natural resources therein. It serves as background for the subsequent examination of the state of resources in the following chapter.

9.1 Biodiversity and protected areas

KEY HIGHLIGHTS

- There is a lack of continuous and systematic monitoring of biodiversity, especially in the marine zone. The data and information base is weak. Furthermore, little research is being undertaken in the two countries regarding ecosystem services, hence the related knowledge is inadequate.
- The Buna/Bojana and Lake Shkoder/Skadar wetlands support about 900–1,000 plant species and about 25,000 wintering waterbirds.
- Over 76% of the bird species in the Buna/Bojana delta are migratory. The area is an important component of the Adriatic bird migration flyways.
- Nearly half of the waterfowl species in the Buna/Bojana delta are included on lists of endangered species at local, regional and international level.
- The mouth of the river Buna/Bojana represents a rare example of a natural delta on the East Adriatic coast. The conjunction of the Bojana and Drin rivers is of outstanding importance as a migration route for fish, linking Lake Shkoder/Skadar with the Adriatic Sea.
- The wider region of the Buna/Bojana delta with Lake Shkoder/Skadar is also recognized as a Balkan centre of reptile biodiversity.
- The entire Albanian side of the Buna/Bojana area has been granted "under protection" status, and has been designated as an Important Bird Area and a Ramsar site. On the Montenegrin side, a number of sites are protected under national law, while some are designated as Important Bird Areas and EMERALD sites.
- Lake Shkoder/Skadar plays an important role in the biodiversity of the Buna/Bojana area, despite its location outside the plan area. The lake has been designated a protected area in both countries.

Figure 21: Biogeographical regions in Europe

Source: adapted from Tockner et al., 2009.

9.1.1 Biogeographic characteristics

The ecological system of the plan area belongs to the Mediterranean biogeographical region (Figure 21) and the Dinaric Western Balkan ecoregion (Figure 22). It is dominated by mixed evergreen and deciduous vegetation of maquis and garrigue. The aquatic components of the area consist of freshwater (rivers and lakes), brackish water, marine waters and coastal wetlands.

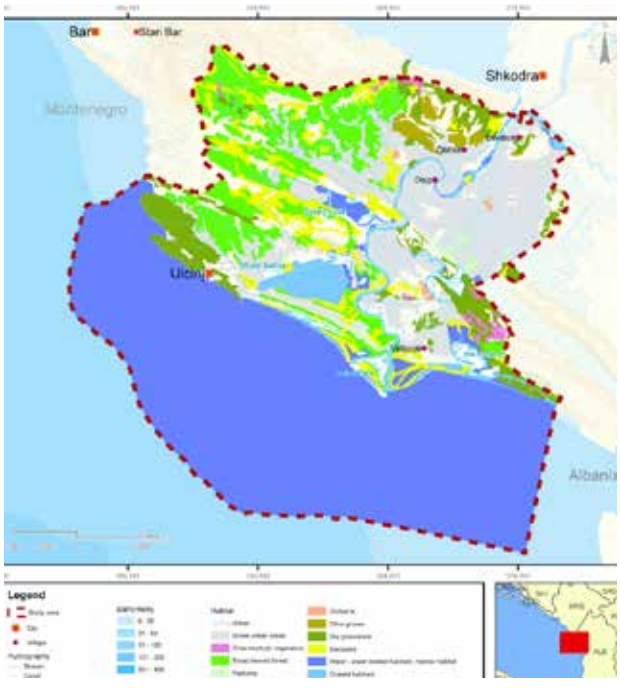
9.1.2 Habitats

Various terrestrial, freshwater, marine and brackish habitat types exist in the area. Wetlands and water related habitats are dominant.

Data and information from a number of sources have been used for the preparation of the land cover/habitat map (Figure 23) for the purposes of the plan (Dömpke et al., 2008; Schwartz, 2010).

Figure 22: European ecoregions according to Illes

Figure 23: Land cover/habitat map



9.1.2.1 Terrestrial habitats

The majority of the plan area is covered by agricultural land dominated by arable crops (permanent and annual), olive trees and so on. Forest or forest remains and semi-natural areas, including maquis and garrigue, shrubs and pastures, beaches, sand dunes and dray grasslands, cover the remaining undeveloped territory.

The slopes of Rumija Mountain are an important habitat for Mediterranean vegetation. Renci Mountain forms a natural bridge for terrestrial mammals crossing the Buna/Bojana River, including brown bear (*Ursus arctos*), jackal (*Canis aureus*), wolf (*Canis lupus*), fox (*Vulpes vulpes*) and wild boar (*Sus scroffa*).

In the coastal area (a narrow but lengthy area stretching from the south in Velipoja beach across Ada Bojana, Velika Plaža, Đerane, Mavrijan, Valdanos and Kručeto Stari Ulcinj island in the north-west), the main vegetation types are as follows:

- **Sand-dwelling**, *psamo-halophyte* vegetation is distributed along the coastline from the Baks-Rrjolli area to Velika Plaža. A representative area with the most developed and preserved psamo-halophyte vegetation is located in the hinterland of Velika Plaža.

- **Associations of** Tamarix africana **and** Juncus acutus are present mostly in the coastal area, particularly at the end part of the river along the Viluni channel, but also at some localities along the Buna/Bojana River and Lake Šasko.

- **Mixed forests** are present in both countries including a dense vegetation belt of wet/hydric forests mainly composed of different Ash tree species (*Fraxinus excelsior, Fraxinus angustifolius*, *Fraxinus oxycarpa*, etc.), coniferous (*Pinus halepensis*, *Pinus nigra*), white poplar (*Populus alba*), field elm (*Ulmus minor*), common alder (*Alnus glutinosa*), as well as an endemic subspecies of oak – Skadar Oak (*Quercus robur ssp scutariensis*). There are also large complexes of floodplain forests along both sides of the river consisting mainly of softwood trees with a variety of transitions to hardwood floodplain forest. Associations of tree spurge (*Euphorbia dendriodes*) are typically present in small rocky areas located in very warm and dry habitats of southern and south-western inclination, from Cape Đerane to the end part of Kruče in Montenegro.

9.1.2.2 Key freshwater, wetland and brackish ecosystems/habitats

Plant communities of *Phragmites* and *Typha* dominate water bodies and wetlands. The following habitats are the most important for this category:

- **Domni marsh** (Albania): associations of *Phragmites australis* and *Typha angustifolia* cover 60% of the surface.[16] Species considered rare and endangered in Albania are also present here.[17] An association of *Trapa natans* exists in the channels near this marsh.

- **Marsh of Murtemza** (Albania): the marsh represents a small remnant of the wetland complex of Domni-Casi-Pentari-Murtemza fed by the Buna River. This complex was well known for the fish, ducks and aquatic vegetation species present in the marsh and especially for White Lotus or Nuphar (*Nymphea alba*) and *Phragmites australis*.

- **Viluni Lagoon** (Albania): this typical coastal lagoon communicates via a major channel with the sea, and covers an area of 390 ha. There is an abundance of fish (eel, mullet, sea bass, etc.). The lagoon is an important nursery area for fish species migrating between wetlands and the open sea. Wet/hydric shrub vegetation can be found in the hinterland. The surroundings of the lagoon (towards Fraskanjel, Donja Klezna and Buna/Bojana River) provide good conditions for flooding meadows, hydrophitic forests and shrub vegetation.

- **Ulcinj Salina/Saltworks** (Montenegro): a variety of wet habitats are present in this area and their distribution depends on the level of soil salinity. The halophyte plant community is characteristic of the area. Wet meadows enriched by reeds (*Phragmites communis*) can be observed along embankments of pools of salty and brackish waters. Away from the water pools, a decrease in salinity is reflected in the variety and structure of plant communities. The following species are present in zones with muddy substrate: *Juncus acutus, J. maritimus* and *Tamarix africana*. Ruderal vegetation is present along the roads, pathways and on the embankments.

9.1.2.3 Marine ecosystems/habitats

The marine zone is poorly studied, particularly on the Albanian side. Little information exists regarding the marine habitats and species along the coast of the Buna/Bojana delta. More information is available concerning the Montenegrin side, however there is a lack of continuous and systematic monitoring of marine biodiversity.[18]

The coastal waters at Velika Plaža and the Buna/Bojana River mouth are under strong mechanical impact from the open sea and the river (see Chapter 9.4) and experience very frequent changes in their physico-chemical parameters. Due to the shallow gradient of the seafloor, the first isolines of 20 m and 50 m are located far from the coastline. The benthos (sea floor) at the area near the Buna/Bojana River consists of *terrigenous* sands, mud and silts. In the marine zone of Ulcinj municipality there are generally muddy habitats.

Posidonia oceanica meadows are present in the vicinity of the **marine zone around Stari Ulcinj** with lower than normal density. There are indications that these meadows are under stress.

16 The main species present include: *Sparganium erectum*, *Schoenoplectus lacustris*, *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Utricularia vulgaris*, etc.

17 *Sagittaria sagittifolia*, *Hydrocharis morsus-ranae*, *Lemna trisulcata*, *Spirodella polyrhiza* and *Nymphaea alba*.

18 Related information provided under this plan comes from various, mostly scientific, projects. More data regarding marine biodiversity can be obtained from thematic reports produced within the framework of the DFS project "Startup of Katič MPA in Montenegro and Assessment of marine and coastal ecosystems along the coast" (2011–2013).

9.1.3 Species

Flora and fauna inventories are incomplete for this area[19] and there is a general lack of information and data regarding species diversity, population dynamics, ecology and the degree of genetic variations. This creates difficulties for the design of adequate protection measures.

Table 4 and Table 5 present characteristic vegetation types and plant species found in the coastal area. Many of these species are rare, endangered and protected. They include daffodil (*Pancratium maritimum*), found in sand dunes, and tree spurge (*Euphorbia dendroides*), found on coastal rocky slopes.

In the lowland area (Velipoja, Štoj) there are wet/hydric forests with very sporadic, endemic sub-species of Skadar Oak (*Quercus robur ssp scutariensis*).

In the terrestrial part of the area the species are adapted to local conditions. The Rumija massif hosts over 1,500 species/subspecies of plants. Among the registered species, 62 are nationally protected,[20] 14 are rare, 2 are vulnerable and 2 are endangered. Evergreen coniferous forests with Holm Oak (*Quercus ilex*) often degraded to macquis[21] are characteristic for the area. The presence of Kermes Oak (*Quercus coccifera* L.) at Mavrijan hill close to Ulcinj is specific to the region.

Water and water-related habitats provide shelter for both commercial and ecologically important species. Marine species[22] are less studied than freshwater species. Mollusks, particularly bivalves, dominate the estuary due to the abundance of phytoplankton.

9.1.3.1 Fish

The presence of notable freshwater and marine fish species contributes to the ecological and economic importance of the area.

Commercially important freshwater fish in the hydrological complex of the Buna/Bojana River, Skadar/Shkodra Lake and the Drin river, include: the Common Carp (*Cyprinus carpio*), Prussian Carp (*Carassius auratus gibelio*), Bleak (*Alburnus alburnus alborella*), Rudd (*Scardinus erythrophthalmus scardafa*), Chub (*Squalius platyceps*), Perch (*Perca fluviatilis*) and so on. Endemic

19 The first integrated list of species for the area was produced by EURONATUR and published in its Rapid Assessment (Schneider-Jacoby et al., 2006).

20 Decree on the protection of certain flora and fauna species (Official Gazette, MNE, No. 76/06).

21 Due to human activities, the original Holm Oak association is degraded in dense and impassable macquis that belongs to a particular Adriatic form – association *Orno – Quercetum ilicis* (Horvatić/1956/1958). Further degradation of maquis is leading to the vegetation type garigue. Garigues are short and sparse evergreen scrub-shrubs, mainly composed of heliophytic flora, usually bushes and semi-bushes. Garigue vegetation determined as *Erico – Cistetum cretici* (Horvatić, 1958) is also present on the end slopes of Rumija Mountain. Dry swards and rocky pastures of the association *Cymbopogo-Brachypodion ramose* characterize the final degradation stage of Holm Oak forests. These plant associations often result from anthropogenic impacts.

22 Recent investigations provided more information on biodiversity in marine coastal waters in Montenegro (DFS survey in 2011–2012), for example, the following groups of invertebrates: Porifera: *Demospongia n.d., Ircinia sp., Hemymicale columella;* Cnidaria: *Cladocora caespitosa, Virgularia mirabilis;* Polichaeta: *Protula tubularia;* Mollusca: *Aglaja tricolorata, Tethys fimbria, Chelidonura Africana, Bolinus brandaris, Natica sp. (eggs), Sepia officinalis, Ensis sp., Hypselodoris orsini, Phyllidia flava, Discodoris atromaculata, Bolma rugosa, Octopus vulgaris;* Briozoa: *Smittina cervicornis;* Crustacea: *Macropodia sp.;* Echinodermata: *Paracentrotus lividus, Echinaster sepositus, Astropecten sp., Arbacia lixula, Holoturia tubulosa, Ophioderma longicaudum, Coscinasterias tenuispina;* and Ascidiacea**:** *Diplosoma spongiforme.*

Figure 24: Ulcinj Salina

© Branko Strugar.

Figure 25: Coastal-marine waters in front of the Buna/Bojana river mouth

© Branko Strugar.

Table 4: Coastal habitats and respective vegetation types

Coastal habitat	Characteristic vegetation types
Sand beaches – Velipoja, Viluni, Velika Plaža, Valdanos, etc. – (movable sand and high salinity)	Psamo-halophyte vegetation
Coastal rocky habitats (open and steep calcareous rocks)	Crithmo-Limonietea

Table 5: Forest habitats and respective species

Forest habitat	Characteristic species
Wet/hydric forests	White Poplar (Populus alba) Ash (Fraxinus angustifolia), Alder (Alnus glutinosa) White willow (Salix alba), Tamarisk (Tamarix africana), Chasteberry (Vitex agnus-castus), as well as Silk Vine (Periploca graeca), Water Mint (Mentha aquatica), Purple Loosestrife (Lythrum salicaria), etc.

fish species, such as the Roach (*Pachychilon pictum*), are also present in these waters. About 50 marine species can be found in the estuary/river mouth, coastal waters and deep sea.

The Buna/Bojana River functions as a fish migration corridor linking marine and freshwater ecosystems, with 13 species moving from the Adriatic Sea to Lake Shkoder/Skadar.

9.1.3.2 Birds

The shallowness of the lagoons and mudflats – particularly in (coastal) wetlands in the areas of Velipoja, Viluni lagoon, Ada Bojana, Velika Plaža, Ulcinj Salina and neighbouring swamps, and Šasko Lake – make them optimal habitats for birds.

Over 76% of bird species in the Buna/Bojana delta are migratory, with the area functioning as an important part of European bird migration flyways, specifically, the Adriatic flyway. Migratory movements also occur between this area and Lake Shkoder/Skadar. About 29% of birds in the Buna/Bojana delta are nesting species.

Numerous passerines land in the area.[23] This area is also visited by Dalmatian Pelicans (*Pelecanus crispus*). In recent years, the average number of birds recorded along riverbanks during winter seasons has reached 8,000, with the bird count in Velipoja indicating the presence of more than 5,000 individuals from around 170 bird species (Beqiraj and Dhora, 2007).

Nearly half of the waterfowl species in the Buna/Bojana delta are included on lists of endangered species at local, regional and international level. For example, the Ferruginous Duck (*Aythya nyroca*) and Pigmy Cormorant (*Phalacrocorax pygmeus*) are globally threatened species.

9.1.3.3 Amphibians and reptiles

Wetland habitats in the Buna/Bojana delta also host amphibians and reptiles.[24]

The wider region of the Buna/Bojana delta with Lake Shkoder/Skadar is also recognized as a Balkan centre of reptile biodiversity (Đukić, 1995), particularly for reptiles that depend on water. Sea turtles (*Caretta caretta*) sporadically lay their eggs at Ada Bojana.

9.1.3.4 Mammals

A number of terrestrial mammals are present in the area. Among the most characteristic are the brown hare (*Lepus capensis*), fox (*Vulpes vulpes*) and golden jackal (*Canis aureus*), concentrated in the forests and marshes of the riverine floodplains; and the European badger (*Meles meles*), least weasel (*Mustela nivalis*), European polecat (*Mustela putorius*), wild boar (*Sus scrofa*), insectivorous bicoloured shrew (*Crocidura leucodon*), lesser white-toothed shrew (*Crocidura suaveolens*), Etruscan shrew (*Suncus etruscus*) and southern white-breasted hedgehog (*Erinaceus concolor*) (Bego, 2003: 38, 54, 61-67; Dhora, Beqiraj and Dhora, 2001; Schneider-Jacoby et al., 2006). The otter (*Lutra lutra*) is a rare aquatic mammal of the Buna River. This globally threatened species has been recorded several times in the river over the last few decades.

The presence of the dolphins *Delphinus delphis* and *Tursiops truncatus* has also been recorded at the mouth and middle stretches of the Buna/Bojana River (Schneider-Jacoby et al., 2006).

9.1.4 Ecosystem services

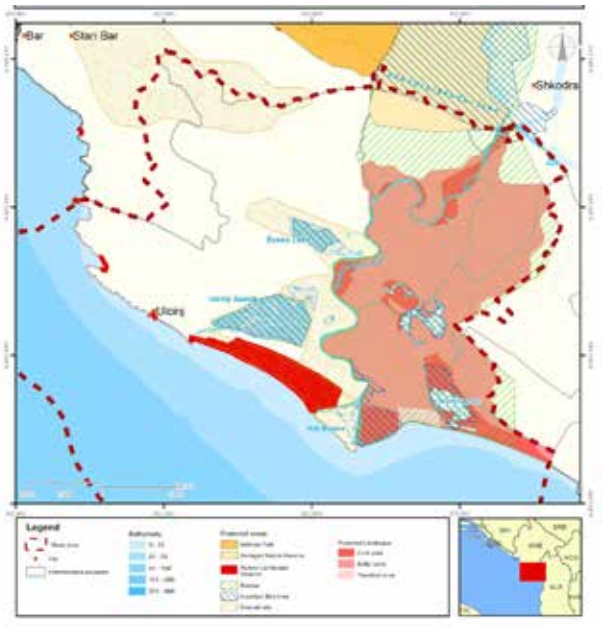
Both countries lack significant research into ecosystem services; hence the related knowledge is inadequate. Neither the private nor the public sector has internalized the costs of ecosystem services. This is particularly true in the coastal zone, which is characterized by urbanization and tourism development. The ecosystem in the Buna/Bojana area interlinks with that of Lake Shkoder/Skadar and shares its values (Box 3).

The role of groundwater in sustaining ecosystems is often overlooked, since it functions as an invisible resource. Groundwater in the plan area supports ecosystem health by providing water and nutrients to coastal wetlands, and through submarine discharges that contribute to the creation of brackish water ecosystems in the coastal zone. These ecosystems represent a high-value eco-landscape, supporting biodiversity and providing a potential buffering capacity for nutrients in the water of the Bojana River. While no detailed study has been undertaken to determine the role of groundwater in sustaining coastal ecosystems (terrestrial and marine) in the plan area, at least some of the coastal lagoons are known to have a strong link with groundwater, as in the case of Viluni Lagoon in Albania (Beshku, 2014).

9.1.5 Protected areas

The entire **Albanian part** of the Buna/Bojana area has been granted protected status (Figure 26).

Figure 26: Protected areas



23 The following are among the most characteristic species: Eurasian Skylark (*Alauda arvensis*), Meadow Pipit (*Anthus pratensis*), White Wagtail (*Motacilla alba*), Goldcrest (*Regulus regulus*) and Blue Tit (*Parus caeruleus*).

24 Examples include the large Whipsnake (*Coluber* gemonensis), European Pond Turtle (*Emys orbicularis*) and Tree Frog (*Hyla arborea*).

Box 3: The Buna/Bojana River and the Lake Shkoder/Skadar wetlands

General description
The system comprising the Lake Shkodra/Skadar wetlands, the outflowing Buna/Bojana River and its delta area on the Adriatic Sea contain important ecosystems with fresh and brackish water, as well as a wide variety of natural and human-made coastal habitats, including one of the largest transboundary lakes in South-Eastern Europe, floodplain forests, freshwater marshes, extensive reed beds, sand dunes, karst formations, calcareous rocks, wet pastures, ponds and irrigated lands. These habitats support about 900 to 1,000 plant species and about 25,000 wintering waterbirds.

Main wetland ecosystem services
The wetland is important for water retention and flood control in a wide area around Lake Shkoder/Skadar and along the Buna and lower Drin river floodplains. The presence of large water bodies and a vast floodplain forest significantly humidifies the regional climate, thus mitigating Mediterranean summer droughts. Sediments carried by the Drin and Buna/Bojana support stabilization of the Adriatic shoreline and prevent the salinization of coastal aquifers and agricultural lands, provided that human interventions allow the continued functioning of these natural dynamics.

Supporting socio-economic services
The wetland is used for fishing and to some extent for hunting, and provides essential support for agriculture and livestock rearing on temporarily flooded grasslands. Peat, sand and gravel are exploited along the lake and river shores. Leisure activities for urban dwellers from Podgorica (the capital of Montenegro), as well as beach, nature, village and cultural tourism are developing rapidly in the area.

Cultural values
The area is renowned for its rich history and former civilizations, with the distribution of historical settlements following the hydrological network. Shkodra town has been an important commercial and cultural centre in South-Eastern Europe for more than 2,000 years. Customs, traditions, old crafts and folklore, together with ancient castles, fortresses, medieval monasteries and traditional villages, combine to present a rich cultural heritage.

Table 6: Protected areas

Site name	National category	International designation	Area (ha)	Country
Lake Shkoder/Skadar and River Buna		Ramsar	49 562	Albania
Lake Shkoder/Skadar	National Park			Albania
Buna River-Velipojë Buna River and the surrounding wetland territories including: delta, Franz Joseph island, Velipojë, Viluni lagoon, Rrjolli Baks beach, the Domni swamp and surrounding territories	Protected Landscape (IUCN Category V), with three zones: the core zone, the buffer zone and the transition area		23 027	Albania
Lake Shkoder/Skadar[21]	Managed Nature Reserve (IUCN Category IV)		26 535	Albania
		Important Bird Area	14 000	Albania
Velipoja[22]		Important Bird Area	700	Albania
Lake Shkoder/Skadar	National Park	Ramsar	20 000	Montenegro
Velika Plaza[23]	Natural Landscape Reserve	EMERALD site (Ada Bojana along with the eastern side of Velika Plaža and Lake Šasko)	600	Montenegro
Ulcinj Salina		Important Bird Area and EMERALD site	1 350	Montenegro
Lake Šasko		Important Bird Area	350	Montenegro
		EMERALD site (Ada Bojana along with the Eastern side of Velika Plaža and Lake Šasko)		
Mala Plaža	Natural Landscape Reserve		1.5	Montenegro
Valdanos	Natural Landscape Reserve		3	Montenegro
Stari Ulcinj island with neighbouring beach (Vučja uvala)	Natural Landscape Reserve		2.5	Montenegro

25 The site includes two coastal areas: Viluni (or Velipoja Lagoon) and the surrounding Velipoja forest and inland Dumi wetland (Keneta e Dumit). Viluni Lagoon is a large, shallow coastal lagoon at the feet of a rocky and forested mountain area (Bregulbunes mountains). The surrounding marshes and the Dumi wetland are drained by a channel. Sand dunes, beaches and small brackish pools are found along the coastline, while riparian deciduous woodland is present along the Buna River and delta (to the north and within the IBA). Main land-uses are hunting, fishing, agriculture and tourism.

26 The site includes two coastal areas: Viluni (or Velipoja Lagoon) and the surrounding Velipoja forest and inland Dumi wetland (Keneta e Dumit). Viluni Lagoon is a large, shallow coastal lagoon at the feet of a rocky and forested mountain area (Bregulbunes mountains). The surrounding marshes and the Dumi wetland are drained by a channel. Sand dunes, beaches and small brackish pools are found along the coastline, while riparian deciduous woodland is present along the Buna River and delta (to the north and within the IBA). Main land-uses are hunting, fishing, agriculture and tourism.

27 Velika Plaza is also characterized as an area of exceptional natural value.

In November 2005, the Council of Ministers approved three decisions related to enlargement of the protected areas system, among which were the designation of the Protected Landscape "Buna River –Velipojë". The protected area includes three main zones: the core zone, buffer zone and transition area.

In addition, the areas of "Shkodra Lake" and "Buna River" were included on the list of Ramsar sites on 2 February 2006, as internationally important areas, especially for water birds. The Lake Shkodra and River Buna Ramsar Site consists of the Albanian part of Lake Shkoder/Skadar, including a narrow strip of its shoreline, the Buna, its delta and coastal areas, as well as an adjacent part of the Adriatic coast.

The **Montenegrin part** of Lake Skadar – north of the Buna/Bojana watershed, adjoining the planning area – and its surrounding area were declared the National Park "Skadarsko Jezero" in 1983 (Lake Skadar – Skadarsko Jezero). In 1995, the territory of the park was proclaimed a Ramsar site (20,000 ha).

In addition, the Law on Nature Protection also designated a number of protected areas:

- Velika Plaža, Mala Plaža, Valdanos and Stari Ulcinj island with its neighbouring beach have been under protection since 1968. Revision of protection status, category and regime for these areas (as stipulated under the Law on Nature Protection (2008)) is pending.
- Ada Bojana and Lake Šasko are designated as an EMERALD site (Resolution 4, Bern Convention).
- Ulcinj Salina (Solana Ulcinj), an area of saltpans largely without vegetation and bordered by agricultural land, became the first Important Bird Area (IBA) in Montenegro.
- Lake Šasko is a transboundary IBA (with Velipoja in Albania).

9.2 Hydrology

KEY HIGHLIGHTS

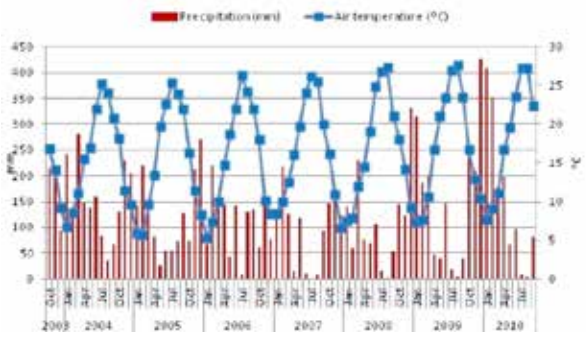
- With a mean annual discharge of approximately 20 km³/year, the flow of the Buna/Bojana amounts to the third greatest discharge in the European Mediterranean after the Rhone and the Po.
- The Buna/Bojana receives water from the Drin River and Lake Skadar/Shkoder; hence, its hydrological regime is directly dependent on that of the Drin-Lake Skadar/Shkoder hydrological system.
- Occasionally, outflow from the lake in Buna/Bojana is impeded due to increase in Drin River flow. High Drin levels and low Buna/Bojana levels can result in Drin water entering Lake Skadar/Shkoder, increasing its water level significantly.
- Due to the low gradient of its channel, the Buna/Bojana River has a weak transport and erosive capacity to remove sediment from its riverbed.
- Change in land uses adjacent to the river channel area has led to downsized floodplains and alteration of the ecosystem structure and hydrological functioning of the river. Before intensive drainage and melioration of the area, almost 50% of the whole Buna/Bojana River and Delta region was regularly flooded.
- The Lower Drin – Buna/Bojana River and Lake Shkoder/Skadar watersheds are subject to high risk of flooding.

The climate in the Buna basin is sub-Mediterranean with mild, wet winters and hot prolonged summers.

Climate summary

The mean annual air temperature ranges between 16°C and 18°C. The coldest month is January (2.3 – 8.3°C), and the hottest is July (19.8 – 25.0°C). The number of days with air temperature above 25°C ranges from 110 to 130 per year. Mean precipitation in Albania varies from 968 mm in the east at Kukes to 3,166 mm in the west at Boge (average 2,089 mm). In Montenegro, precipitation varies from 1,287 to 2,597 mm. Maximum precipitation occurs in November–January and minimum precipitation in July–August (Bogdani, 1996; Sekulic and Radojevic, 2007).

Figure 27: Monthly average rainfall and air temperature for the stations of Ulcinj, Bushat, Dajc and Velipoje over the period 2003-10



As noted above, the hydrological regime of the Buna/Bojana is directly dependent on that of the Drin-Lake Skadar/Shkoder hydrological system. In Montenegro, several small torrential streams flow into the Buna/Bojana River, together with waters of Lake Šasko through a channel.

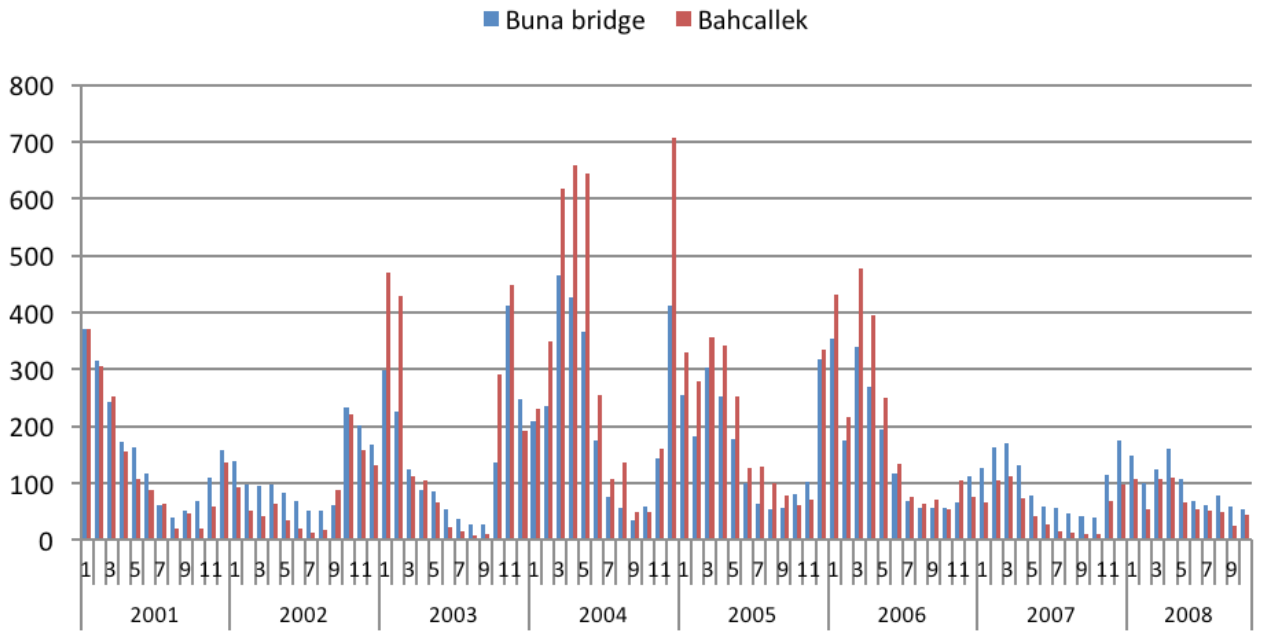
The mean annual discharge of the Buna/Bojana River prior to its confluence with the Drin is 10.1-10.4 km³/year, of which 9.47-10.09 km³/year (APAWA et al., 2007; Bogdani, 1996) originate from Lake Skadar/Shkoder. The average discharge of the Buna/Bojana is 21.19 km³/year (Bogdani, 1996) – the third biggest discharge in the European part of the Mediterranean after the Rhone and Po Rivers.

More information about the surface hydrology of the River Drin and Lake Skadar/Shkoder is given in Part C "Water Resources Management: Situation Analysis".

The inter-annual distribution of discharge in the Buna/Bojana River presents two peaks, one in winter (December) and one at the end of spring (April–May), with minimum discharge in August. The maximum/minimum flow ratio in the Buna/Bojana River is 5.3 (Cullaj et al., 2005).

Figure 28 presents the monthly discharge distribution for the Buna/Bojana and Drin Rivers prior to their confluence during the period 2001-08.

Figure 28: Mean monthly discharge distribution (in m³/s) of the Buna/Bojana and Drin Rivers prior to their confluence



Occasionally, outflow from the lake into the Buna/Bojana is impeded due to increase in the flow of the Drin River. In the event of high Drin levels and low Buna/Bojana levels, Drin water can even enter Lake Skadar/Shkoder increasing its water level significantly. This happens mostly from December to February, but may also occur during other periods, depending on factors including the quantity of water released from hydropower dams (Vau Dejes) which, in turn, depend on rainfall as well as electricity demand.

The construction of dams on the Drin River (see Chapter 10.4) resulted in reduced suspended solids. However, confluence with the Gjader and Kir Rivers[28] enables transport of a significant load of sediments to the Drin and subsequently to the Buna/Bojana River. This load eventually accumulates on the riverbed of the latter, as well as at the Drin-Buna/Bojana confluence point, thereby further obstructing outflow from the lake. Due to the low gradient of its channel, the transport and erosive capacity of the Buna/Bojana to remove sediments from its riverbed is weak. Sediment accumulation in the bed of the Buna/Bojana results in regular flooding of nearby land.

Change in land uses adjacent to the river channel area has led to downsized floodplains and, thus, alteration of the ecosystem structure and hydrological functioning of the river. Before intensive drainage and melioration of the area, almost 50% of the whole Buna/Bojana River and delta region was regularly flooded.

In general, the Lower Drin – Buna/Bojana River and Lake Skadar/Shkoder watersheds are subject to a high risk of flooding (see Chapter 10.4 for more information on floods).

9.3 Hydrogeology

KEY HIGHLIGHTS

- A significant part (~24%) of the area consists of karst limestone formations, which offer considerable potential for groundwater exploitation.
- The coastal aquifers interact with the sea, including in the form of submarine groundwater discharges, which contribute to the creation of brackish water habitats in the coastal zone.
- A significant portion (~54%) of the plan area is classified as having low and very low vulnerability to groundwater pollution.
- Only 7.2% of the area can be considered as having very high and high vulnerability to groundwater pollution.

A significant part of the planning area consists of karstified limestone formations (~24% of the total), which present a very high permeability rate and thus offer considerable potential for groundwater exploitation. Most of this karstified rock mass is located in the west and northern parts of the plan area. Outcrops of this formation are regularly encountered during the course of the Buna/Bojana River, leading to strong interactions between the concurrent aquifers and the river. Karstified limestone is present in the broader area of the Buna/Bojana hydrological basin and the karstic aquifer extends beyond the Buna/Bojana catchment.

With these exceptions, the bed of the Buna/Bojana River is cut into alluvial, mainly loamy, deposits. Low permeability rocks such as Flysch formations are observed in ~26% of the plan area, while moderate to high permeability formations (usually alluvial) are encountered in ~50% of the plan area.

28 The Kir River is a spring flowing as a stream. The high load of suspended solids derives from severe erosion of its banks.

On the basis of lithostratigrafic composition, structure and spatial position of hydrogeological phenomena, the following permeable hydrogeological units (with potential for exploitation) have been recorded:

- Alluvial sediments are mostly represented by a complex of gravel, sand and clay, with frequent vertical and horizontal variations of these components. Transmissivity is mostly between 15-50 m^2/day, with a specific yield of 0.1-0.3 l/s/m and a maximum yield of 0.5-2l/s.
- Terrace sediments include more or less cohesive conglomerates and gravel, with limited spreading at the rim of Ulcinjsko field, deposited over the Miocene sediments.
- A group of Quaternary rocks of integranular porosity with low and good transmissivity is present. Transmissivity is low near the coast and increases towards the north. It consists mainly of gravely and sandy sediments, partly clayish. Transmissivity is mostly between 1,000-8,000 m^2/day, with a specific yield of 10-35 l/s/m and a maximum yield within the limits of 60-80l/s.
- The most important rocks from a hydrogeological point of view are the Upper Cretaceous and dolomitic limestones. They make up the anticline structure of Možura, Brivska Gora and Šasko hill in Montenegro and Karst aquifer of Renci anticline structure in Albania. This is a highly karstified terrain, marked with numerous superficial and underground karst forms with great potential for water exploitation.

As is frequently the case, and particularly where large karstic areas affect groundwater movement, river basins do not coincide with groundwater units; this is also the case in the Buna/Bojana basin.

The quaternary aquifers in the Buna/Bojana basin are recharged mainly through infiltration from the hydrographic network, with additional infiltration from precipitation and irrigation water. Karstic aquifers recharge mainly from precipitation. Recharge in the Albanian part of the area is estimated at 10.4 Mm^3/yr (Beshku, 2014).

The coastal aquifers interact with the sea, including in the form of submarine groundwater discharges, which contribute to the creation of brackish water habitats in the coastal zone. Submarine groundwater discharges to the Adriatic Sea in the Albanian portion of the plan area are estimated at 0.29 Mm^3/yr (Beshku, 2014), while no estimate exists for Montenegro.

Groundwater is extracted primarily for drinking purposes, with a secondary use being crop irrigation. Depending on local conditions, groundwater is exploited through wells, mainly in the plains and valleys, or through springs, most frequently in the hills and mountain areas.

The rich groundwater potential has created a trend for significant exploitation, and there are now indications of salinization in aquifers in the coastal area. Approximately 130 boreholes have been officially recorded, most of which are located in the karstic aquifer at the north part of the catchment and in the broader deltaic plain at the lower part of Buna/Bojana catchment. This number is not exhaustive.

Figure 29: Hydrogeological map of the Buna/Bojana basin

Figure 30: Main groundwater flow component in the Montenegrin part of the Buna/Bojana basin

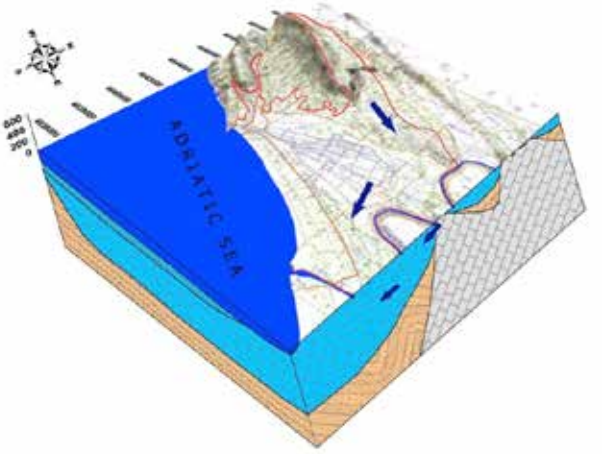


Table 7: Main hydrogeological formations and their extent in the plan area

Formations	% of total
Fissured and karstified porosity aquifer with high to very high permeability	23.56
Fissured porosity aquifer with medium to low fracture permeability	0.45
Moderately productive intergrannular aquifers with medium to low permeability	29.83
Practically impermeable rocks without considerable intergranular or fissured porosity	25.67
Productive intergrannular aquifers with very high to medium permeability	20.49

The rich groundwater potential has created a trend for significant exploitation, and there are now indications of salinization in aquifers in the coastal area. Approximately 130 boreholes have been officially recorded, most of which are located in the karstic aquifer at the north part of the catchment and in the broader deltaic plain at the lower part of Buna/Bojana catchment. This number is not exhaustive.

Total annual extraction of groundwater from aquifers in the Buna/Bojana plan area is estimated at just over 10.3 Mm^3 (~4.7 Mm^3 for Albania and 5.5 Mm^3 for Montenegro) (Radojevic, 2014). These estimates likely exclude consumption from many privately owned boreholes and wells and require updating and validation by a groundwater-monitoring programme (taking into account piezometric level fluctuations).

9.3.1 Vulnerability of groundwater to land-based pollution

Vulnerability of groundwater[29] to pollution in the Buna/Bojana basin was assessed using the COP method (see Part C "Water Resources Management: Situation Analysis").

Based on the results of the assessment,[30] the forested or semi-natural areas over flysch/non-permeable formations, as well as the cultivated sedimentary (medium to low permeability) areas at the southern, north and northeast parts of the watershed are classified as of low and very low vulnerability to groundwater pollution. This area represents ~54% of the Buna/Bojana basin. There is moderate vulnerability in the central, western and coastal parts of the basin (39% of the total area) where either karstic formations with significant soil cover and/or natural vegetation cover, or medium to low permeability porous formations with soil protective layers and natural vegetation are present. The area considered to have a very high and high vulnerability to pollution (7.2% of the Buna/Bojana basin) lies in the central, north-western and eastern part of the Buna/Bojana watershed, where there are calcareous formations characterized by a lack of thick overlying soil layer and/or without natural vegetation and slopes of low gradient.

Box 4: COP method

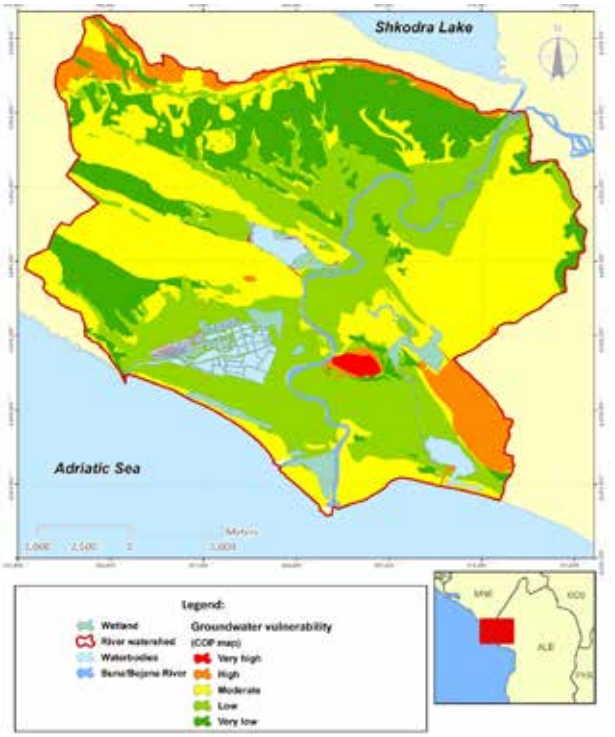
The COP method combines three different thematic maps: the Concentration of flow map, the Overland layer protection map and the Precipitation reduction map.

The "Concentration of flow" map ranks catchment areas according to the pollutants' potential velocity intrusion into the aquifer. Thus, karstic areas, shallow holes and highly fissured substrate with low to moderate slopes and sparse vegetation lead to low C map values (no protection = high risk), while absence of karstic features and high slopes lead to high C map values (low pollution risk).

The "Overland layer protection" map classifies the catchment according to the protective function of the overland soil layers. Therefore, areas with clayey, thick topsoil and low infiltration potential are classified as highly protected areas (low pollution risk), while areas with sandy, thin topsoil and karstic substrate are considered as low protected areas (high pollution risk).

The "Precipitation reduction map" refers to reduction of protection from precipitation patterns, since high intensity rainfalls in combination with moderate annual rainfall levels (800–1,600 mm) enhance pollutant drainage towards the aquifer (Zwahlen, 2004).

Figure 31: Groundwater vulnerability – COP map



29 Vulnerability is the measure of physical protection provided in the aquifer by topographic, geologic, soil and vegetative conditions in the catchment (pollution sources are not considered). There are several methods to assess coastal aquifer vulnerability. UNESCO IHP tested three methods as part of the MedPartnership Project. Two were specifically targeted at karstic environments of the Croatian coasts, which are highly exposed to both vertical and horizontal infiltration of pollutants and seawater intrusion, and one was tailored for alluvial coastal plains and estuaries of the Tunisian coast, where clastic sediments of varied granulometry accumulate and unconfined shallow aquifers are common and widespread.

Choosing the most effective method for the plan area was not simple. The area is large and extends well beyond the coastal area *sensu strictu*, including mountainous reliefs and highly variable lithology, from karstic carbonates to flysch and alluvial sediments. The COP method (Andreo et al., 2006) was eventually selected, in spite of being designed mainly for karst, due to its level of flexibility. The methodology assesses the protection provided to the aquifer based on physical properties of the area.

The method can be used in a comparative manner only (to identify areas more prone to pollution than others within the same catchment). Therefore, the classification scale of vulnerability can be used to depict the different magnitude of protective conditions within the particular catchment and cannot be considered in an "absolute" sense. In this regard, classification of an area as low vulnerability does not imply that the groundwater cannot be polluted, but means that the groundwater is more "naturally protected" than other areas classified as moderate or high vulnerability within the same catchment area.

However, the results obtained must be considered with caution, given the large size of the area, its complex geomorphology, and, especially, the lack of sufficiently detailed information. For more information see Part C "Water Resources Management: Situation Analysis".

30 There are limitations regarding data availability and accuracy in relation to land use, soil and vegetation cover. These limitations affect the accuracy of the output of the COP methodology used here. The Corine 2006 land use map was used.

9.4 Coastal and marine environment and processes

KEY HIGHLIGHTS

- The marine area under the direct influence of the Buna/Bojana River is defined by the sea surface salinity values (combinations of monthly isolines of 35 PSU average).
- Buna/Bojana freshwater runoff is one of the four main external factors driving Adriatic currents. It seems to be the dominant forcing factor for circulation in the early spring along with seawater coming from the Ionian Sea.
- The tidal regime presents high variability at daily, monthly and yearly timescales. Due to the flat bottom slope of the Buna/Bojana River, tides can "travel" upstream of the river for several kilometres.
- River sediments accumulate in the right mouth of the Buna/Bojana River, while the left mouth is under an erosion regime.

Most of the coastal and marine area is open and highly exposed to influences from the open sea, as well as to freshwater and sediment inputs from the Buna/Bojana River, which is the main factor responsible for the creation of sandy beaches in this area.

The extent of the area influenced by the river depends on river discharge, the temperature of freshwater and marine water, the morphology of the sea floor, sea currents, wave activity, and groundwater discharges of freshwater towards the sea, among other factors. Determination of the area under direct influence of the Buna/Bojana River is based on data on sea surface salinity (Figure 34).

9.4.1 Current, tide and wave regimes

Adriatic Forecasting System (AFS) simulations (Guarnieri et al., 2010) indicate that predominant currents are northward during winter and autumn and reverse during summer. Four main "external" forces drive marine currents in the area: (i) inflow of Ionian waters from the south; (ii) local winds; (iii) air-sea heat and water fluxes (collectively termed buoyancy forcing); and (iv) freshwater runoff from the Buna/Bojana River. Different factors are becoming dominant depending on the season. River freshwater runoff and entering Ionian waters seem to be the dominant forcing factors for circulation in early spring (Marini et al., 2010)

Although there are no precise datasets on the tidal regime, the AFS time series (Guarnieri et al., 2012) indicate that the dominant tidal frequency in the coastal zone of the plan area is semidiurnal, as in the rest of the Adriatic basin. Simulations for the Buna/Bojana River mouth (for the year 2003) show that the difference between mean higher waters and mean lower waters is approximately 30 cm, while the amplitude between the highest and lowest waters is approximately 50 cm. The maximum values of the zonal and meridional currents are approximately 5-6 cm/s and present high variability at daily, monthly and yearly timescales. As the bottom slope of the Buna/Bojana River is quite flat, tides can "travel" upstream of the river for several kilometres.

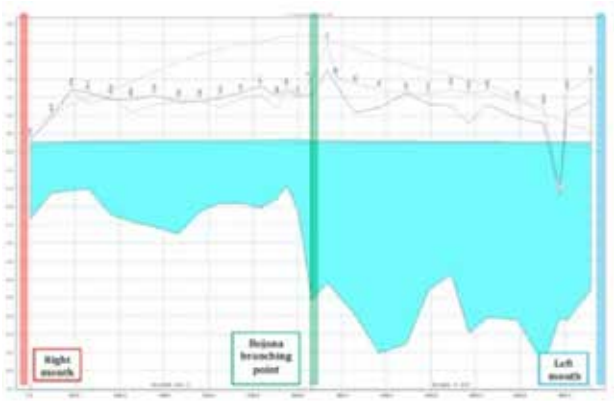
Information regarding wind waves in the coastal zone is very limited and insufficient. Moreover, most of these data have been collected through visual observation from ships, providing only qualitative estimates. Based on studies undertaken during the Adricosm-Star project, using the SWAN wave model, it can be concluded that the majority of waves in locations in front of the Buna/Bojana River mouth come from the south-west with an average significant wave height of 2 m and highest values of 4 m.

9.4.2 Coastal sediment transport

River fluxes influence a number of parameters including sea surface salinity. Aside from certain physicochemical parameters (see Chapter 10.5), the latter is the only parameter for which information is available. Salinity levels are lowest at the area between Buna/Bojana River and Ulcinj Salina (Figure 33). The area under the direct influence of the Buna/Bojana River is designated using combinations of monthly isolines of 35 PSU as an average sea surface salinity value (see Figure 34). The area covers the Montenegrin part of the coast included within the catchment.

Sediment investigations in the Buna/Bojana delta are rare and insufficient.[31] However, it is evident that sediments accumulate in the right mouth of the Buna/Bojana River, while the left mouth falls under an erosion regime (Figure 32). The main outflow of sediments and freshwater clearly occurs from the left branch, which is much deeper than the right one. The most important seasons for sediment transport along the river are winter and autumn, when water flow in the river is highest.

Figure 32: Longitudinal profile of the right (western side) and left (eastern side) Bojana River branches, starting from the branching point (green line) up to the sea mouth



Source: Adricosm-Star project.

The coastal area in front of the right branch of the delta is a sediment accumulation area, despite low input from the river. The coastal area in front of the left branch, on the contrary, is characterized by erosion (see Chapter 10.4.2). During the winter and autumn seasons, in spite of strong input from the river, the quantity of sediment from the river and from advection in the sea is not high enough to balance the erosion effect caused by the combined activity of waves and currents. As a result, the currents and waves carry sediment material away from the river mouth

31 Related work and analysis is still continuing under the Adricosm-Star project and final results are as yet unavailable.

along the coastline. Conversely, the period from May to October is characterized by a balance between erosion and deposition.

Simulated interactions between Buna/Bojana River plume and waves at the mouth of the river (Adricosm-Star project) show that river plume (containing sediments) tends to deviate south-east of the river, thus indicating a possible accumulation region south of the Buna/Bojana. Sediments are also advected south-east from the river mouth as a result of waves and seasonal (spring and summer) currents in the river delta. However, currents and waves reverse during winter and autumn, giving rise to the possibility that some sediment will also be transported north.

Figure 33: (a) Salinity values in the coastal area in April (annual maximum) and (b) Salinity values in August (annual minimum)

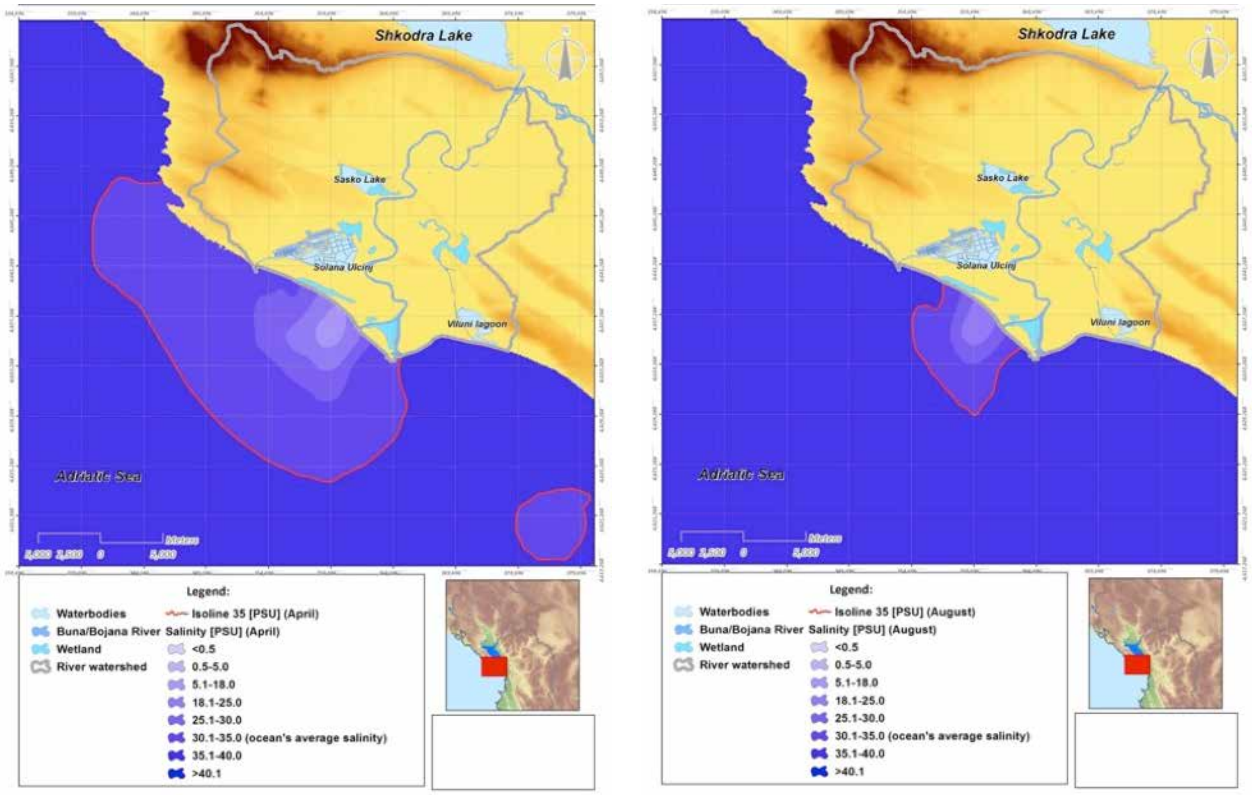


Figure 34: Marine area with the direct influence of freshwater from the Buna/Bojana River

10. MAJOR PRESSURES AND IMPACTS ON THE NATURAL ENVIRONMENT

Analysis of pressures and impacts on the natural system in the plan area enables the identification of measures to encourage action towards sustainable growth, and to preserve ecosystems or improve their status, as appropriate.

This chapter analyses the main pressures on natural values, related hydrological, hydrogeological and hydromorphological issues, and the effects of climate change and pollution.

10.1 Pressures on natural values

The Buna/Bojana delta is a highly dynamic natural system that experiences a variety of impacts which threaten its natural balance, in particular its sensitive coastal ecosystems. These impacts are present on both sides of the plan area, but some are more significant for for one side than the other.

Increasing **tourism** and **human habitation** cause several adverse impacts on natural values:

- *Loss, degradation and fragmentation of natural habitats, particularly coastal and wetlands habitats*. The most threatened coastal habitats are **sand dunes** in Baks-Rrjolli near Velipoja and Velika Plaža in Ulcinj, which hosts unique and rare halophyte vegetation.[32]

- *Landscape degradation*. Tourism-related construction and new infrastructure and urban areas are causing physical and visual changes to landscape characteristics. These are particularly evident in newly constructed zones such as Štoj area in the hinterland of Velika Plaža.

- *Pollution of marine and freshwaters due to increased discharge of polluted and untreated wastewaters*. According to overall assessment of the status of water bodies, the most threatened are the waters of the Buna/Bojana River and **coastal waters** (see Chapter 10.5). As a consequence of pollution, **eutrophication** phenomena have been observed, particularly in Port Milena and the Buna/Bojana River.

- *Disturbance*. The presence of tourists and visitors in natural areas, particularly in the wilderness, disturbs and moderates (spatial distribution/aggregation) biodiversity, particularly during the peak **summer season** (July – August).

Direct use of natural (primarily **biological) resources** cause significant *loss of biodiversity* due to:

- *Fishing*. Intensive and destructive[33] impacts can be caused by unsustainable fishery practices, such as: (i) the use of nets with a small mesh size, (ii) trawling in depths <50 m, and (iii) the use of dynamite and electricity. Illegal collection[34] of date mussels (protected species) is also present. Fish catch on the Albanian side decreased by 20-80% over the last 25 years.[35][36] According to police reports (Dan online, 2015) 35 dynamite fishermen have been identified in Ulcinj.

- *Hunting*. Similar to fishing, this practice is also destructive, 37 poorly controlled and very often illegal. Hunting is formally banned in Velipoja (core area) and Ulcinj Salina.

- *Loss of local agricultural varieties and breeds*. Due to the introduction of new agriculture species and varieties (cattle, crops, vegetables, etc.), local examples such as the Ulcinj sheep "**Ljaba**" are declining and disappearing (MSPE, 2010b).

Plans for **drying** wetland/water areas are a potential cause of impacts that can endanger biodiversity over a wider area, particularly fish populations. At present, general hydrological processes are diminishing smaller wetlands zones, such as swamps ("knete") around Ulcinj Salina.

The natural values of the plan area are also threatened by invasive/alien species.

Among marine **invasive species**, the following are present in plan area: (i) fishes: *Tylosurus acus imperialis* and *Sphoeroides pachygaster* (ii) decapods – crustaceans: *Callinectes sapidus* (2006, Port Milena); and (iii) plants: *Caulerpa racemosa*. Populations of introduced non-native fish such as Goldfish (*Carassius auratus gibelio*), European perch (*Perca fluviatilis*) and Topmouth Gudgeon (*Pseudorasbora parva*) have previously had negative impacts on populations of native fish species, such as cyprinids, and especially the commercially important wild Carp (*Cyprinus carpio*). Terrestrial invasive plant species are poorly investigated, but the following are often present: Black Locust (*Robinia pseudoacacia*), which is almost resident, Chinese Sumac (*Ailanthus altissima*) and Paper Mulberry (*Broussonetia papyrifera*), which is present in urban areas.

In general, low level of public awareness about environmental issues is a persistent problem resulting in lack of appreciation of ecosystem services and natural values.

32 These include the following endangered halophytes and psamo-halophytes: *Cakile maritima, Xantium italica, Salsola kali, Euphorbia peplis, Euphorbia paralias, Polygonum maritimum, Atriplex hastate, Echinophora spinosa, Eryngium maritimum, Agropyrum junceum, Medicago marina, Inula crithmoides, Lagurus ovatus and Cuscuta sp.*

33 Destruction affects other marine organisms and habitats, not only fishes.

34 The collection of date mussels (*Lithophaga lithophaga* L.) causes severe destruction of submarine rocky habitats.

35 Source: (Albaninan) Fishery Management Organisation.

36 Data indicate that Twaite shad are in a critical condition, while sturgeon species are only very rarely present or completely missing in the Buna/Bojana River.

37 Massive destruction of migrating birds was observed on the Albanian side in February 2012. Decrease in bird populations on the other side of the area is estimated to be in the range of 10-20% (Schneider-Jacoby, unpublished).

10.2 Hydrological and hydrogeological issues

10.2.1 Water budget

The water budget of the Buna/Bojana basin is calculated for the period July 2006 – October 2009.[38] The methodology used, the calculations made and the analysis conducted are presented in Part C "Water Resources Management: Situation Analysis". The meteorological stations indicated in Figure 35 produced the data series for the hydrologic and water quality estimations and calculations made in this study.

The results of the monthly water budget analysis of the Buna/Bojana basin indicate that:

- 40.1% of the total amount of water available (770.8*106 m^3) is evaporated and transpired, 15.0% is used for irrigation, and 4.3% covers domestic and industrial needs.

- 39.4% of the total amount of water is either stored surficially in the numerous water bodies and wetlands of the basin, absorbed underground by porous and karstic formations, or discharged directly from the Buna/Bojana River or underwater springs into the Adriatic Sea.

The above data indicate that there is generally high water availability in the plan area.

Nevertheless, the amount of water necessary to support the ecosystems has not been quantified and taken into account. In this regard, it is likely that an increase in abstraction rates (water use for human activities) may have a direct or indirect effect on water-dependent ecosystems.

Equally important, increased abstractions could have an effect on the water resource replenishment rate, resulting in deficits in the water balance and, hence, reduced water availability, with possible effects on the aquifer's water table and water quality.

Additional hydrological and hydrogeological monitoring and data of sufficient quality and quantity in terms of land and water uses are necessary to more precisely assess the water budget. This information could then be used to support managerial decisions related to allocation of water for different uses, should this be necessary.

The effects of climate change may be important in this area (see Chapters 10.4; 11.3.1, 11.3.2 and 11.4.1); however, these effects could not be quantified in this study. Mitigation and adaptation measures should be taken to address alterations in the hydrological cycle that could affect water replenishment rates.

38 This is the period for which complete hydrologic and meteorological data series, appropriate for use, were made available to the project. The water budget was calculated using data for precipitation, surface water inflow, actual evapo-transpiration, discharge to the sea, and water used for irrigation, domestic and industry. Groundwater exchanges between the Buna/Bojana catchment and neighbouring basins were considered for the purposes of the calculations to be negligible.

10.2.2 Groundwater[39]

Decreasing groundwater levels may be an issue in the area. In Albania, related anecdotal evidence from observations of abandoned wells indicates that coastal aquifers remain under pressure, but with decreased piezometric levels. Scientific work undertaken in the area also provides limited indications of this phenomenon (Puri, 2010;[40] the work was carried out in the Montenegrin part of the Buna/Bojana area; see Part C "Water Resources Management: Situation Analysis").

The geophysical structure of the Buna/Bojana River favours salinization phenomena. The base of the river is below sea level and therefore seawater may flow along the river bottom[41] and interact with the alluvial aquifers. According to Puri (2010), measurements of total dissolved solids (TDS) in alluvial aquifers indicate levels ranging from 151 to 2,944 mg/l. A review of the hydrogeology (Puri, 2010) of saltpans in the plan area, which are directly in connection with seawater, indicate at least a partial connection with the surrounding alluvial aquifer, despite the fact that saltpans are engineered structures.

There are some indications of inflow of saline water from alluvial aquifers into karstic aquifers:

- Following the wet season when groundwater levels are at the highest point, the Gac spring in Montenegro, which discharges from a karstic aquifer in the plan area, yields a maximum of 1,000 l/s. In summer, when groundwater levels decline, spring discharge nearly vanishes and the water discharged is saline. It is possible that overextraction results in decreased groundwater levels and this causes intrusion of saline water from alluvial aquifers in contact with the sea (Radojevic, 2014).

- In Ulcinj, extracted groundwater used for irrigation has been observed to demonstrate elevated salinity. This may be a result of seawater intrusion induced by decreased groundwater levels (Radojevic, 2014).

- In Albania, TDS levels have been measured between 4.1 and 16.8 mg/l in the Velipoja Plain (Beshku, 2014).

39 Groundwater quantitative and qualitative data for the area are very scarce and only a few instantaneous measurements exist for low-depth constructed wells and two exploratory boreholes. The few available data in this study cannot be considered as representative and adequate for evaluating groundwater status in the area. There is therefore an urgent need to establish a groundwater-monitoring programme to assess with accuracy the qualitative and quantitative status of aquifers. In particular, a detailed study should be conducted to examine possible seawater intrusion in the aquifers.

40 Between 2008 and 2010, UNESCO-IHP conducted the AQMOD hydrogeological study into aquifers in the Bojana delta of Montenegro. AQMOD is the Bojana Bay catchment Aquifer Model component of the ADRICOSM-STAR Project. The study aimed to model the behaviour of coastal aquifers in the Bojana Bay of Montenegro. A 3D aquifer system model was prepared that included a review of archive data, formulation of a preliminary conceptual model, a field campaign, exploratory drilling, and finally a synthesis of all gathered data into a model.

41 This hypothesis is supported by the fact that marine macro-invretebrates were found high upstream during sampling performed to assess the ecological status of the basin (see Part C: "Water Resources Management: Situation Analysis").

Table 8: Meteorological stations in the wider area of the Buna/Bojana watershed used to calculate the water budget

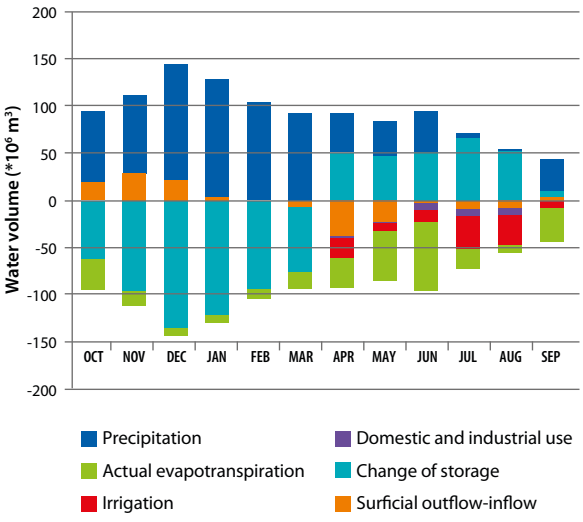
a/a	Name	WMO	Owner	lat	lon	Thiessen weight
1	Ulcinj	WMO13464	Hydrometeorological Institute of Montenegro	41.916667	19.216667	0.4
2	Bushat	-	Institute of GeoSciences, Energy, Water and Environment	41.964500	19.536461	0.1
3	Fshati	-	Institute of GeoSciences, Energy, Water and Environment	42.053250	19.489064	0.2
4	Velipoje	-	Institute of GeoSciences, Energy, Water and Environment	41.870442	19.427647	0.3

Table 9: Water budget of the Buna/Bojana watershed, July 2006 to October 2009

Month	Precipitation	Actual evapotranspiration	Irrigation	Domestic and industrial use	Change of storage and runoff
	*106 (m^3)				
October	76.6	31.1	0.3	1.1	62.7
November	82.8	14.7	0.0	1.0	95.7
December	121.5	8.4	0.0	1.1	133.7
January	126.0	7.2	0.0	1.1	120.2
February	103.3	8.9	0.0	1.0	93.2
March	93.5	17.6	0.0	1.1	68.0
April	42.9	32.1	22.2	1.0	-49.6
May	37.4	52.4	7.6	1.1	-46.5
June	45.5	73.0	12.6	7.7	-49.4
July	5.4	20.6	34.3	8.0	-66.2
August	2.2	7.3	32.2	8.0	-52.3
September	33.8	35.6	6.4	1.0	-5.8
Total *106 (m^3)	770.8	309.0	115.6	33.2	303.7
Total (%)	100.0%	40.1%	15.0%	4.3%	39.4%

Figure 35: The main meteorological stations in the plan area

Figure 36: Water budget of the Buna/Bojana watershed, July 2006 to October 2009



10.3 Climate change

Climate change is an increasing threat to both natural biodiversity and agrobiodiversity, which are particularly sensitive to changes in temperature and water regime. For example, the appearance of the alien fish species *lessepsian migrant* and *Fistularia commersonii* (Joksimović, Dragicević and Dulčić, 2008) in the Adriatic Sea near Bar (2007) is indicative of changes attributed to climate change.

Potential impacts from climate change in the plan area for the period up to 2050 (UNEP-MAP RAC/SPA, 2008) may include:

- *Increase of temperature* especially during the summer and with a notable difference between land and sea temperatures;
- *Reduction of precipitation* especially during summers, with a reduction in the relative humidity of air and land and an increase in evaporation;
- *Increased frequency of extreme weather conditions*; and
- *Sea-level rise*.

10.3.1 Temperature

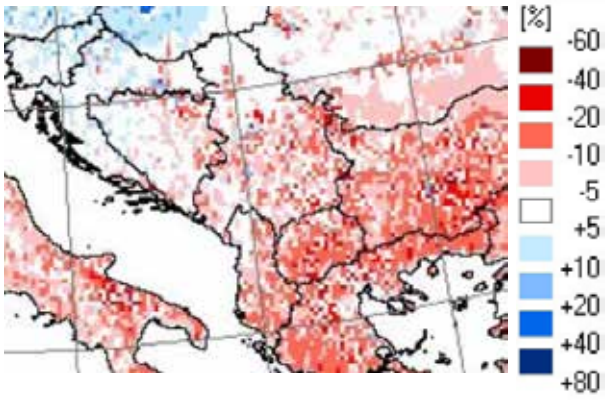
The Initial National Communication of **Montenegro** on Climate Change to the United Nations Framework Convention on Climate Change (UNFCCC), regarding the regional climate model EBU-POM, states that existing changes in temperatures fall within the range of 0.1–1.0°C, but that some scenarios for the period up to 2100 predict changes of up to 4.8°C. The Second National Communication of Montenegro on Climate Change to UNFCCC states that, according to the A1B scenario, heatwaves will last on average two times longer in the coastal region, with three heatwaves per year.

Results of analyses developed for the Third National Communication of **Albania** to UNFCCC (UNDP, 2014), show that the Albanian Costal Area is likely to become warmer. The annual average temperature for the northern part of the coastal area is 14.3°C. It is expected to increase up to 1.8°C (15.6–16.1°C) in the north by 2050 and up to 4.2°C (17.1–18.5°C) by 2100. Temperature increase in all seasons is expected, but summer projections seem to be extremely problematic. The highest warming with the greatest contribution in annual temperature change is likely to reach up to 5.3°C (4.6–6.0°C) by 2100. The number of days with temperature above 35°C is expected to increase by 7-14 days by 2050, along with the number of heatwaves (UNDP, 2014).

10.3.2 Precipitation

In terms of annual precipitation and rainfall, the World Bank (Pollner, Kryspin-Watson and Nieuwejaar, 2008) notes that the north-western tip of South-East Europe will see an increase in rainfall of 5% over 2071-2100 relative to 1961-90. However, annual mean precipitation in the rest of the Adriatic coastline and the Western Balkans region (including Albania) is expected to decrease by 10-20% over the same period (European Commission, 2007). Moreover the World Bank notes that annual runoff is expected to fall sharply by 25% (Figure 37).

Figure 37: Change in mean annual precipitation over 2071-2100 relative to 1961-90



Source: EC, 2007.

Projected changes in precipitation show a change in the seasonal distribution of rainfall, with the most significant changes occurring in the summer months (June-July-August).

In relation to the rainfall model for **Montenegro**, results show negative and positive changes in precipitation, depending on the part of country and the season.[42] Negative changes, according to the A2 scenario, go up to -50% in the southern part of Montenegro during June-July-August. The scenario for changes in precipitation and temperature up to 2100 implies significant disturbance in the balance of water resources. Given the high degree of correlation between precipitation and the volume of flow and yield – in accordance with future climate scenarios in which precipitation is expected to decrease by different percentages ranging up to 50% in certain periods (A2 scenario for the period 2071-2100) – a reduction in the overall water balance (water potential) in certain areas can be expected by as much as 50%.

For **Albania**, annual reductions in precipitation are anticipated: up to -8.5% (from 47.4% to -64.4%) by 2050; -14.4% (from 81.1% to -109.9%) by 2080; and -18.1% (from 99.0% to -135.5%) by 2100. Demand for water could increase, especially in summer (UNDP, 2014).

Impacts related to sea level rise and extreme events are examined further in the following chapters.

10.3.3 Sea level rise

Sea level rise has a special significance because it contributes significantly to factors that cause flooding, coastal erosion and disappearance of the flat surface of the coastal area, as is the case with Ada Bojana on the south-eastern coast of Montenegro. In addition, sea level rise increases the intrusion of saltwater into mainland areas and causes threats to coastal ecosystems and wetlands. The high risk of flooding also poses threats to human life, property, tourism, infrastructure and transport among others. On a global level, sea level rise projections for the twenty-first century are in the range of 9-88 cm, due mainly to thermal expansion of the ocean.

42 The Initial National Communication of Montenegro on Climate Change to UNFCCC.

Table 10: Projection of changes in annual sea level

	Sea level rise (c[m])	
Years	2050	2100
Average	14.6	37.8
Maximum	26.4	72.6
Minimum	7.2	15.2

Figure 38: Sea level rise in the plan area in Albania

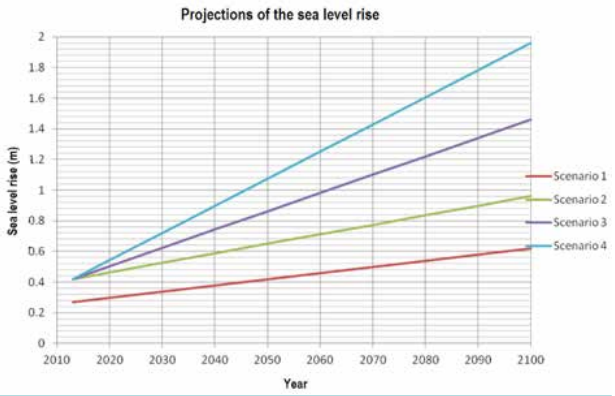
The Albanian Costal area is prone to subsidence, which might intensify the impact of sea level rise. Results for the Albanian coastal area indicate that the sea level is likely to increase on average by up to 40 cm, reaching a maximum level of 73 cm by 2100 (UNDP, 2014) (Table 10).

Figure 38 shows the flooded area due to maximum projected sea level rise. The combined effect of sea level rise and storm surges may cause even more extensive flooding in the area.

The analysis of sea level rise in the Montenegrin coastal area was done within CAMP Montenegro.[43] The analysis was conducted to determine the zone of flooding or vulnerability of the coast to sea level rise. Projections derived from climate models recommended by the International Panel on Climate Change (IPCC), as well as projections based on semi-empiric methods of certain authors, have been taken into account in the analysis. Transference of projected sea level rise for the Montenegrin coastal zone into space was achieved through application of the digital terrain model (DTM), without the use of techniques to downscale global models to regional level, and by taking into account changes in sea level in the Adriatic basin. Effects caused by strong winds and waves were not considered in the assessment, but thermic expansion of the sea, glacier melt and the highest local sea level rise for the period 1978-2013 were taken into account in making sea level rise projections. Taking into account the above, the analysis proposed four projected scenarios of sea level rise (0.6–2 m) in the coastal zone of Montenegro by 2100 (Figure 39).

43 Vulnerability Assessment of the Narrow Coastal Zone-Sea Level Rise.

Figure 39: Linear interpolation of sea level rise projections under four scenarios



Considerations and conclusions pertaining to application of the four sea level rise scenarios[44] for the Montenegrin coastal zone have been mapped with precision through the use of high resolution LiDAR data, and an estimation of the spatial implications for sea level rise implications has been made. Given the fact that sea level rise estimates are long term in nature (referring to the year 2100), an assessment was performed to calculate the probability of occurrence, both at present and in the near future, based on application of the assumptions presented above.

The assessment produced two key recommendations for the size of flood zones and vulnerability of the Montenegrin coast:

- The results of the first scenario (sea level rise of +0.62 m in the DTM) should be integrated into each future spatial plan.
- The results of the second scenario (sea level rise of +0.96 m in the DTM) should also be integrated. These correspond to maximum sea level rise in current, but still rare, emergency situations of coastal zone flooding due to the impacts of strong winds. This is especially important in the context of application of data to projected impacts of sea level rise in the Montenegrin coastal zone during development of the Special Purpose Spatial Plan for the Coastal Zone of Montenegro. According to the data of the Institute of Hydrometeorology and Seismology of Montenegro (acquired over a longer period of time at tide gauge stations along the Montenegrin coast) and estimations of existing tide impacts, as well as data that refer to meteorological factors, sea level rise of 0.69 m is presently occuring during storms.[45]

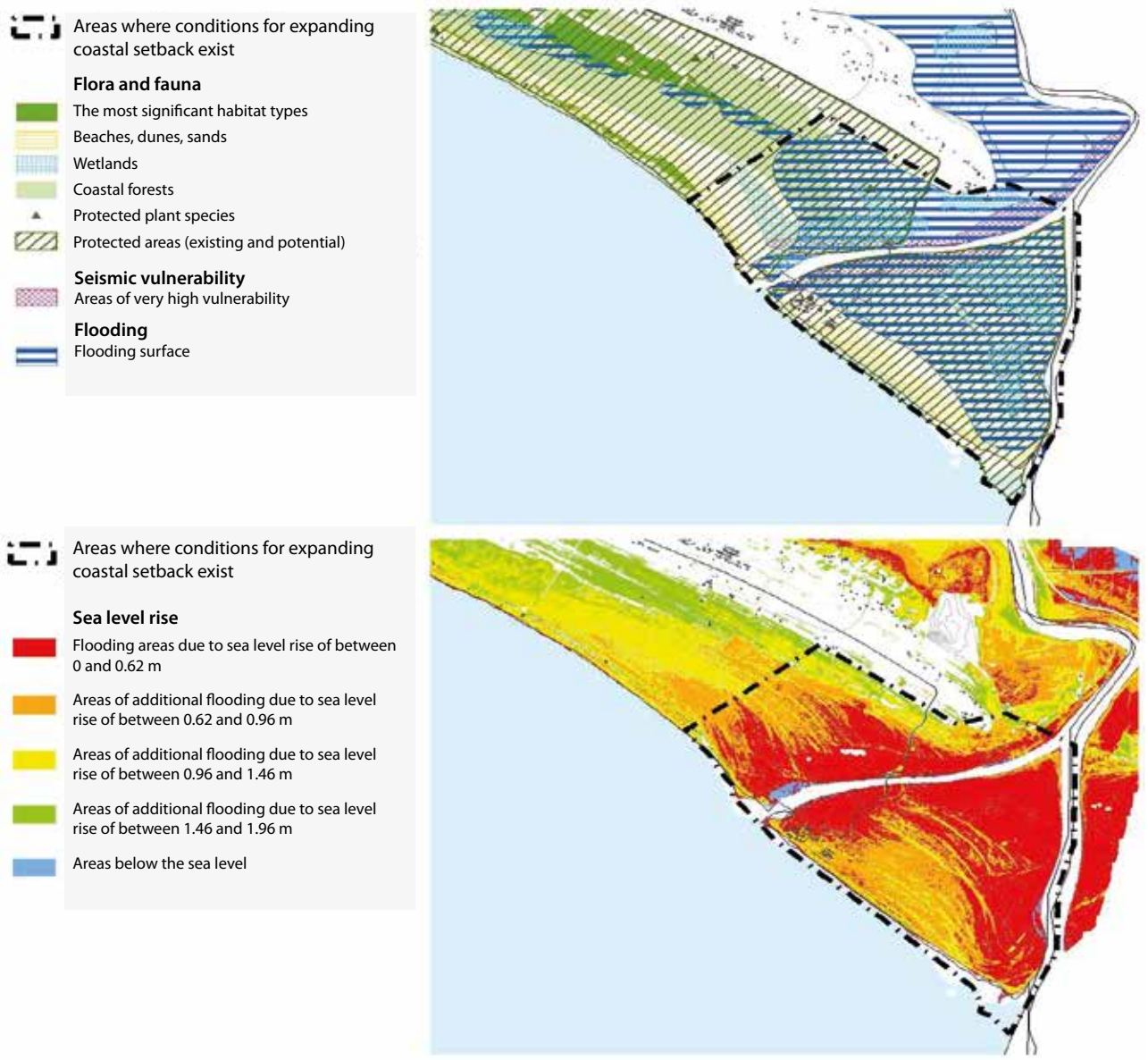
Sea level rise will probably have significant effects, particularly on coastal lagoons and estuaries. With increasing salinity there may be shifts in the nature of the ecosystems (Figure 40).

Thus the possible ranges of SLR projections for the Buna/Bojana region vary (based on the methodology applied) but could range from 7 to 26 (Albania) for the 2050s, and 15 to 73 (Albania) for the 2100s with 62 being the most likely scenario (as applied for Montenegro).

44 The scenarios are based on analysis of data from the literature and are in line with IPCC projections and relevant semi-empirical methods.

45 This value does not take into account calibration of the sea level in relation to the Trieste vertical datum – 0.27 m.

Figure 40: Storm and sea level rise impacts – Ada Bojana



The combined effect of sea-level rise and storm surges could lead to flooding of the coastal environment, which may not able to adapt to the predicted changes, particularly if natural assets are irreversibly altered (UNDP, 2014). The final report of the PESETA study (Ciscar, 2009) estimates the number of people expected to be affected by coastal floods due to sea level rise for different regions in Europe under different climate change scenarios. Without adaptation, the number of people expected to be flooded annually in Southern Europe is estimated at 456,000 under the A2 scenario (3.9°C temperature increase during 2071-2100 and high sea level rise). For the same scenario, land loss as a percentage of the regional total for Southern Europe is estimated at 0.783%, which is valued at USD307.42 million, when no adaptation is considered.

10.3.4 Extreme weather events

Climate change is expected to have significant impacts on extreme weather events in Europe (IPCC, 2007). These impacts are likely to increase, resulting in significant damages if no action is taken. Hence, adaptation to such events needs to be planned, including future infrastructure design and changes in land use. Changes in the hydrologic regime of the river under different climate change scenarios should be assessed and quantified in this regard.

Water demand management measures should be designed and implemented in the short term as future water demands are expected to grow as a result of economic development (e.g. tourist industry), while the potential increase in air temperature will also enhance water losses (due to increased evapotranspiration).

The World Bank (Pollner, Kryspin-Watson and Nieuwejaar, 2008) notes that South-East Europe (which includes Albania and Montenegro) will be one of the European regions hit hardest by global warming. It also notes that temperatures are expected to increase by 1.8°C for the years 2030-49 and that the highest increases will occur in Albania and Montenegro among other countries.

According to the Second National Communication of Montenegro on Climate Change to UNFCCC, climate change is expected to increase the frequency and severity of many types of extreme events, including floods, droughts, forest fires, storms (i.e. extreme cyclone) and wind storms, as well as the nature of many other hazards not directly related to weather conditions (i.e. landslides), in relation to analysis of observed extreme events on the Montenegrin coast up to 2010. Thus far, trends of observed changes and projected changes in climate extremes coincide. The World Bank (Pollner, Kryspin-Watson and Nieuwejaar, 2008) also states that, for South-East Europe, the decrease in precipitation and increase in temperature will lead to greater frequency and severity of drought. UNDP notes that the occurrence of severe, moderate and dry droughts is expected to increase in Albania by 2100. Records of the highest maximum temperatures in Montenegro indicate that in the region of the Montenegrin coast the highest maximum temperatures occured during the decade 1981-90.[46] The drought of 2003 resulted in an agricultural drought that mostly affected the coastal region. The drought of 2007 was long and in addition to an agricultural drought also developed into a hydrological drought, which affected all regions of Montenegro. The drought of 2011, which was meteorological in type, lasted for a very long period of time and resulted in agricultural, hydrological and socio-economic impacts.

Monitoring and assessment of climate in Montenegro shows that heatwaves are occurring more frequently and that their length shows great variability from year to year. Over longer periods, there has been a successive increase in the duration. Analyses for Montenegro show that long-lasting heatwaves are dominant during August, while in June and July heatwaves are short in duration. Frequent and long-lasting heatwaves have contributed to greater frequency of extreme temperatures, and therefore warmer climate in Montenegro.

In addition, despite the overall decrease in rainfall in South-East Europe, an increase in storm days with about 3-5 days of hazardous rainfall can be expected by 2100 (UNDP, 2014). Research undertaken within CAMP Montenegro[47] of observed data and damage due to storms indicates that storms (well-developed cyclones) have occured more frequently and with greater intensity since 1998, bringing heavy rains, storm to hurricane-force winds, high waves and flooding of wider areas along the coast. In terms of maximum daily rainfall (an absolute record), the results show that the decade 2001-10 was the second greatest for extreme rainfall in the coastal area.[48] Heavy rains may occur either within a well-developed cyclone (ie. storm) or as a result of strong local instability of air.

Despite the fact that decrease in total precipitation combined with higher evaporation would probably result in overall lower runoff, extreme changes in weather conditions (drought and severe storms) could lead to an overall increase in flooding in the Buna/Bojana area. Data from the PESETA project present the relative change in river discharge for flood events in Europe that have a probability of occurring once every 100 years between the scenario period (2071-2100) and the control period (1961-90).[49] This is shown in Figure 41.

Pasari, Orli and Mohorovi (2004) predict that the northern Adriatic coast will be prone to more severe and longer lasting floods due to higher wind speeds, which will intensify storm surges. According to the World Bank (Pollner, Kryspin-Watson and Nieuwejaar, 2008), the evidence shows that when South-East Europe does receive rain, the intensity of precipitation will increase. They also note that drought conditions combined with intense bursts of precipitation may lead to flash floods. This could result in greater soil erosion rates and an increase in the risk of landslides.

For the Buna/Bojana region (indicated with a pink circle in Figure 41) there **appears to be a 20-40% increase in river discharge** for flood events with a probability of occurring once every 100 years between the scenario period (2071-2100) and the control period (1961-90). **This implies that 100-year flood events in this region will become more severe**. To quantify the impacts would require detailed modelling at the catchment level, which was beyond the scope of the current research. Given the importance of flooding in the coastal zone, this is an area that needs further investigation.

The PESETA study estimates the physical impacts of river floods in terms of the additional expected population affected at about 49,000 people per year for Southern Europe (A2 scenario, 3.9°C temperature increase during 2071-2100 scenario from the baseline period of 1961-90). This translates into additional expected economic damages of about €2,122 million per year (Ciscar, 2009).

The vulnerability analyses on climate change and extremes presented in the Second National Communication of Montenegro to the UNFCCC indicate that the reduction in number of days with heavy rains (over 20mm) is largest in the coastal area of Montenegro (Figure 42). Reduction in the number of days with heavy precipitation and increased precipitations in those days indicates a higher intensity of rainfall in the future, and intensifying weather events such as convective storms, which can lead to flooding. According to the A2 scenario, intensive local summer storms with heavy winds and heavy, brief rainfall affect Ulcinj, Bar and Herceg Novi. It also highlights the high degree of vulnerability in this area to damage caused by stormy winds and heavy rains. The area of Lake Skadar and the Bojana River is also highly vulnerable to **flooding**, which can threaten important agricultural area, material goods and the urban zone.

Leckebusch and Ulbrich (2004) find a 20% increase in the maximum track density of extreme cyclones for Europe under the A2 (2070-99) scenario, compared to the control period of 1960-89. In other words, they find a 20% increase in the frequency of the top 5% of winter storms (October–March) for Europe. From the figures presented (Leckebusch and Ulbrich, 2004: 189-191), the control period (1960-89) daily maximum wind speed for the Buna/Bojana region appears to fall within the range of 11-14 m per second (m/s) (Figure 43).

46 The Second National Communication of Montenegro on Climate Change to UNFCCC, 2015.

47 CAMP-Coastal Area Management Programme of Montenegro, 2011-2014.

48 The Second National Communication of Montenegro on Climate Change to UNFCCC, 2015.

49 See http://peseta.jrc.ec.europa.eu/docs/Riverfloods.html

Figure 41: River discharge for flood events: change in 100-year return level

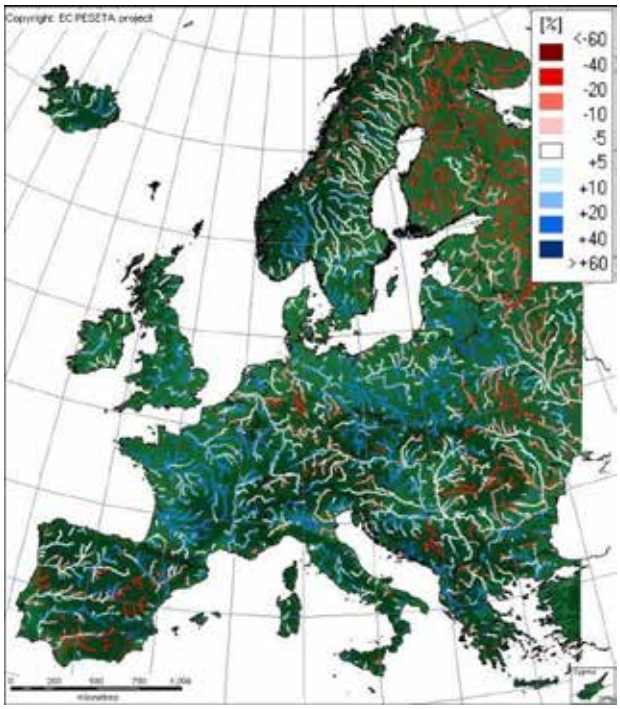
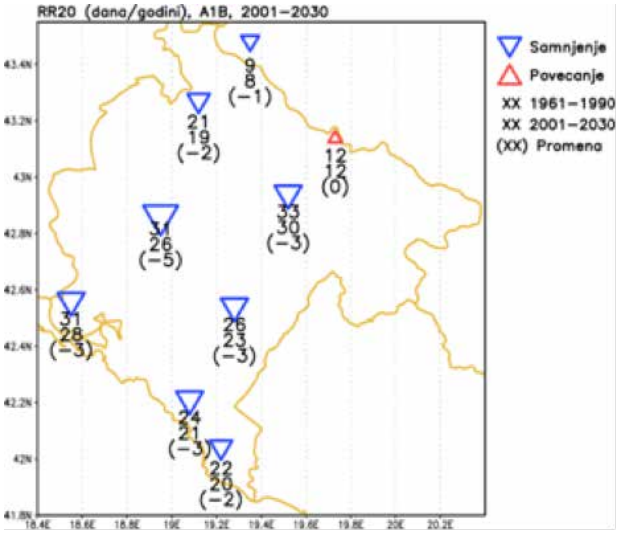
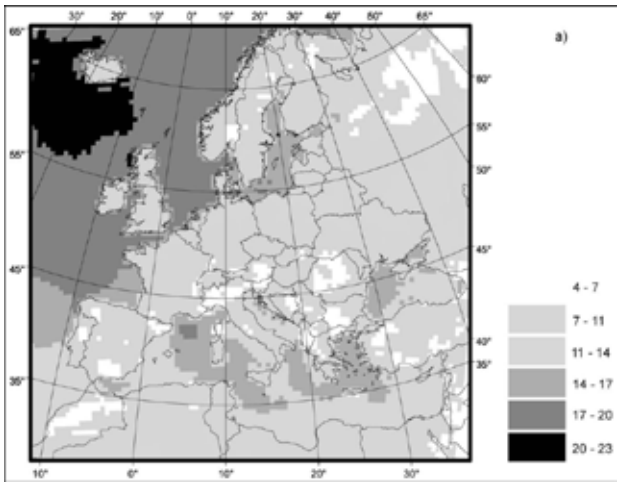


Figure 42: Days with heavy rains



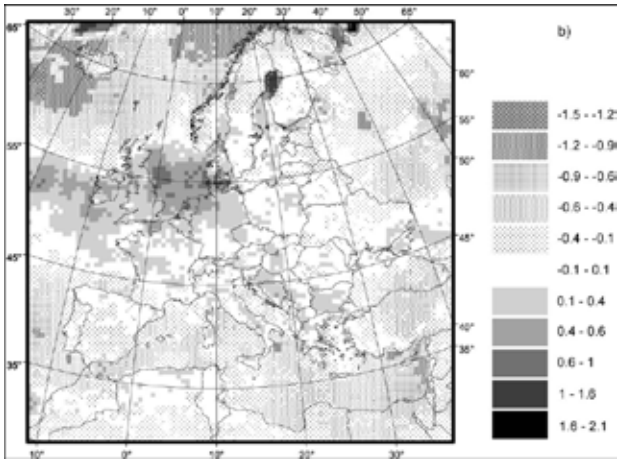
Source: The Second National Communication of Montenegro to the UNFCCC.

Figure 43: HadRM3H, 95th percentile of winter (October–March) 10-m daily maximum wind speed in metres per second for the control period (1960-89)



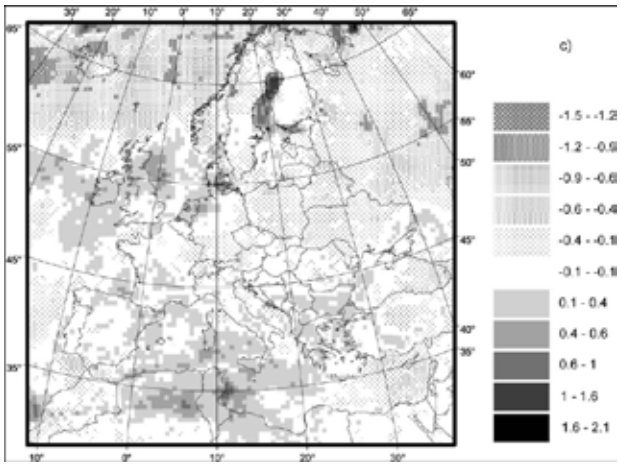
Source: Leckebusch and Ulbrich, 2004.

Figure 44: HadRM3H, 95th percentile of winter (October–March) 10-m daily maximum wind speed in m/s: difference A2 (2070-99) – control



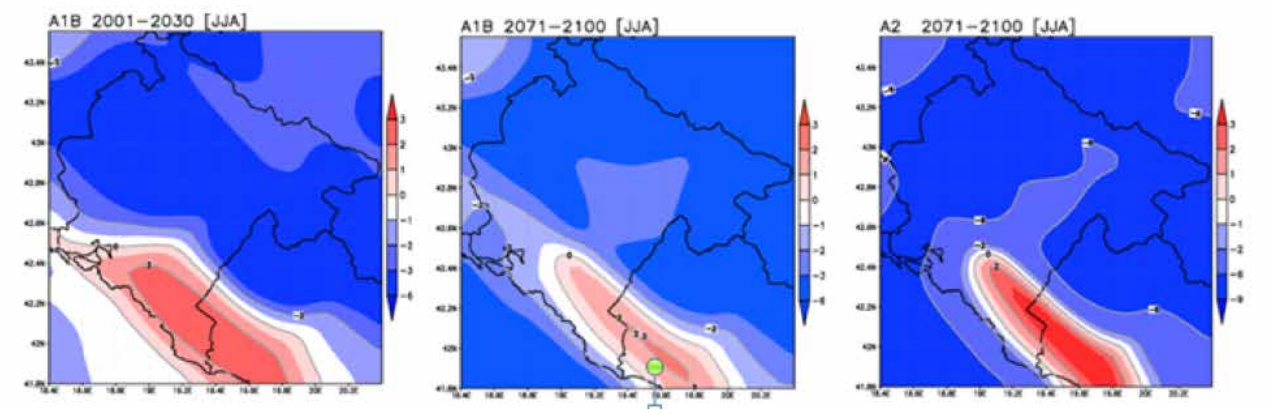
Source: Leckebusch and Ulbrich, 2004.

Figure 45: HadRM3H, 95th percentile of winter (October–March) 10-m daily maximum wind speed in m/s: difference B2 (2070-99) – control



Source: Leckebusch and Ulbrich (2004).

Figure 46: Change in mean daily maximum wind speed in summer



Source: the Second National Communication of Montenegro to the UNFCCC.

Table 11: Economic losses from natural disasters in Albania and Montenegro, 1974-2006

Number of years taken for average	Country	GDP PPP per capita (US$/inh.) 2005	Annual average economic loss due to all perils (million US$)	% GDP	Economic loss (in million US$)		
					Drought	Earthq.	Flood
1974-2006	Albania	2 755.3	68.67	2.49	2 238	2 to 5	24.67
1989-2006	Serbia and Montenegro	4 936.0	82.00	1.66	-	2 705	0

Source: Pollner, Orli and Mohorovi, 2008.

Table 12: Summarized table of natural disasters in Albania and Montenegro, 1900 to 2011

		Number of events	Persons killed	Total persons affected	Damage (000 US$)
ALBANIA					
Drought	**Drought**	1	-	3 200 000	-
	avg. per event		-	3 200 000	-
Extreme temperature	**Extreme winter conditions**	1	68	7 085	-
	avg. per event		68	7 085	-
	Heat wave	2	3	150	-
	avg. per event		2	75	-
Flood	**Unspecified**	1	4	1 500	-
	avg. per event		4	1 500	-
	Flash flood	1	11	35 000	7 000
	avg. per event		11	35 000	7 000
	General flood	6	4	92 484	17 673
	avg. per event		1	15 414	2 946
	Storm surge/coastal flood	1	-	8 000	-
	avg. per event		-	8 000	-
Mass movement wet	**Landslide**	1	57	26	-
	avg. per event		57	26	-
Storm	**Local storm**	2	8	525 000	-
	avg. per event		4	262 500	-
Wildfire	**Forest fire**	1	-	75	-
	avg. per event		-	75	-
MONTENEGRO					
Flood	**Flash flood**	1	-	1 086	-
	avg. per event		-	1 086	-
	General Flood	3	-	6 800	-
	avg. per event		-	2 267	-

Source: EM-DAT, www.emdat.be/

Figure 44 shows that the difference in daily maximum wind speed between the A2 (2070-99) scenario and the control period for the Buna/Bojana region is in the range of -0.4 to 0.1 m/s. Taking a mean daily maximum wind speed of 12.5 m/s for the control period and a mean difference in the daily maximum wind speed of -0.15 m/s between the A2 (2070-99) scenario and the control period gives a daily maximum wind speed of 12.35 m/s for the Buna/Bojana region in the A2 (2070-99) scenario. This translates into a 1.2% decrease in daily maximum wind speed for the A2 (2070-99) scenario from baseline levels.

Figure 45 shows that the difference in daily maximum wind speed between the B2 scenario (2070-99) and the control period for the Buna/Bojana region is in the range of 0.1 to 0.4 m/s. Taking a mean daily maximum wind speed of 12.5 m/s for the control period and a mean difference in the daily maximum wind speed of 0.25 m/s between the B2 scenario (2070-99) and the control period gives a daily maximum wind speed of 12.75 m/s for the Buna/Bojana region in the B2 scenario (2070-99). This translates into a 2% increase in daily maximum wind speed for the B2 scenario (2070-99) from baseline levels.

ABI (2005) note that a 20% increase in the frequency of the top 5% of storms, measured in terms of windspeed, increases average annual total financial losses by 35% for Europe. This implies that a 2% increase in the frequency of the top 5% of storms under the B2 (2070-99) scenario would increase average annual total financial losses by 3.5% for the Buna/Bojana region over that period.[50] Similarly, a 1.2% decrease in the frequency of the top 5% of storms under the A2 (2070-99) scenario would decrease average annual total financial losses by 2.1% for the Buna/Bojana region over that period.

The vulnerability analyses on climate change and extremes presented in the Second National Communication of Montenegro to the UNFCCC indicate that, according to the A1B scenario for the summer period (2001-30), maximum wind speed growth on average will be above 2% for the coastal region, but will reduce in other regions and seasons. During the summer period (2071-2100), under both scenarios, the zone of larger maximum windspeed will narrow and shift towards the south-east coast (Figure 46). The highest wind speeds occur under the A2 scenario, with increases of up to 3% in the area of Lake Skadar and Buna/Bojana with respect to the period 1961-90.

Table 11 presents the economic losses from natural disasters in Albania and Montenegro (and Serbia) during the period 1974-2006. These figures illustrate the negative impact that natural disasters can have on the economy. This issue becomes even more acute once the potential increase in windstorms and floods due to global warming are taken into account. Moreover, Albania and Montenegro have insufficient annual budgets to finance large losses from extreme events (Pollner, Orli and Mohorovi, 2008).

In addition to the above information on economic losses from natural disasters in Albania and Montenegro, the International Disaster Database[51] records information on natural disasters by country. This includes the number of events that have occurred in a given time period, the number of people affected and damage estimates in dollar terms, where available. This information for Albania and Montenegro is summarized in Table 12.

The above information shows that floods, storms and droughts seem to occur most frequently in this region and also seem to affect the most number of people.

10.4 Hydromorphological issues

The construction of a cascade of dams on the Drin River in Albania for hydropower generation has affected natural environmental processes and resulted in impacts, not only to the Drin, but also to the Buna/Bojana catchment.

Box 5: Hydropower in the Drin River Basin in Albania

Hydropower is the main source of electrical energy in Albania: 95% of the country's production derives from hydropower plants (HPP). Electrical energy generated in the Drin River basin accounts for 93% of Albania's total hydropower production.

The characteristics of the three large Drin River HPPs – the Fierza HPP, the Koman HPP and the Vau Dejes HPP – are presented in the following table. The respective reservoirs are used only for hydropower generation purposes. An additional HPP was constructed on the Drin River at Ashta area a few kilometres away from Lake Shkoder/Skadar. There are also 40 dams serving irrigation purposes.

Basic characteristics	HPP Fierza	HPP Koman	HPP Vau Dejes
Construction year	1973-1979	1980-1988	1971-1973
Plant flow (m^3/s)	4 x 123.5	4 x 180	5 x 113
Nominal head (m)	118	96	52
Number type of turbine	4 x Francis	4 x Francis	5 x Francis
Capacity (MW)	4 x 125	4 x 150	5 x 50
Annual production (GWh)	1 138	1 500	878
Reservoir total storage (mi. m^3)	2 700	430	623
Reservoir active storage (mi. m^3)	2 350	250	310
Type of dam	Rockfill	Rockfill, concrete facing	2 rockfill, 1 earth
Water level (a.s.l.)	295	172	76

Source: adapted from Drin River Hydropower Plants, KESH 2006.

50 Average annual total financial losses in the Buna/Bojana region are calculated as a proportion of ABI (2005) results (i.e. 2*35/20 = 3.5%).

51 See www.emdat.be/

Adverse effects include the following:

- Severe perturbation of the flow regime and disturbance of the sediment distribution regime. These have caused severe disturbances to the river, deltaic and coastal ecosystems.

- A 13-fold reduction in sediment load. This was due to sediment retention in reservoirs, combined with the long-term decline in Drin river runoff. However, increase of erosion processes in the Drin's tributaries continues to provide sediment inputs to the Buna/Bojana River. The material currently transferred into the Adriatic Sea corresponds to remnant sediments transported by the Drin prior to dam construction.

Other morphological alterations concern the extraction of inert materials from the riverbanks, damage of island barriers and the construction of dikes along the Buna/Bojana River for flood control. Sedimentation in the Buna/Bojana River and barriers constructed for fishing purposes along migration routes to the Adriatic Sea may cause fish stock degradation in Lake Skadar/Shkoder.

Reinforcement of riverbanks and a system of dikes have been built since the 1960s to protect the Buna/Bojana area from floods and to increase agricultural land. Experience has shown that these structures have not always been effective. Hydromorphological constructions have been deemed necessary by the authorities as emergency measures in response to the December 2010 floods.

10.4.1 Floods

The Lower Drin–Buna/Bojana River and Lake Skadar/Shkoder watersheds are subject to a high risk of flooding. Floods in Albania have been common throughout history, and were described by the Romans and the Turks. Major floods in the Drin-Buna/Bojana basin were reported in the 1850s, in 1905, 1962-63 and 1970-71. Floods are generally pluvial in origin, and are hence observed during from November to March when 80-85% of annual runoff is generated. Figure 48 presents a flood risk and a flood potential map of Albania highlighting the high risk and potential for floods in the lower Drin and Buna/Bojana basins.

Floods also occured after the construction of the Drin reservoirs in 1979, 1992, 2003-04 and 2010.

There were two floods in 2010 – the first occurred in January (an 80-year return period flood) and the second in December. While there is some debate, experts assert[52] that the intensity of the January 2010 flood increased due to the mode of operation of the cascade of dams in Albania. The flood was caused by snow melt and heavy precipitation combined with strong winds, which resulted in unusually high tides that impeded outflow from Lake Shkoder/Skadar. For more details on both floods, see Part C "Water Resources Management: Situation Analysis".

Figure 47: Dams in Fierza (above) and Koman (below)

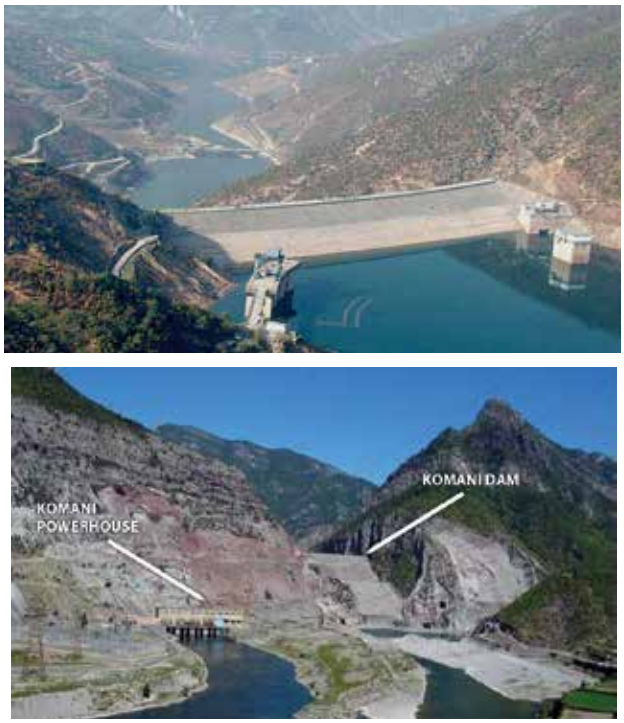
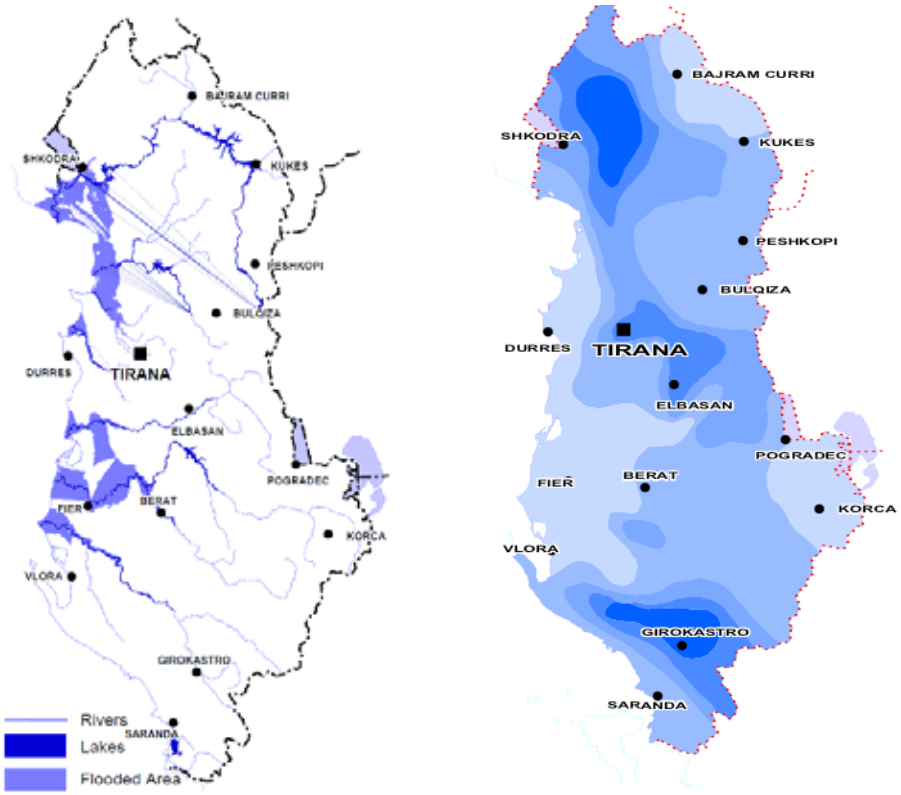


Figure 48: Flooded areas in the Buna/Drin River area before the construction of dams on the Drin (1963)

52 The Lake Shkoder/Skadar Integrated Ecosystem Management Project (2008-2012) developed a Predictive Hydrological Model for the SS-LBA and analysed the extreme flooding events that occurred in January 2010.

Figure 49: Flood risk map according to flooded areas in winter 1962-63 and a flood potential map with a 100-year return period



Source: Selenica, Ardicioglu and Kuriqi, 2011.

Figure 50: Outflow of the Vau-I-Dejes dam, January 2010

Figure 51: Flooded areas in the Buna basin, 13 January 2010

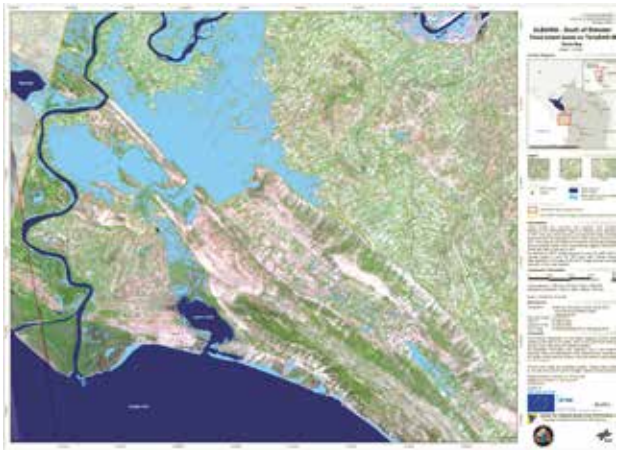


Figure 52: Flooded areas in the Buna–Drin–Shkoder/Skadar area in Albania, 8 December 2010

Figure 53: Flooded areas in the Buna–Drin–Shkoder/Skadar area in Albania, 12 December 2010

Floods in the Skadar/Shkoder and Buna/Bojana area have detrimental socioeconomic effects. While there is a need for these phenomena to be further studied there are indications that they result from the combined effects of the following:

- flow variability due to both natural (once every ten years flow in the lower part of the Drin-Buna/Bojana River system reaches about 13 times the river average flow) as well as anthropogenic factors, such as water release from dams on the Drin River;
- high sediment input through the tributaries of the Drin downstream of the dams due to erosion caused by gravel extraction and loss of plant coverage;
- accumulation of alluvium in the tributaries of the Drin, the Drin itself and the Buna/Bojana. In the case of the Drin, this is due to decreased sediment transport capacity as a result of controlled outflow from the artificial lakes. In the case of the Buna/Bojana, the latter is combined with the low gradient of the riverbed;
- blockage of the natural secondary channels of the Buna/Bojana River in the delta area, with peak flows exceeding the capacity of the main (existing) channel; and
- poor maintenance of drainage channels and flooding, which prevents construction, on the Albanian side, and poor maintenance of embankments on the Montenegrin side.

Plans to dredge the Buna/Bojana River, as a flood prevention measure benefitting navigation, will have severe effects on the riverine ecosystem and the delta. It is questionable whether this measure will sufficiently reduce the flood risk since fresh sediment coming from the Drin River, as a result of erosion in its lower part, may cause new sediment depositions to the riverbed. Deposition of sediment at the mouth of the River Buna/Bojana also influences navigation.

10.4.2 Coastal dynamics

The Buna/Bojana River influences the wider coastal area around its mouth. Velika Plaža in Ulcinj and Ada Bojana – areas in Montenegro with significant touristic development potential – are created by sediment deposits from the Buna/Bojana River. The following factors and the balance between them define the morphology, hydrography and related values of the Buna/Bojana deltaic complex:

- accumulation of sediment in the Drin and Buna/Bojana;
- reduced sediment load[53] reaching the mouth of the Buna/Bojana in the Adriatic Sea;
- water flow regime in the Skadar/Shkoder–Drin–Buna/Bojana system; and
- variability of wave activity and sea level in combination with short-term events (storm waves and tides) and long-term processes (sea transgressions).

53 According to some authors, a 13-fold reduction in sediment load has taken place, compared to 1854 when the Drin River was naturally diverted to the Buna/Bojana River.

Figure 54: Direction of water during floods in the Albanian part of the Buna basin

Figure 55: Buna delta change between 1971 and 2007

Note: Red indicates areas with erosion and green indicates areas with sediment deposition.

Source: K. Zaimi.

Figure 56: Coastal erosion of Ada island in the main Buna/Bojana delta over a ten-year period (~1985–~2005)

Source: EuroNatur, 2009.

Information and data regarding coastal dynamics are limited and there is a need for further research in this area. The available data (Adricosm Project) indicate that the coastal area in front of the right branch of the delta is characterized by sediment accumulation, and the coastal area in front of the left branch is characterized by erosion. During autumn and winter the quantity of sediment from the river and from advection in the sea is not sufficiently high to balance erosion effects produced by the combined activity of waves and currents. As a result, the currents and waves carry sediment material away from the river mouth and along the coastline. Conversely, the period from May to October is characterized by a balance between erosion and deposition. Simulated interaction between the Buna/Bojana River plume and waves at the mouth of the river show that sediment tends to deviate and accumulate south-east of the Buna/Bojana. Overall, erosion occurs in some parts of the Buna/Bojana Delta while sediment deposition takes place in others (Figure 55).

The past 20 years have seen extensive erosion of Ada Bojana with the sea advancing inland by 2.5 m/y. According to estimates the sea line has progressed by 400 m since 1936 (Figure 56).

10.5 Pollution

KEY HIGHLIGHTS

- The main pressures in terms of N and P pollution come from outside the plan area. Specific measures should therefore be taken to reduce these pollution levels.
- The amount of N and P pollution deriving from urban waste from municipalities in the Buna/Bojana area and Shkodra town is significantly lower than the respective amounts deriving from agriculture and livestock operations in the Buna/Bojana watershed. However, the pressures exerted on the system are comparable.
- Overall assessment of groundwater bodies, according to WFD requirements, is not possible at present due to the almost complete absence of necessary data.
- Areas of high and very high groundwater pollution risk cover only 4.6% of the plan area. High/very high and moderate pollution risk areas are mainly calcareous dominated zones.
- The biological status of surface water bodies at all stations for which data were available was assessed as poor.
- The chemical status of the Buna/Bojana River is "lower than good", resulting in an overall status of "bad". In addition to heavy metal pollution, mean concentration of some metals are above Environmental Quality Standards at one or more sampling stations: mercury in all stations, nickel in Dajc and Bojana Left Branch, cadmium in Fraskanjelm, and lead in Dajc and Fraskanjel.
- The chemical-physicochemical quality of the Buna/Bojana River deteriorates from its sources to its mouth, ranging from "moderate" to "poor", due to elevated ammonium and BOD5 concentrations.
- Special attention must be paid to the issue of invasive species (e.g. *Dreissena spp*) and the conservation of threatened species, such as Valvata montenegrina.[50]
- Concentrations of mercury are elevated in Lake Šasko and Viluni Lagoon.
- The ecological quality of coastal zone waters is classified as "bad".

Box 6: Levels of pollution in the lower part of the Drin River in Lake Skadar/Shkoder[51]

Lower part of the Drin River

- Oxygenation conditions, BOD_5, COD and phosphorous compounds were at satisfactory levels (data and studies used are for the years 2004-05 and 2008-12). Concentrations of nitrogen compounds were relatively high.
- The lower part of the Drin River is affected by high geochemical levels of Cr, Cu, Fe, Ni due to mining activity, resulting in elevated heavy metal concentrations in river sediments (Neziri and Gössler, 2006).
- Concentrations of dissolved metals are lower, hence water quality is satisfactory in this regard.
- Total pesticide concentrations were higher in the downstream portion of the river (Neziri and Shabani, 2013), between Vau i Dejes (with maximum levels of 8,389 ng/l) and at the mouth of the Drin River.
- The same was true for DDT and its metabolites (although a maximum concentration of 91 ng/l was found in Vau i Dejes). Levels of lindane, DDTs and metabolites, HCHs and methoxychlor in some cases exceeded the maximum permissible values set in Directive 2008/105/EC for surface natural waters.

Lake Skadar/Shkoder

- The quality of lake waters in terms of physico-chemical parameters, BOD5, COD and nutrient compounds was satisfactory (2004-10).[52] The same levels were indicated in a study that examined nutrient pollution. However, microbial pollution at the outflow of the lake into the Buna/Bojana River proved an issue (Bushati et al., 2010).
- According to a study by Neziri and Gössler (2006), concentrations of dissolved heavy metals (Cr, Co, Ni, Cu, Zn, As, Cd, Sn, Hg and Pb) in lake water were generally lower for 2006 than those in the Drin and Buna Rivers. Elevated heavy metal concentrations in the mouth of the lake were attributed to inflow of the Drin to the lake, which usually takes place during December to February (Bushati, Neziri and Hysko, 2010), due to release of dam water into the Drin River. Concentrations of lead and cadmium (Neziri and Laso, 2009) were lower than Environmental Quality Standards for priority substances, according to Directive 2008/105/EC.
- The presence of PAHs in the lake (concentrations ranged from 0.025 to 1.65 ng/SR during the years 2007-08) indicated the influence of anthropogenic pollution.
- Levels of DDT-total, HCB and HCHs exceeded Environmental Quality Standards for surface natural waters.[53]
- Concentrations of total PCBs in Lake Skadar/Shkoder were lower than the EU norm (Neziri et al., 2012).
- Relatively high values of Lindane – compared to other HCH isomers – were found in fish.[54]
- A total of 39 compounds of toxic hydrophobic organic pollutants (HOPs) were identified at six sampling sites in the lake. Alkylated PAHs were the most abundant compounds present along with various sterols and sterol derivatives. Numerous other compounds found remain unidentified. Fifteen of the 16 targeted PP-PAHs, mainly originating from oils and hydrocarbon fuels, were present in the lake. Bioassays indicated that toxicologically relevant compounds are readily available for uptake by aquatic biota (Rastall et al., 2004).

54 IUCN Red List of Threatened Species; see www.iucnredlist.org/details/164824/0.

55 Tables with concentration of pollutants can be found in Part C "Water Resources Management: Situation Analysis".

56 According to data reported by Albanian authorities to the European Environmental Agency for 2004-10.

57 Total organochlorinated pesticides in the water column of Lake Skadar/Shkoder varied between 0.0176 and 0.0834 µg/l (Nuro and Marcu, 2011). The levels of total organochlorinated pesticides in the water were two orders of magnitude higher ranging from 1.05 to 10.2 µg/l (Neziri and Gjini, 2011).

58 A maximum concentration (80.5 ng/g f.w.) was detected in Allosa agone. Maximum values of ΣDDTs were found in Carp (Cyprinos carpio), a non-migratory fish characteristic of Lake Shkodra (Nuro and Marcu, 2011).

Table 13: Estimation of total N produced per municipality/commune, 2011

Municipality/commune	Area (km²)	Total N (tonne/year)				Total N (tonne/year/km²)
		Urban	Agriculture	Livestock	Total	Total
Ana Malit	48.9	6.46	220.33	273.60	500.39	10.23
Balldre	9.3	-	3.10	62.26	65.36	7.05
Bar	38.4	3.07	33.93	11.31	48.31	1.26
Berdice	29.6	7.52	133.78	1 001.74	1 143.04	38.66
Bushat	24.5	4.60	57.60	424.57	486.77	19.90
Dajc	50.8	8.96	212.15	726.38	947.49	18.64
Rrethina	1.8	0.80	0.23	0.00	1.03	0.58
Ulcinj	241.4	46.78	339.54	618.65	1 004.96	4.16
Velipoje	63.5	8.37	149.82	913.72	1 071.91	16.89
Total	508.11	86.56	1 150.49	4 032.22	5,269.27	117.38

10.5.1 Pollution in the Drin River and Lake Shkoder/Skadar

As the Buna/Bojana River falls under the direct influence of the Drin River and Lake Skadar/Shkoder, it is necessary to understand the level of pollution in these two water bodies. Box 6 presents the main conclusions of a review of the available bibliography regarding pollution in these two bodies.

10.5.2 Estimation of point source and diffuse pollution loads in the Buna/Bojana catchment

The characterization of waters and groundwater as described in Article 5 of the WFD is a premise that requires review of the environmental impacts of human activities and the identification of pollution pressures (EC, 2003a). Registering and understanding pollution pressures, as well as their magnitude, provides part of the information necessary to design the measures necessary to achieve good ecological status.

Pollution loads were calculated for the three major economic activities in the plan area:[59] **urban wastewater,**[60] **agriculture**[61] **and livestock.**[62] The available data used for the calculations – the results of which are presented in Table 13 – were of inefficient quantity and low quality.[63] This is not unusual when management plans are prepared for the first time in a given area. As a result, there is a high level of uncertainty with regard to the actual situation in terms of pollution sources and loads generated.

According to the results of the analysis, stockbreeding is the main source of total N in the Buna/Bojana watershed, while urban wastewater from settlements in the Buna/Bojana area contributes the least. The biggest quantities of total N in the basin are produced at Berdice, Ulcinj, Velipoje and Dajc municipalities. The biggest quantity of total N per km² is produced at Berdice, while the least quantity is produced at Rrethina and Balldre, and can be attributed mainly to urban wastewater and livestock, respectively. The inclusion of urban liquid waste generated by tourism in the calculations was not possible, since no relevant data were available for the entire plan area. If calculations include this sector, some of the estimated figures (e.g. TN and TP) may increase significantly (Figure 57).[64]

The main pollution source in terms of total P is agriculture. The biggest loads of total P are produced at Ana Malit, Velipoje, Dajc and Ulcinj municipalities. The biggest produced quantity per km² is produced at Ana Malit and Berdice, while the lowest is produced at Rrethina and Balldre and can be attributed mainly to urban wastewater and livestock, respectively (see Table 14, Figure 58).

59 See Part C "Water Resources Management: Situation Analysis" for details.

60 Statistical data regarding water consumption (Van den Berg and Danilenko, 2011; IBNET; Statistical Office of Montenegro) and the literature regarding the composition of untreated urban wastewater (Metcalf and Eddy, 1991) were used to calculate the nitrate and phosphate loads per municipality/commune: the volume of domestic wastewater produced in one-year period was calculated based on average water consumption per capita and the population of each settlement.

61 Statistical data about agriculture activities in the municipalities/communes of the Buna/Bojana watershed (from the literature, municipal/regional statistical offices and EEA - CORINE Land Cover 2006, 2011) as well as the literature regarding fertilizer amounts applied in cultivation, were used to calculate nitrate and phosphate loads per municipality/commune.

62 Statistical data regarding the number of breeding animals (Statistical Yearbook 2012 of the Statistical Office of Montenegro concerning the municipality of Ulcinj, the Regional Council of Shkoder concerning the municipalities/communes of Bushat, Berdice, Rrethine, Velipoje, Ana e Malit and Dajc and the Regional Council of Lezha (REC, 2005) concerning the Balldre commune) and specifications for livestock waste production proposed by WHO (1982) were used to calculate the nitrate and phosphate loads per municipality/commune. A correction factor was applied in order to estimate actual livestock activities that take place in the municipalities. The spatial distribution of these activities was based on data concerning the ecosystems/habitats of the plan area and CORINE data (EEA - CORINE Land Cover 2006, 2011).

63 CORINE 2006 was used, however the statistical data were not adequate. Moreover, it was not possible to access or use information related to a number of other pollution sources, such as municipal solid waste, hazardous industrial waste, dairies and fuel storage installations for the entire plan area (including the Albanian part). These were considered in a recent assessment on national baseline budget for pollution in Montenegro that includes estimates about the respective pollution loads. According to the same assessment, the most significant pollution pressures in the Montenegrin study area are municipal urban waste followed by tourism. Agriculture, dairies and municipal solid waste are not considered equally significant pollution pressures in the specific area.

64 NBB (2013) estimated TN and TP values for the urban and tourism sectors in Ulcinj at about 87 t/yr and 22 t/yr, respectively (only part of the Ulcinj area is included in the Buna/Bojana catchment).

Figure 57: Distribution of total N per municipality/commune of the Buna/Bojana watershed

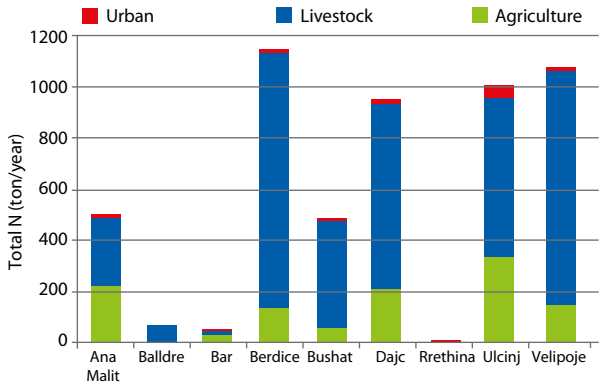


Figure 58: Distribution of total P per municipality/commune of the Buna/Bojana watershed

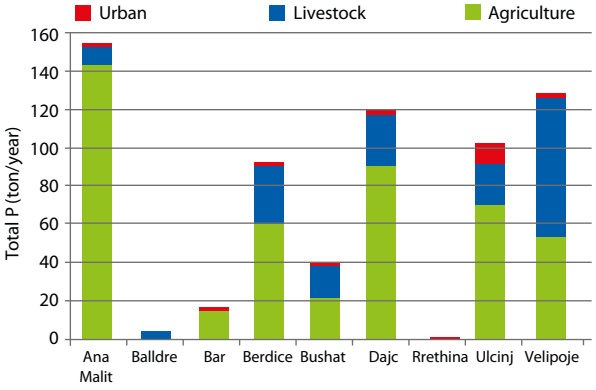


Table 14: Estimation of total P produced per municipality/commune, 2011

Municipality/commune	Area (km²)	Total P (tonne/year)				Total P (tonne/year/km²)
		Urban	Agriculture	Livestock	Total	Total
Ana Malit	48.9	1.29	144.13	8.93	154.35	3.16
Balldre	9.3	-	1.07	2.33	3.40	0.37
Bar	38.4	0.61	14.59	0.73	15.93	0.41
Berdice	29.6	1.50	60.61	29.94	92.06	3.11
Bushat	24.5	0.92	21.81	16.28	39.00	1.59
Dajc	50.8	1.79	90.52	26.97	119.28	2.35
Rrethina	1.8	0.16	0.11	0.00	0.27	0.15
Ulcinj	241.4	9.36	70.06	22.41	101.82	0.42
Velipoje	63.5	1.67	53.77	72.93	128.38	2.02
Total	508.11	17.31	456.67	180.52	654.50	13.59

Table 15: Nutrient load of aquifer system

System	Nitrogen as mg/l of NO_3	Phosphorus as mg/l of PO_4	Comments
Alluvium	13.9 8.2	<0.03 0.08	Analysis results of water samples taken from the two drilling sites
Flysch	No data	No data	
Karst	0.23	No data	From Gac Water Supply Well/Spring

Source: Puri, 2010.

To obtain a more complete picture of pollution sources and loads, it is necessary to take into consideration pollutants entering the Buna/Bojana River from its tributaries, especially Lake Skadar/Shkoder and the Drin. There are indications of considerable pollution levels with loads of some pollutants (e.g. nutients from the Drin) higher than those generated in the Buna/Bojana area. However, the available data series are insufficient to reach safe conclusions.

Although not within the plan area, Shkodra town is a significant point source of pollution.[65] Total N and total P loads produced in Skhodra town are estimated to amount to 98 tonnes/year and 19.6 tonnes/year, respectively. Taking into consideration that approximately 60% of total urban wastewater is collected (following construction of the sewage network), about 59 tonnes/year of N and 12 tonnes/year of P are discharged directly from Skhodra town to the Drin, extremely close to the confluence with the Buna/Bojana River.

These loads resemble and add to pollution loads from urban liquid wastes generated in the Buna/Bojana watershed. It is important to note that the pollution loads from Shkodra town enter the river directly, while this is not the case for the majority of urban wastewater from municipalities in the Buna/Bojana area (the same is true regarding diffuse pollution from agriculture and livestock). According to the literature about 20% of pollution loads from the latter reach the water body.

In this regard, pressure deriving from urban wastewater in terms of N and P pollution is significantly lower but comparable to pressures deriving from agriculture and livestock generated in the Buna/Bojana watershed.

65 Part of the untreated urban wastewater from the Shkodra town area collected by the sewage network (including hospital wastewater) reaches the Buna/Bojana River. It is discharged into the Drin River after Bacalek Bridge and sometimes into Lake Skadar/Shkoder (due to power failures that render pumps used to transfer wastewater to the Drin ineffective).

10.5.3 Groundwater pollution

10.5.3.1 Pollution in the aquifer system of the Buna/Bojana delta

While the annual average flow of coastal aquifer systems in the Buna/Bojana delta is much lower than that of the river (about 0.1%), the limited data related to NO_3 concentrations indicate that nitrogen levels in the alluvial aquifer can reach 13.9 mg/l (Table 15). While this is still well below the maximum allowable concentration of nitrate (50 mg/l) set by the Drinking Water Directive (98/83/EC), it should be noted that it is several times higher than the concentration in the Buna/Bojana River. This could become an issue of greater concern in the future, especially if agricultural activities intensify. The PO_4 values from specific field campaigns are quite low.

10.5.3.2 Hazard and risk

Groundwater hazard

A groundwater hazard[66] map was produced using data from the CORINE 2006 database[67] (for more information see Part C "Water Resources Management: Situation Analysis"). Based on the results[68] (Table 16, Figure 59), areas assessed as having "very high" and "high hazard" cover/land uses (17.3% of the total area) are located sporadically in urban areas not covered by a sewerage system and in intensively cultivated and irrigated areas. "Low" and "very low hazards" are encountered in natural areas such as forests, wetlands and abandoned areas.

Groundwater pollution risk[69]

The pollution risk map was developed based on a vulnerability map and a hazard assessment and map.[70] Most of the area was assessed as of "moderate" pollution risk (48%). Areas of "high" and "very high" pollution risk cover 10.3%, whereas zones of "low" and "very low" pollution risk cover 41.6% of the plan area. Calcareous zones dominate the "high", "very high" and "moderate" pollution risk areas. The forested areas on flysch formations (expected since flysch is an aquiclude) and cultivated sedimentary areas in the central, north and north-east part of the catchment are assessed as "low" risk, while agricultural areas in the lowland, porous formations are of "moderate" risk.

66 A hazard assessment considers the potential degree of harmfulness for each type of land use. It is determined by both the toxicity and the quantity of harmful substances, which may be released as a result of a contamination event. The likelihood of such an event, in which contaminants are actually released into the environment, depends on many factors (Zwahlen, 2004).

67 A weighing factor (Hazard index) was given for each documented land use in the plan area, based on the hazard intensity of each specific land cover type regarding water pollution (Andreo et al., 2006). In order to assign a hazard value to each land cover unit, the information related to pollution pressures in the area was compared with a relevant reference table provided by the above-mentioned methodology.

68 Information regarding the location and intensity of point pollution sources is inadequate. Accordingly, only the CORINE 2006 database and map were used to assign hazard values to each land use category and create the hazard map. As a result, urban and touristic areas are characterized by very high pollution risks and agricultural areas by moderate pollution risks.

69 These results should be treated with caution, as the information base for application of the groundwater pollution risk assessment method is weak. The land use data utilized are old (2006) and information regarding pollution sources, both point and diffuse, is inadequate. In this regard, these results are mostly indicative of the situation in the area, and the effort should be repeated once more adequate information is available.

70 The attempt to assess groundwater pollution risk in the Buna/Bojana watershed was based on methodology developed under the COST Action 620 project, targeting the protection of carbonate aquifers (Zwahlen, 2004). Groundwater pollution risk can be defined as "the probability that groundwater in the aquifer will become contaminated to an unacceptable level by activities on the immediately overlaying land surface". This approach focuses on the interaction between the infiltrating contaminant load and the vulnerability of the aquifer at the location concerned. According to Foster and Hirata (1988), the proposed risk assessment is calculated by overlaying the intrinsic vulnerability map and the hazard map.

Table 16: Hazard classes and extent (waterbodies and wetlands not included)

Vulnerability classes	Area (km²)	Area (%)
Very low	29.2	6.2
Low	60.4	12.8
Moderate	300.3	63.7
High	65.7	13.9
Very high	16.0	3.4

Table 17: Groundwater risk classes and extent (waterbodies and wetlands not included)

Risk classes	Area (km²)	Area (%)
Very high	0.4	0.1
High	48.0	10.2
Moderate	226.6	48.1
Low	169.9	36.0
Very low	26.6	5.6
Total	468.5	100.0

Table 17: Groundwater risk classes and extent (waterbodies and wetlands not included)

Risk classes	Area (km²)	Area (%)
Very high	0.4	0.1
High	48.0	10.2
Moderate	226.6	48.1
Low	169.9	36.0
Very low	26.6	5.6
Total	468.5	100.0

Figure 59: Hazard map of the Buna/Bojana watershed

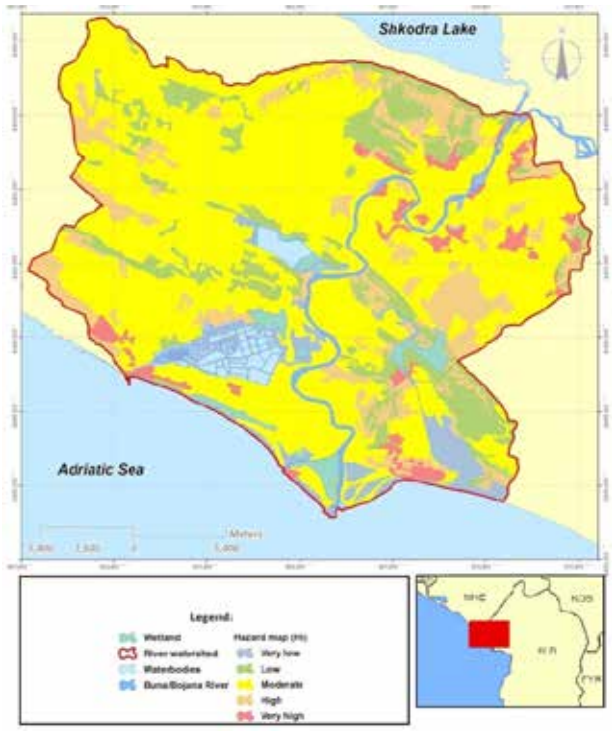


Figure 60: Groundwater pollution risk map

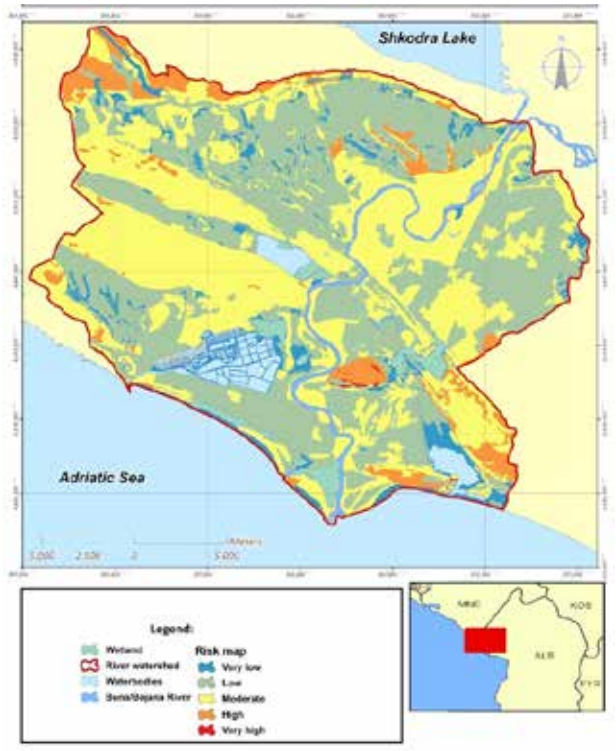


Figure 61: The five quality categories and the boundary between good and moderate ecological status

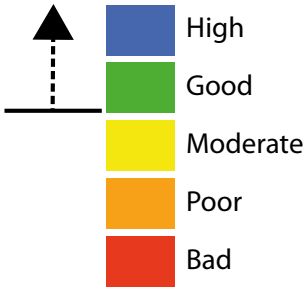
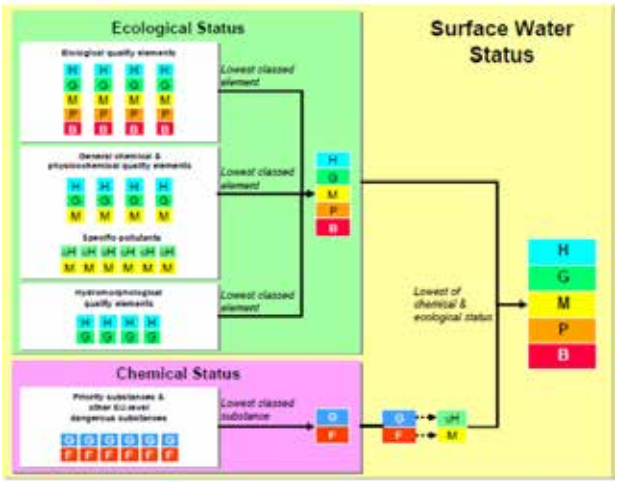


Figure 62: Procedure for assessing the status of a water body and the relative roles of hydromorphological, chemical-physicochemical and biological quality elements in ecological status classification



10.5.4 Status of the water bodies

An assessment was performed to extract information regarding the status of water bodies in the Buna/Bojana River basin. The information was combined with data on pressures (see above) and ICZM-related information, including socio-economic and environmental data, to define: (i) whether measures are necessary to preserve or improve the status of the system, and (ii) the nature and extent of the necessary measures.

The assessment was performed in accordance with the Water Framework Directive (WFD). The WFD requires assessment of ecological status/potential and surface water chemical status in order to classify surface water into five quality classes. The boundary between good and moderate ecological status is critical, since water bodies of moderate quality should be considered within integrated river basin management plans to improve their status to at least good.

When assessing the effects of various categories of pollutants emanating from human activities on the quality of rivers and streams, certain impacts should be considered – either in isolation or in combinations. The wide array of possible factors include:

- the different **types** of pollution (an indicative list of the main pollutants can be found in Annex VIII of the EU, 2000, WFD);
- **periodicity** concerning the time and seasonality of the pollution period, its magnitude, point or non-point pollution sources, riverbed modifications, alterations to the river basin; and
- **the relationship with other natural environmental variations and characteristics at different scales,** such as climate, water discharge, geology, topography, diversity of flora and fauna, etc.

Consideration of all these factors constitutes a highly complex issue. **It has not been possible to take into consideration all the above parameters, due to restrictions in the available data**. Information on the parameters used for assessment of status in the different parts of the system is given in the detailed analysis included in Part C "Water Resources Management: Situation Analysis".

10.5.4.1 Designation of water bodies in accordance with the WFD

Water bodies are spatial units whose status is assessed to identify environmental objectives and defining measures as means to: (i) prevent further deterioration, and (ii) protect and enhance the status of aquatic ecosystems, as well as the terrestrial ecosystems and wetlands directly dependent on the aquatic ecosystems. Water bodies are therefore units used for reporting and assessing compliance with the Directive's principal objectives.

Surface water bodies (SWBs)[71] fall within one of the following surface water categories: rivers, lakes, transitional waters or coastal waters, or artificial surface water bodies or heavily modified surface water bodies. Details on the methodology followed for the identification of water bodies are given in Part C.

The following surface water bodies have been identified:

WB 1. The Buna/Bojana River (i.e. from the confluence of the Drin River with outflow of Lake Skadar/Shkoder up to the river delta).
WB 2. Lake Šasko
WB 3. Viluni Lagoon (a transitional water body)
WB 4. The wetlands
WB 5. The coastal zone

The following groundwater bodies have been identified:

- **Impermeable rock formations** constitute the largest aquifer in the watershed, albeit not the most important in hydrogeological and socio-economic terms.
- The second largest formation of **karstic rocks** in the Montenegrin part of the catchment is important for water balance in the area.
- The **coastal intergranular aquifer** is the next most important groundwater body, characterized by moderate productivity. It sustains important wetlands.
- The **upstream intergranular aquifer** is a highly productive groundwater body.
- The **karstic formations in Albania** are characterized by high productivity and vulnerability.

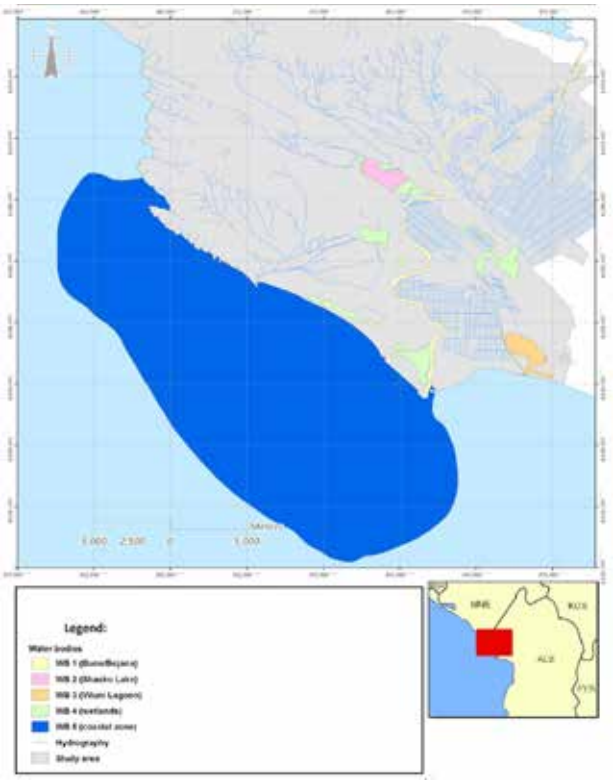
Estuaries are the transition zones between rivers and the sea, and can be classified according to salinity (McLusky and Elliott, 2004). Table 19 presents the classification of estuarine divisions.

Average sea surface salinity in the coastal area is not stable and depends on river fluxes. Salinity levels present the lowest values in the area between the Buna/Bojana River and Solana Ulcinj. In addition to river fluxes, this could be an indication of groundwater discharges of freshwater towards the sea. The decrease in salinity could also be caused by sea currents. The boundary of the Buna/Bojana system in the marine area is defined through estimates of the influence of surface water flows on inshore marine waters, as indicated by the levels of salinity. This was assessed using combinations of monthly isolines of 35 PSU for average sea surface salinity (see Chapter 7).

Box 7: Defining the status of the water bodies in accordance with the WFD

Ecological status derives from hydromorphological, chemical-physicochemical and biological quality elements, and the resulting respective status, through the application of the "one-out all-out" principle. Hydromorphological status classifies a water body as a reference water body or not; chemical-physicochemical status classifies a water body as of high, good or moderate status; and biological status classifies a water body in terms of four quality categories: poor, moderate, good and high status (Figure 62). More information about the methodology used in assessment of the status of water bodies, in accordance with the WFD, is given in Part C "Water Resources Management: Situation Analysis".

Figure 63: Surface water bodies in the Buna/Bojana watershed



71 According to Article 2.10 of the WFD, a "body of surface water" is a **discrete and significant element** of surface water. Aspects such as water category and type, as well as geographical and hydromorphological elements, etc., are considered in the identification of water bodies. An initial identification of water bodies in the Buna/Bojana area was made on the basis of a typological characterization of the basin, as well as on a preliminary assessment of pressures and impacts. The identification was revisited following assessment of the status of each of the water bodies, but no alterations were deemed necessary. Hydrogeological information regarding dominant formations, as well as potential pressures and an impact analysis, were taken into account when identifying groundwater bodies in the area. More information regarding the designation of water bodies in the plan area is presented in Part C "Water Resources Management: Situation Analysis".

Table 18: Extent of groundwater bodies in the Buna/Bojana lower catchment

Groundwater bodies	Area (km²)	% of total
Coastal intergranular, moderate productivity	100.98	19.36
Impermeable rock formations	134.41	25.76
Karstic rocks, high productivity, Albanian side	22.88	4.39
Karstic rocks, high productivity, Montenegrin side	113.42	21.74
Moderately productive intergranular aquifer, upstream	48.50	9.30
Upstream intergranular, high productivity	101.48	19.45

Table 19: Classification of estuarine divisions

Estuary division	Tidal	Salinity (PSU)	Venice system (1959)
River	Non-tidal	<0.5	Limnetic (freshwater)
Head	The highest point that tides reach		
Tidal fresh	Tidal		
Upper		0.5-5	Oligohaline
Inner		5-18	Mesohaline
Middle		18-25	Polyhaline
Lower		25-30	
Mouth		30-40	Euhaline
		>40	Hyperhaline

Figure 64: Groundwater bodies of the Buna/Bojana lower catchment

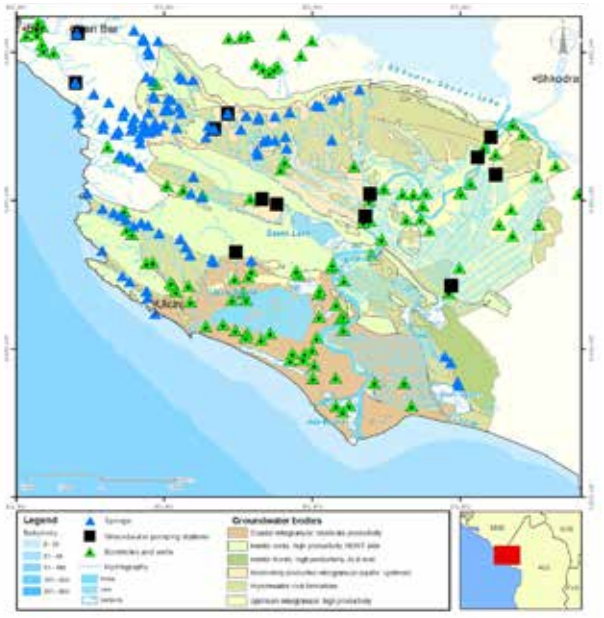


Figure 65: Monitoring stations for abiotic and biotic parameters in the plan area

10.5.4.2 Assessment of the status of the Buna/Bojana watershed

The status of a water body derives from the combined assessment of its ecological and chemical status. Lake Skadar/Shkoder and the Drin River may be considered as point sources of pollution for the Buna/Bojana River system as they affect its quality, among others, through the pollutants they carry into the system. Further to the assessment of water bodies in the Buna/Bojana watershed, an assessment was carried out to determine the status of the Drin River at its most downstream part prior to its confluence with the Buna/Bojana River and the status of the outflow from the lake.

The data used to assess the status of the different parts of the Buna/Bojana system and their sources are as follows:

- The chemical-physicochemical status and chemical status of outflow from Lake Skadar/Shkoder and the Drin River, at its most downstream part prior its confluence with the Buna/Bojana River, were assessed using a combination of data sources:
  - available research studies and papers;
  - data generated for the purposes of the present study through analysis of samples from monitoring stations at the two bodies collected during two sampling expeditions (July and November/December 2012); and[72]
  - data from the State of Environment Report (published in 2013, including 2012 data) of the Albanian National Agency of Environment.

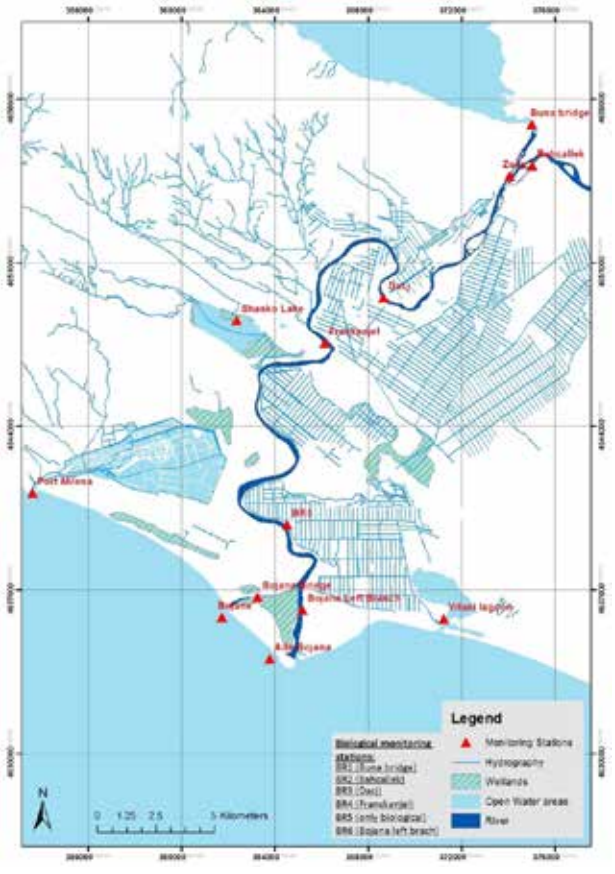
- The chemical-physicochemical status and chemical status of the Buna/Bojana River were assessed using a combination of data sources:
  - data reported by the Albanian authorities to the EEA;
  - data provided by the Montenegrin Ministry of Sustainable Development and Tourism;
  - data generated for the purposes of the present study through analysis of samples collected during two sampling expeditions (July and November/December 2012) from stations along the Buna/Bojana River, Lake Šasko and Viluni Lagoon;[73] and
  - data from the State of Environment Report of the Albanian National Agency of Environment (published in 2013, including 2012 data).

- The biological status of: (i) outflow of Lake Skadar/Shkoder, (ii) the Drin River at its most downstream part prior to its confluence with the Buna/Bojana River, and (iii) the Buna/Bojana River, were assessed using data exclusively related to macro-invertebrates. These were generated for the purposes of the present study through analysis of samples collected during three sampling expeditions (November 2012, March 2013 and June 2013).[74] No biological data regarding fish, aquatic flora and phytoplankton were available for use.

Figure 65 shows the monitoring stations used for the purpose of the study.

The methods, classification systems, metrics and indices used to characterize the ecological and chemical status of the Buna/Bojana system are presented in Part C "Water Resources Management: Situation Analysis".

Figure 65: Monitoring stations for abiotic and biotic parameters in the plan area



72 The Centre for Ecotoxicological Research of Montenegro (CETI) carried out the sampling and analysis of samples.

73 The Centre for Ecotoxicological Research of Montenegro (CETI) carried out the sampling and analysis of samples.

74 Samples were collected and analysed by Albanian and Montenegrin experts. Respective indices were selected, as appropriate, to assess the impacts of pollution on biota, and applied. Calculation of biotic indices was performed by Dr Konstantinos Gritzalis at the Hellenic Centre for Marine Research (HCMR - www.hcmr.gr/en/). Details on the procedure for site selection, sampling procedures and assessment of biological status are presented in Part C "Water Resources Management: Situation Analysis".

10.5.4.3 Surface water bodies

The key quality element of the WFD (i.e. biological status) was assessed as "poor" in all stations for which data were available, with the exception of Viluni Lagoon where status was "moderate" (however, this result was based on one biological element – Chlorophyll-α). For most cases (e.g. the lower Drin River, Lake Skadar/Shkoder outflow, Bojana Bridge and Bojana Left Branch), taking into account available data and using expert judgment, biological status was considered to be "worse than poor". The richness and abundance of macro-invertebrate fauna in the river system was found to be low when compared with similar river types and conditions. A remarkable finding was the existence of **marine species, even in the upper part of the river**. This could be attributed to the fact that, under specific conditions, tidal phenomena can result in seawater reaching the upper parts of the river. Special attention must be given to addressing the issue of invasive species (e.g. *Dreissena spp*), as well as the conservation of threatened species, such as Valvata montenegrina.[75]

The physicochemical quality of the **lower Drin River** was assessed as "moderate" due to elevated mean nitrate and nitrite concentrations. Besides Cu, levels of specific pollutants fall below those set by Environmental Quality Standards (EQS). Ecological status was "poor" as a result of poor biological status. Regarding the chemical status of the lower Drin, mean concentrations of cadmium, lead, mercury and nickel (Cd, Pb, Hg and Ni) were above the EQS set by Directive 2013/39/EC. Overall, the status of the lower Drin River was assessed as "poor".

The chemical-physicochemical quality of **Lake Skadar/ Shkoder** was "high". This was not the case for outflow from the lake, which had elevated concentrations of nitrate and ammonium (pH, DO, BOD and COD mean concentrations were at satisfactory levels), classifying the outflow as of "moderate" physicochemical quality. Aside from Cu, the levels of specific pollutants were below EQS. The ecological status was "poor", as a result of the poor biological status. As far as chemical status is concerned, mean concentrations of cadmium, lead, mercury and nickel (Cd, Pb, Hg and Ni) were above EQS limits set by Directive 2013/39/EC. Overall, the status of outflow from Lake Skadar/Shkoder was classified as "poor".

The chemical-physicochemical quality of the **Buna/Bojana River** ranged from "good" to "moderate", deteriorating from its sources to its mouth, due to elevated ammonium, nitrite and BOD concentrations. With regard to specific pollutants, mean concentrations of Cu and Sn were elevated and above EQS limits in the upstream stations of Dajc and Fraskanjel, respectively. Biological status in all four stations along the Buna/Bojana River was "poor" resulting in "poor" ecological status. Cadmium (mean concentration) is above EQS only in Fraskanjel and is almost non-detectable in the other stations; lead is above EQS in Dajc and Fraskanjel, mercury is above EQS in all stations and nickel is above EQS in Dajc and Bojana Left Branch. The chemical status of the Buna/Bojana River was assessed as "moderate", and the overall status was "poor".

It should be noted that limited data were available for stations along the Buna/Bojana River, at least regarding abiotic parameters. Only two seasonal measurements existed for a number of parameters. In addition, no information was available for a number of specific pollutants and priority substances. The poor data both in terms of quality and quantity resulted in a high level of uncertainty regarding the chemical-physicochemical and chemical status of these stations, and the results may be considered preliminary. It is safer to rely on the biological assessment, since it mirrors the impact of long-term pressures on macro-invertebrate assemblages, which are good indicators for organic pollution.

Mercury was also present in **Viluni Lagoon** (it was the only heavy metal whose concentration was above EQS). According to the available physico-chemical data, there are high nutrient concentrations. Using Chlorophyll-α as a surrogate for the biological elements required by WFD, the resulting theoretical ecological status was "moderate", as was the overall status of the lagoon.

The overall status of **Lake Šasko** was assessed as "equal to or below moderate" due to its theoretical "equal to or below moderate" ecological status (in the absence of biological data). The latter results exclusively from the "moderate" chemical-physicochemical status of the lake (due to elevated total N concentrations). Other nutrient species and specific pollutants were of satisfactory quality. The chemical status of the lake was "moderate" as a result of elevated mercury (Hg) concentrations.

It should be noted that only two seasonal measurements were available for Lake Šasko and Viluni Lagoon, introducing a high element of uncertainty into assessment of their status. In addition, a number of specific pollutants and priority substances were not determined. Moreover, concentrations of dissolved substances may vary considerably with time, depending on pollution sources, sedimentation, eutrophication and water level fluctuations. Thus, assessment of chemical-physicochemical status and chemical status of these lentic systems may be considered as very preliminary. The same is true for the biological status assessment, as only one biological element was available (i.e. Chlorophyll-α for Viluni Lagoon).

Finally, the status of the coastal zone was classified as "poor" due to its poor biological status (the chemical-physicochemical status is considered "moderate"). Here, again, the assessment includes a high degree of uncertainty, since the classification was influenced by the "poor" biological status, which was based exclusively on Chlorophyll-α.

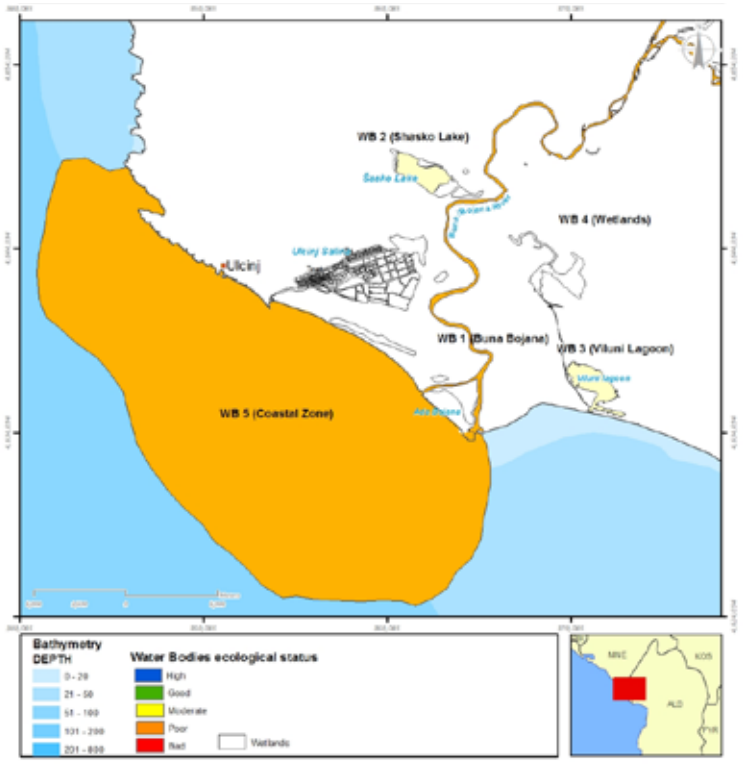
75 IUCN Red List of Threatened Species; see www.iucnredlist.org/details/164824/0

Table 20: Overall assessment of the status of surface water bodies in the plan area, in accordance with the WFD

WBs		Stations	Physico-chemical quality	Potential specific pollutants	Chemical – physicochemical status	Biological status*	Ecological status	Chemical status	Overall status	Water body status
	Lower Drin	Bachalleck	Moderate	Moderate	Moderate	Poor	Poor	Moderate	Poor	Poor
	Skadar/ Shkoder outflow	Buna Bridge	Moderate	Moderate	Moderate	Poor	Poor	Moderate	Poor	Poor
1	Buna/Bojana	Dajc	Good	Moderate	Moderate	Poor	Poor	Moderate	Poor	Poor
		Fraskanjel	Moderate	Moderate	Moderate	Poor	Poor	Moderate	Poor	
		Bojana Bridge	Moderate	Good	Moderate	Poor	Poor	Moderate	Poor	
		Bojana Left Branch	Moderate	Good	Moderate	Poor	Poor	Moderate	Poor	
2	Lake Šasko	Lake Šasko	Moderate	Good	Moderate	**	≤ Moderate†	Moderate	≤ Moderate	≤ Moderate
3	Viluni Lagoon	Viluni Lagoon	Moderate	Good	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
4	Wetlands		**	**	**	**	**	**	**	**
5	Costal marine zone	Ada Bojana	Moderate††	**	Moderate	Poor	Poor	**	Poor	Poor
		Bojana	Moderate††	**	Moderate	Poor	Poor	**	Poor	
		Port Milena	Moderate††	**	Moderate	Poor	Poor	**	Poor	

Notes: * assessed exclusively using macro-invertebrates; ** data are absent or unavailable to assess the respective status; † theoretical ecological status resulting exclusively from assessment of chemical-physicochemical status (in the absence of biological data); †† assessed using nitrate, ammonium and phosphate.

Figure 66: Ecological status of surface water bodies



10.5.4.4 Groundwater bodies

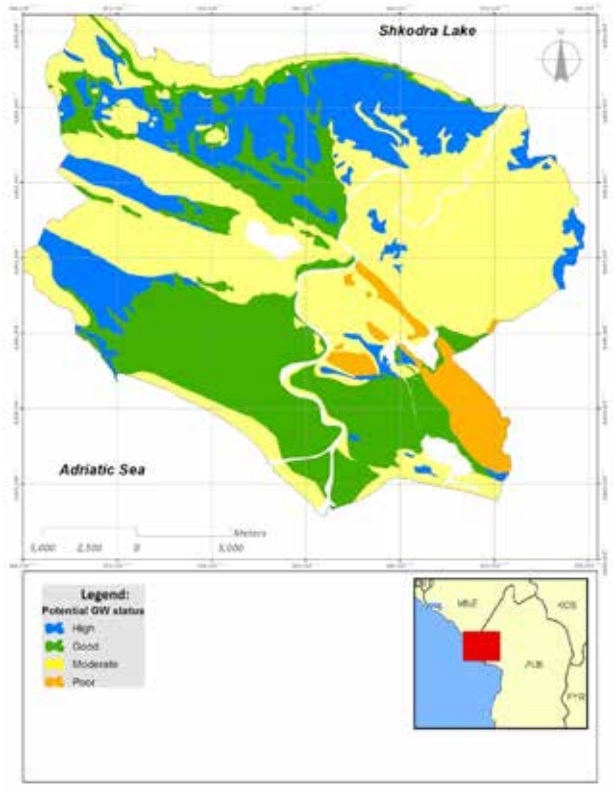
Overall assessment of groundwater bodies, according to WFD requirements, was not possible due to the almost complete absence of necessary data. To obtain an indication, the respective risk map was used to offer a probabilistic sense of the potential status of groundwater bodies in the plan area (taking into account pollution pressures/hazards). Thorough monitoring is necessary to assess actual groundwater status in the plan area, and the present preliminary conclusions need to be verified by chemical measurements prior to their use in decision-making.

Table 21 shows potential groundwater quality status. Karstic formations with intensive anthropogenic land uses are expected to have "poor" status; limestones with moderate hazards related to their land cover are expected to have "moderate" status; and low permeability formations are expected to have "good" to "high" status, depending on the pollution hazard related to their land cover.

Table 21: Potential groundwater quality status in the plan area

GW status	Area (km2)	Area (%)
High	97 030 000	19.76
Good	143 680 000	29.26
Moderate	228 580 000	46.54
Poor	21 830 000	4.44

Figure 67: Potential groundwater quality status based on groundwater vulnerability and hazard (risk map)



11. SOCIO-ECONOMIC AND DEVELOPMENT CHALLENGES

KEY HIGHLIGHTS

- Urbanization in the plan area is characterized by the recent rapid development of a narrow strip within 1 km of the coast, generally linear in nature, running along the coast and highways. In Montenegro, there is considerable "over supply" of land designated for building, resulting in heavily dispersed construction and landscape degradation.
- Albanian development has been characterized by a lack of formal plans and informal development, particularly in the coastal areas and urban centres.
- In the absence of an effective planning system, the rate of urbanization can be expected to fluctuate widely according to tourism and speculative market factors rather than demographic pressures.
- The already inadequate infrastructure throughout the plan area has not kept pace with rapid spatial transformation. Wastewater management is not sustainable leading to possible contamination of both land and marine environments, with consequent risks to human health. Potable systems are of particular concern as the lack of (or inadequate) infrastructure may result in water shortages and even contamination risks. Solid waste collection and disposal systems are of major concern throughout the plan area, as inconsistent local collection services result in frequent illegal dumping. Roads are in poor condition and suffer from inadequate maintenance. Severe congestion is frequent during the summer months, notably in Montenegro.
- In Albania, the agricultural sector is characterized by under-development, with underlying structural issues ranging from field fragmentation to ownership problems and the transition to a market economy, while the irrigation system is in a state of disrepair as a result of lack of investment.
- In Montenegro, the sector is characterized by field abandonment and changes in land use category, from agriculture to development.
- The overall effects of tourism on the economy, while increasing growth, could still be considered inadequate, primarily due to the under-utilization of available accommodation capacities, the dominance of residential tourism and the absolute concentration of tourism activities in the three summer months.
- Climate change impacts are likely to be reflected in agriculture and tourism, generally over the mid to long term. Certain aspects of coastal development have a particularly long lifespan (e.g. transport networks, coastal defences, areas for residential construction), and if constructed without consideration of climate scenarios could entail high future adaptation costs.

After the 1990s, changes in the operation of industrial facilities led to a general decrease in anthropogenic impacts on the environment. Over the last decade, however, political and economic stability has led to the re-opening of many potentially polluting industries, including mining, fertilizer production and tanning, alongside population growth in urban centres. While some of these facilities are equipped with wastewater treatment plants, many have fallen into disrepair. Continued economic growth in Albania and Montenegro has been accompanied by a rise in the use of artificial fertilizers and pesticides by inadequately trained agricultural workers. Modifications have also been made to the watersheds of the Drin River and the Buna/Bojana River.

These activities exert pressures on the natural environment mainly through pollution, unsustainable use of natural resources, disturbance of natural regimes in terms of water flows and sediment distribution and so on. This process has also had an impact on the anthropogenic environment, affecting both economic activities and human wellbeing.

11.1 Urbanization

Albania

The urbanization process in Albania intensified after the 1990s, as the share of the urban population increased from 35% (in 1989) to 42% (in 2001) (World Bank, 2007). The 2011 Albanian census (INSTAT, 2012) highlighted the dominance of urban populations: according to preliminary results, 54% of the population lives in urban areas compared to 46% in rural areas.

The main characteristic of urbanization in the Buna area is the lack of important urban centres and the predominance of rural areas. In fact, the entire area could be considered as rural. However, as indicated in Chapter 8, the share of urban population is probably higher than indicated by official data, as a result of voting patterns. Even though there are no urban centres in the Buna area, the main villages of Velipojë, Dajç, Ana e Malit and Bërdicë could be considered as important local centres (see Figures 9, 11 and 12).

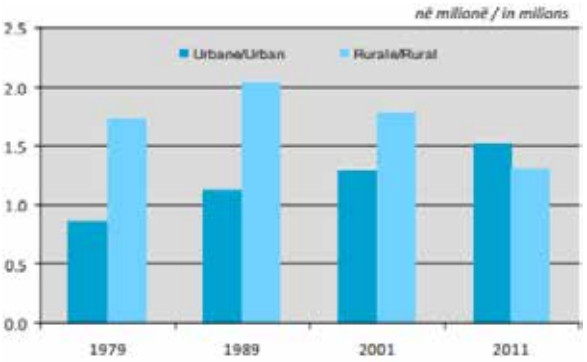
Neither Shkodra County nor any of the local municipalities in the Buna area have comprehensive territorial plans regulating development. Existing strategic documents and urban/development studies include the following:

- Strategic Concept for the Regional Development of Shkodra Region;
- Strategic Development Plan of Dajçi Commune;
- Local Development Plan of Velipoja Commune; and
- REMAKE – Urban study for tourism development and protection of the coastline of Velipoja for the Velipoja beach.

Figure 69 shows the distribution of area covered by territorial plans, indicating that such planning exists only in Dajçi and part of Velipoja commune. According to the Strategic Development Plan of Dajçi Commune, an area of urban consolidation accounts for the greatest share of the territory (i.e. a future residential area with related services). The proposed density of such an area is from 100 to 140 inhabitants/ha. It is interesting to note that the plan also proposes "freezing" urban areas, by reducing or banning future development. All communes in the Buna area are due to prepare territorial plans in the near future.

The lack of effective plans has resulted in uncontrolled construction leading to increased costs of basic infrastructure (roads, sewage, water, etc.). Spread of settlements has increased fragmentation and reduction of agricultural land and contributes to the degradation of the natural environment (due to unregulated solid waste dumping, collection of sewage in septic tanks, etc.) (REC, 2006).

Figure 68: Urban and rural populations in 1979, 1989, 2001 and 2011



Source: INSTAT, 2012.

Figure 69: Distribution of area covered with spatial plans in Albania

Information from the Shkodra region (SRC, 2011) highlights the overall predominance of agriculture in current land cover, except for the commune of Velipoje where forest and other green areas comprise the dominant land cover. In all communes (except Dajci) non-productive surfaces account for 10-20% of total commune area (Figure 70). In addition to built-up areas, these include farm roads, drains, irrigation structures and abandoned agricultural land.

In the absence of comprehensive territorial planning documents, an integrative land cover map of the area has been produced, based on CLC 2006, orthophotos and expert opinion (Figure 71). The area is mainly agricultural with patches of urban development near the main communal centres.

The European Environment Agency's (EEA) updated land cover database, CORINE Land Cover (CLC 2000–2006), indicates that overall land cover change from agriculture to artificial surfaces in Albania during 2000-06 reached 3% – the highest level of change in Europe for this period. Urbanization trends could also be observed in the Buna area, where the greatest changes occurred after 2006. According to expert evaluation of the available orthophotos, urbanization from 2006-12 occurred on approximately 30 ha or 0.2% of the entire territory, with a total urbanized area of 896 ha (Figure 72).

The phenomena of urbanization along the narrow coastal area can also be observed (500 and 1000 m from the coastline). According to the available information, nearly 55 ha (12%) of the 500 m zone and 93 ha (10%) of the 1000 m zone were urbanized by 2012. Expert preliminary analysis using available orthophoto and Google Earth images indicates that coastal urbanization is predominantly located more than 50 m from the shoreline. Unlike Montenegro, however, it was not possible to compare urbanized land against land designated for urbanization, due to lack of spatial planning documents.

Montenegro

The urbanization process in the coastal areas of Montenegro intensified from the 1960s onwards, in particular after the 1990s. Results of the 2011 census show that 63% of the total population live in urban settlements (MONSTAT, 2011a). Between 2003 and 2011, the share of the urban population in the municipality of Ulcinj increased from 49% to 54%. However, this proportionate increase took place against the backdrop of a decline in overall population.

With the exception of Vladimir, most settlements are within 5 km of the coastline. Even though initial settlements were located away from the coast on higher ground, the spread of settlements migrated downhill towards the coast. This has resulted in a significant share of the population living in the narrow coastal zone: 62% of all population in Ulcinj municipality live in settlements that have direct access to the sea (within 1 km from the coastline); 73% live within 5 km of the coast.

Figure 70: Share of agricultural land

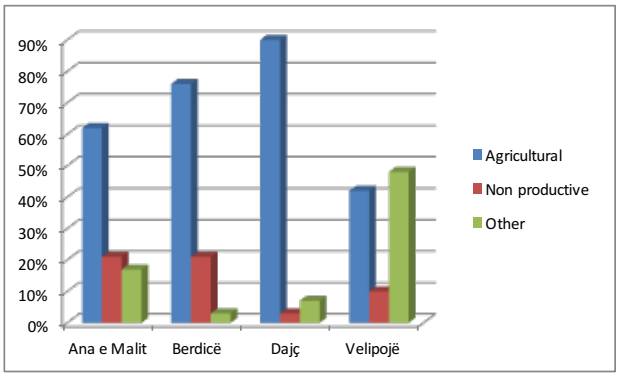


Figure 71: Land cover map based on expert opinion, orthofotos and CLC

Figure 72: Urbanized areas in 2012

The importance and attractiveness of the narrow coastal zone can generally be assessed using the percentage of the area that is urbanized. Although it can be generally concluded that pressures related to population growth and economic activities in the narrow coastal zone of Montenegro are mostly the result of the specific coastal topography (especially in the northern coastal zone in Boka kotorska bay), this is less the case for the southern municipalities (in particular, Ulcinj).

Information from CORINE Land Cover (CLC) on land-cover changes for the period 2000-06 shows only minor changes. The reason is twofold: the greatest land-use changes did not occur during that period; and the low resolution of the mapping (which aims to show the entire European surface) prevents identification of changes below 5 ha. However, the current percentage of artificialized area can easily be extracted through use of the latest orthofoto images (2011).

Examination of the entire municipal surface shows that 3% of Ulcinj municipality is urbanized. However, up to 7.5% of the surface within the narrow 1 km coastal area is urbanized (Figure 66). The urbanization trend intensifies towards the north (e.g. 45% of the coastal area in Bar is urbanized).

Another interesting indicator is the percentage of urbanization of the coastline.[76] Coastal urbanization in Montenegro developed along the "Adriatic coastal road" (Jadranska magistrala) in a linear manner. This resulted in urban sprawl all along the Montenegrin coastline with 32% of the entire coastline being urbanized. This is not entirely the case in the municipality of Ulcinj where 12% of the coastline is urbanized (Figure 73), due mainly to the fact that wide sandy beaches account for a significant part of the coastline, and fall under a specific regime managed by Morsko Dobro, a public enterprise charged with management of the maritime domain.

Although demographic trends highlight a decline in the overall number of people, analysis of urban plans[77] shows that planned urbanization is designed to cope with a 400% increase in population numbers and a twofold increase in tourist numbers (as compared to 2011 figures). In addition, the most intense development pressure is concentrated in the narrow coastal area, where almost 40% of the total area within 1,000 m from the coastline is designated for building (Figure 74).

Such intense planning is therefore not founded on realistic projections and needs, but rather on opportunistic real-estate business pressure. Combined with a lack of strict development rules that can ensure building concentration, such planning practice results in scattered, non-concentrated buildings across the territory. In addition to deteriorated landscape quality, such build-up leads to increased cost of infrastructure development, which often results in inadequate or even lack of infrastructure.

Figure 73: Urbanized areas in Ulcinj

Figure 74: Land use area in Ulcinj

76 A geographical line where the land meets the sea.

77 State planning documents include the following: (i) Spatial Plan of Montenegro; (ii) Spatial Plan of Special Purpose; (iii) Detailed Spatial Plan; and (iv) State Location Study. Local planning documents include: (i) Spatial Master Plan of Local Government; (ii) Detailed Urban Plan; (iii) Urban projects; and (iv) Local Studies of Sites.

11.2 Infrastructure and technical systems

11.2.1 Water supply

Albania

The **water supply** system is inadequate, however villages supplement their potable water needs with individual drilled wells often constructed without permission.

In the commune of **Dajç**, only four out of the 11 villages receive or have access to drinking water from the water supply network. Overall, only 15% of the total population of the commune is supplied with drinking water from the network, while 85% access drinking water from individually drilled wells, which do not ensure adequate quality for water consumption.

The water supply network provides drinking water to five villages in the commune of **Bërdicë** (excluding the village of *Trush*).

The villages of *Shtuf*, *Goricë*, *Fshat* i *Ri*, *Alimetaj*, *Dodaj* and *Muriqan* in the commune of **Ana e Malit** face potable water shortages. In general, the drinking water supply system does not function in a consistent and reliable manner. Local stakeholders have highlighted the importance of this issue and proposed the construction of four new water supply networks to remedy the situation.

The village of *Trush* provides supply for the commune of **Velipojë**. The water supply network consists of a system of mechanical pumps, a storage system and a free flow system. The commune has two water supply networks: one provides water for the village of *Mali Kolaj*, while the other supplies the rest of the commune. The water supply network situation has improved following finalization of the second phase of construction. However, water quality remains a major issue of concern, as the network as a whole is generally outdated.

Montenegro

Since July 2011, a regional water supply system has operated in the Montenegrin coastal area, significantly improving water supply in all coastal urban areas. As of July 2012, the water supply system in **Ulcinj** covers 85% of the municipal territory and links to the regional system (serving 54% of the total municipal population). In addition, five local water supply systems operate (mainly) in rural areas through the use of eight local wells: Gač, Mide, Salč, Kaliman, Klezna, Lisna Bori, Brajša and Vladimir. Two of the five local systems are maintained by the public enterprise "Vodacom" and three are maintained by the local population.

Although the water supply system has generally improved since development of the regional water supply system, there are still some major issues. Reported losses in the system in Ulcinj for the year 2013 reached almost 74%,[78] and increased concentrations of ammonia and iron were found in samples from the water supply system in Ulcinj (MORT, 2015).

In addition, water shortages in Ulcinj were recorded during the summer months (2013) with a total duration of 50 hours.

11.2.2 Wastewater

Albania

None of the communes possess sewage network systems. The populations use septic tanks, which are equal in number to households. In many cases, sewage overflows from septic holes to the surface, posing pollution and health risks to residents, which intensify during flooding periods. Greater density in the beach area leads to a rise in the number of septic tanks, increasing the risk of groundwater contamination.

Montenegro

Development of the sewerage system in **Ulcinj** municipality, as in most parts of Montenegro, is significantly delayed, with consequent negative impacts and increasing pressures on the environment. Although 80% of the urban area (30% of total area) in the municipality of Ulcinj is connected to the sewage system, wastewater is drained directly into the sea without any pre-treatment, leading to increased pollution.

One branch of the main collector transports wastewater to **Port Milena**, with direct effusion into the sea.

Beach tourist facilities in Ulcinj (including **Velika Plaža**), **Valdanos** and **Ada Bojana**, and villages in the hinterland of Ulcinj municipality are not connected to the system. However, the Valdanos tourist complex collects and disposes of wastewater into the sea, 1,850 m distant from the coastline. In Velika Plaža, a 1,200 m long drain terminates in the sea at a depth of about 25 m. In addition, a number of hotels near Velika Plaža collect wastewater in septic tanks for disposal in the sea. Regardless, marine water quality assessments frequently report that water quality meets the highest standards (JPMD, 2015).

11.2.3 Waste management

Albania

The 2010 assessment on municipal waste composition (EU INPAEL[79] project, 2010) indicated that waste production in Shkodra County reaches around 0.9 kg/person/day. Over 50% of all accumulated municipal waste is biodegradable. In addition, significant quantities of other recyclable materials are present in the form of glass, textiles and plastics.

Only low quantities of ferrous and non-ferrous metals were found in the municipal waste stream, as much of this material is scavenged from waste bins at the point of collection. In addition, the quantity of healthcare waste within the municipal waste stream was also low, as healthcare waste is normally collected at the point of generation and sampling was not conducted at healthcare facilities.

According to waste regulations, solid waste collection is the responsibility of the local authorities. In light of the significant waste problems in the area, local communities agreed to establish a joint landfill in the **Bushat** area (Figure 75). However, construction of the landfill in 2011 led to major problems. The location of the site proved to be particularly problematic as it cuts across the riverbanks and floodplain. In addition, the site is affected by seasonal rainfall and meltwater from the mountains.

78 5,717,383 m^3 of water suppressed; 1,505,344 m^3 of water delivered (and charged).

79 Implementation of the National Plan for the Approximation of Environmental Legislation in Albania.

The base of the Bushat site is the gravel riverbed, which allows any contaminants to percolate directly into the water table or surface waters. The depth of waste deposition does not appear to be particularly deep and is spread and compacted over the site, limited only by the surrounding main roads and the river itself. The river is also eroding part of the site and transporting waste downstream. Ultimately, the costs of transporting the waste are a major obstacle to utilization, as the landfill is located some distance from the communes, in particular **Velipoje**. At present, only the commune of **Dajç** performs collection and discharge of solid wastes into the landfill (see below).

A serious issue in the area is the absence of general plans for the distribution of waste collection points, and the lack of waste bins and collection vehicles.

In the commune of **Ana e Malit**, solid waste collection is carried out by two employees with simple collection equipment. In the absence of a specific collection site, the waste is gathered near institutions, business activities, housing and so on. No specific location is used for waste disposal. The area of Ana e Malit is also exposed to flooding from the Buna River, as well as water from mountain streams, which transport garbage and plastic into water bodies. According to different sources the commune collects from 1 to 6 tonnes of waste per day.

Since 2011, the solid waste collection service in the territory of **Dajç** municipality disposes of waste in the Bushat landfill. Previously, the authority had deposited waste in "Mali i Gjymit", a natural cavity located 2-3 km from the main road connecting the village of *Pentar* with the centre of Dajç. The commune has developed an awareness-raising campaign in cooperation with local and national NGOs (Miqte e Bunes, Eden centre) to discourage dumping of waste in open irrigation and drainage canals, but the practice persists in a few cases (Figure 76).

Based on commune data, the average quantity of waste produced in the commune of **Velipoja** is 30-40 tonnes per day, with organic waste being the dominant type. A major issue is the significant increase in waste around the beach area during the summer season, due to the rise in seasonal visitors.

Waste is collected daily from villages of the commune along the main road, and twice a day from the beach during the summer season. More remote villages are provided with the service between one and three times per week. Businesses are provided with regular solid waste collection. The commune is equipped with garbage containers as result of different projects and private donations.

At present, the commune deposits waste in an old dump located in the village of *Pulaj* about 4.4 km from the beach area and 800 m from the Buna River. The dump, with a surface area of around 0.9 ha is used mostly during the summer season (June–September), without application of EU standards.

Figure 75: Bushati landfill

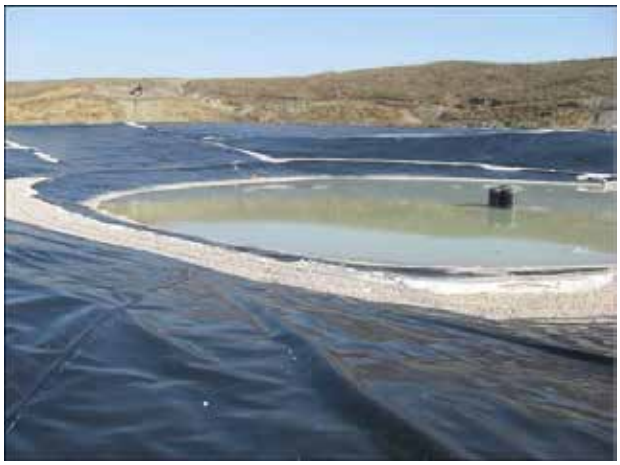


Figure 76: Waste in Dajç municipality

Montenegro

In accordance with the Management Plan on Solid Waste for the Period 2008-12 (Official Gazette 16/2008) the approximate quantity of waste produced by the municipalities of **Ulcinj** for the year 2006 was 8,311 tonnes.[80] These calculations were made assuming that the permanent population produces 0.90 kg of waste/per day, tourists produce 1.50 kg/per day and refugees produce 0.25 kg/per day. The composition of waste in the coastal area is estimated as follows: approximately 15% of waste is paper, 7% glass, 4% metal, 12% plastics, 5% textile, 35% organic waste and 22% the remainder.

Collection of waste is the responsibility of local municipalities. In Ulcinj municipality, Public Enterprise Ulcinj collects waste on a daily basis. However, a special plan was designed for the old part of the town, where streets are narrow, with waste collected three times a day. Since 2012, municipal waste collected from Ulcinj has been deposited in the regional sanitary landfill "Možura". The site is located within the territory of the municipality of **Bar**, 17 km from the town of Bar and 11 km from Ulcinj. The area intended for the sanitary landfill and recycling centre covers 24.4 ha. The "Možura" site is

80 Only 54% was managed (deposited and/or recycled).

situated about 1,500 m from the sea. There are no residential or corporate facilities within a radius of 850 m.

According to the Management Plan, the prior landfill, Kruče, was prioritized for remediation by 2012. Remediation has still not taken place.

11.2.4 Transport system

Albania

The **transport** network in the Buna area is poorly organized. The existing network of roads does not promote effective circulation of vehicles, bicycles and pedestrians. There are no pavements, parking areas or cycle paths, increasing the danger to pedestrians. There is also a need for better connections between villages and with the main road from Shkoder to Velipoja. The closest maritime port is **Shenjin**, south from Velipoja and outside the plan area.

Montenegro

Existing road infrastructure in the territory includes national, regional and local roads. Although these are of relatively good quality and connectivity there is a lack of regular maintenance, and intensive traffic jams occur especially during the summer season (June–September) when the frequency of traffic increases by up to 20 times. The main and regional roads run largely through towns (due mainly to unplanned expansion of cities) with consequent impacts on the urban quality of life and congestion.

Bar is the most important port in Montenegro for international maritime traffic, and the only port with a developed infrastructure, modern equipment, storage facilities and personnel to compete in the international market. All international maritime traffic for Ulcinj therefore passes through the port.

Given that the outdated quality of **rail infrastructure** and the relationship with the Port of Bar, which is of key importance, the railway is an important factor in regional development.

There are no **airports** in the plan area. However, the proximity of airports in **Tivat** and **Podgorica** ensures the region is relatively well served.

11.3 Challenges in agriculture

Albania

Agriculture is characterized by small farm size and remains oriented towards auto-consumption. The majority of farm sizes in the area are significantly below 1 ha[81] and are fragmented into numerous plots (3-4 plots per farm on average). This could be considered as a major obstacle to increased and efficient agricultural productivity and securing high returns on investments. Frequent problems related to land ownership also contribute to inefficient development of the agricultural sector.

As a result, total production from the area is sufficient to cover local consumption needs for six months with the remainder of the year covered by imports. Products are usually traded in very poor sanitary conditions, such as on pavements along streets. There is no technology for packaging or standardization of products for local/national or export (including tourist) purposes (REC, 2006). Before the 1990s, agricultural land was drained by a well-managed system, composed of underground canals, drainage canals, pumping stations and rivers. This system is now highly compromised and the situation is critical, to the extent that the area cannot produce crops without improvement to the system (REC, 2006).

Montenegro

Regardless of favourable climate conditions and the availability of high-quality land, agricultural development in the coastal region is limited due to lack of interest among the local population, the availability of alternative and lucrative sources of income, and limited support for agricultural development. Agriculture is characterized by small-scale production with only 277 out of 1,731 (i.e. 16%) family agricultural holdings considered as serious producers on agricultural fields larger then 2 ha (MONSTAT, 2011b). In addition, substantial areas of agricultural land are not used for production. Arable land area has reduced further as a result of conversion to meadows and pastures outside urban areas. The investment and construction boom also increased the conversion of agricultural land for housing (Figure 77).

Analysis of local spatial plans highlights the negative trend of reallocating highly valuable agricultural land for building,[82] underlining the municipality's orientation towards development of tourism and real estate at the expense of intensive agricultural development (Figure 77).

Figure 77: Conflicts between urbanization and agriculture in Ulcinj, Montenegro

81 According to the Agriculture and Food Sector Strategy (MAFCP, 2007), Shkodra County is among the counties with the smallest farm sizes (on average from 0.5 to 1 ha).

82 The "blue areas" in Figure 77 show land units larger than 5,000 ha converted into buildable areas. There are also several smaller areas.

11.3.1 Impacts of climate change on the agricultural sector

The National Communications by Montenegro and Albania to the UNFCC highlight the potential impacts of climate change on the agricultural sector. For Albania, as stated in the First National communication, these include increase in irrigation requirements as a result of changes in rainfall, evaporation and soil moisture changes. However, these changes are not expected to impact crop yields in the short term owing to sufficient available water resources for irrigation up to 2025. A number of impacts are expected over the longer term, up to 2050 and 2100: "the reduction of the extent of arable land, due to soil erosion and alteration; the changes in the growth cycles, harvest time and the quality of the agricultural production, especially along the coastal area, owing to an increase in salinity because of the sea level rise and intrusion of salt water into the soil; the cultivation of early agricultural products in the open air or in greenhouses, owing to an increase in winter temperatures" (MoE, 2002: 100). However, the UNDP report prepared for the Third National Communication, notes that rising spring temperatures will increase soil temperatures, potentially extending suitable zones for summer crops and the length of the growing season (by over 30 days). The impacts of climate change on the agricultural sector discussed in the National Communication of Montenegro include effects on soil structure and moisture content, and agricultural productivity, on the basis of evapotranspiration and water demand by plants, under two future scenarios for 2001-30 and 2071-2100 (Ministry for Spatial Planning and Environment, Montenegro, 2010).

To provide an **initial quantification** of changes in agricultural output for the Buna/Bojana area as a result of climate change, two sets of percentage change in agricultural productivity estimates were used – one from the PESETA study (Iglesias et al., 2009) for the 2011-40 scenario and another from the Cline (2007) study for the 2080s with and without carbon fertilization. **It should be noted that these quantifications are not absolute figures, but represent a demonstration of potential climate change impacts on agriculture**. Baseline agricultural data for 2003 for the part of Ulcinj municipality within the Buna/Bojana area in Montenegro come from the Statistical Yearbook of Montenegro (MONSTAT, 2006). Calculations were based on certain cereals and vegetables (maize, wheat, potatoes and beans) for which comparisons based on these two studies could be made.

The assessment shows that a 2% decline in agricultural yield translates into a loss in agricultural output for selected crops of €0.12 million for Ulcinj, 75% of all coastal municipalities and 16% of the total agricultural loss for Montenegro as a whole during 2011-40.

Similarly, an 8.6% decline in agricultural yield (excluding the effects of carbon fertilization) translates into a loss in agricultural output of selected crops of €0.52 million for Ulcinj, 75% of all coastal municipalities and 14% of all Montenegro for the 2080s. Conversely, assessment shows that use of carbon fertilizers can increase agricultural yield by 5.1%, which translates into a gain in agricultural output of selected crops of €0.36 million for the 2080s.

Regarding wine production, the IPCC Fifth Assessment Report (AR5, Kovats et al., 2014) indicates that "climate change will alter the geographic distribution of wine grape varieties (high confidence) and this will reduce the value of wine products and the livelihoods of local wine communities in southern and continental Europe (medium confidence) and increase production in northern Europe (low confidence)". In addition to impacts on grape yields, higher temperatures may also affect wine quality as well as grape varieties. In this area, impacts could even be positive; however, any assessment will require further research.

A study by Ponti et al. (2014) assessed the ecological and economic impact of a projected 1.8°C climate warming (A1B scenario) on olive trees and their pest, the olive fly, across the Mediterranean Basin, and found varying impacts on olive yields and fly infestation levels, with some areas benefitting economically and others losing. Comparing the periods 1961–70 and 2041–50, the study predicted only minimal impacts of climate warming on aggregate olive oil production with some decrease in risk across the region. The study provides results for Albania, Croatia, Greece, Turkey and Cyprus as a whole. These show slight increases in average olive yield, from 2.2 to 2.38 tonnes per hectare, and decreases in olive fly infestation from 57% to 45%, which translate into an increase in profit from about €2,234/ha to €2,491/ha.

The above assessment relied mostly on regional estimates. Detailed studies on individual crop needs will be necessary to obtain more precise information. Caution should therefore be exercised in interpreting the above values. Regardless, the approach used in the above analysis can be followed to estimate the impacts of climate change on the agricultural sector.

11.3.2 Impacts of climate change on fisheries

There is increasing evidence that the distribution of fish species is changing, as waters begin to warm. These changes will likely have impacts on the fisheries and tourism sectors (Callaway et al., 2010). Other threats include invasive species, overfishing and destruction of habitats. A number of studies have been undertaken on the North Sea and changes in the centre of gravity of certain fish species, but only a few on the Mediterranean (Cheung et al., 2009), although one study highlighted changes in the distribution of *Sardinella aurita* in the Western Mediterranean (Sabates et al., 2006). More work is needed in this area to permit estimation of the impact of climate change on fisheries.

Salinity is also likely to have an impact as sea level rise extends the reach of brackish water. However, at this stage it is not possible to ascertain the scale of the impact.

11.4 Tourism

Albania

The Buna area has strong tourism potential, however existing facilities near the beach have been developed in an illegal manner to extremely poor standards, and attract low-quality mass tourism exclusively during the summer months (June–July–August). The trend in informal construction decreased after 2007, as demolition of informal construction in the beach area discouraged new initiatives.

Montenegro

Tourism activities in the area have strong economic potential, however overall performance is far from sustainable. Analysis of the ratio of overnight numbers and accommodation capacity in Ulcinj (2011) shows that only 44% of available (official) capacity is utilized. Furthermore, the majority of available capacity (2.4 times more) is concentrated in *complementary* tourism resources (i.e. apartments, private rooms, secondary homes, etc.), with a lower contribution to tourism (economic) development. Finally, although general figures indicate a constant rise in the number of tourists and overnights, including the average length of stay, around 83% of all tourist visits occur during the summer months (June–July–August).

There is a good correlation between (official) accommodation capacity and local population numbers (0.3-0.4), but the ratio becomes more unfavourable once estimated numbers of residential tourists (24,604) are taken into consideration, implying significant pressure on the local community. However, these pressures have not yet caused significant disruption to the social and cultural integrity of area.

Nevertheless, the issue of secondary homes in the area indicates an unsustainable path of tourism development. According to the European Environment Agency (EEA, 2002), secondary homes take (per person basis) up to 40 times the land area required for an apartment and up to 160 times that of an 80-bed hotel. Figures show a significantly greater number of dwellings compared to the number of people/households (Monstat, 2011a). At the same time, it is evident that the majority of dwellings in Ulcinj are intended for seasonal use. Almost all of these (95%) residential tourism dwellings are situated within the 5 km coastal zone. This confirms that tourism in Ulcinj is based predominantly on residential tourism, which consumes valuable coastal resources with minimum economic benefit and exerts additional pressure on the local community and government, requiring necessary infrastructure usually beyond economic sustainability.

11.4.1 Impacts of climate change on tourism

As with agriculture, quantifications were used to demonstrate the potential level of climate change impacts on the sector, rather than producing absolute figures. Taking into consideration the relevance of the sector to the national economy, the study only evaluated the impacts of climate change on tourism for Montenegro. However, the overall conclusions are also applicable to the Albanian part of the area, which was examined in a recent study by Callaway et al. (2010). Two approaches were used to assess the likely consequences – the Hamburg Tourism Model (HTM) and an approach developed under the PESETA project that used monthly rather than annual data. The results highlight the range of potential outcomes for the region in terms of both tourism numbers and expenditures – and the sensitivity to the scenario applied and the modelling technique.

In terms of modelling tourism demand, three scenarios are presented: the historic average for the period 2001-08, the period 2007-08 and a "high" scenario, which represents a doubling of 2007-08 tourism levels. Although it is difficult to project future demand, these scenarios give an idea of the sensitivity of climate impacts to assumptions regarding tourism levels.

The findings showed that tourism impact is likely to be negative under all scenarios with the HTM model, but could be slightly positive under lower temperature increases with the Peseta model. In any event, under both models increases in temperature above 3°C result in visitors numbers becoming negative. This indicates a potential threshold effect for temperature change and tourism demand. However, other variables should also be taken into account (e.g. growth in overall demand, which may be more significant than climate).

There may also be a change in the seasonality of tourism. In the event of a 2.5°C increase, tourism demand may shift from June–July–August towards other months.

12. INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

- Albanian and Montenegrin policies, laws and institutional structures related to the environment are changing rapidly in order to comply with the requirements of the EU accession process.
- Inadequate law enforcement and slow implementation of adopted plans is an issue.
- High-level management mechanisms have been established for joint decision-making processes related to management of the Drin basin, including the Buna/Bojana area.
- Coastal management is required by the ICZM Protocol but lacks integrated structures.
- There is a need to upgrade capacities at both national and local levels, and to introduce awareness-raising campaigns and other initiatives to improve current law enforcement and implementation of integrated approaches for managing coastal and marine ecosystems.
- The main area of the institutional framework in need of strengthening is local government.

12.1 Current situation

Strategic planning (strategies, action plans, etc.) and legislation have created a basic foundation for integration across sectors. Policies and legal framework are currently undergoing a process of a revision with the EU Accession Process[83] as the main driving force.

Albania and Montenegro have both ratified the Barcelona Convention and the ICZM Protocol. Albania was among the first countries to ratify the latter in 2010, and ratification of the Protocol by Montenegro at the end of 2012 resulted in the incorporation of the ICZM concept into a number of national policies and strategic documents.

Overall, progress in law-making is considerable and has introduced, among others, the concept of "command and control" into decision-making, as well as several economic instruments. Nevertheless, some deficiencies remain in the areas of implementation and enforcement. The reasons are manifold:

- Hasty adoption of sectoral policies, plans and programmes results in conflicts, due to lack of attention to integration and environmental considerations.
- Many laws are framework laws and require the adoption of secondary legislation and a set of regulations. Steps have been made in this direction, but further efforts are required.

Aside from gaps in existing legislation, a key issue is the weak administrative capacity of institutions involved in environmental policy-making and implementation. According to EC progress reports, existing institutions are not fully operational and there are corresponding gaps leading to fragmentation of responsibilities, particularly in the water and waste sectors. Furthermore, understanding of sustainability requirements and the necessary commitment varies among different institutions. Consolidation of effective cooperation and coordination mechanisms has yet to take place. Efforts to strengthen administrative capacities are continuous, but still inadequate.

An additional issue is availability and access to existing data. This must be improved to ensure a sound basis for policy-making and implementation. Furthermore, the unstable economic situation has had an effect on law enforcement and the success of economic instruments, as well as willingness to pay for the use of natural resources, especially water.

Public participation is legally defined in both countries; however, timely and efficient public influence in the decision-making process is still lacking. While there is progress in this respect, additional effort is necessary for NGOs to become a key source for capacity-building, awareness-raising and increasing accessibility of information.

Management of water resources within the Buna/Bojana area requires transboundary cooperation. Existing mechanisms such as the Lake Shkoder/Skadar Commission, established through an agreement between the two countries, could be used in this regard. The mandate of the joint body would have to extend to also cover management of the Buna/Bojana watershed. Furthermore, both countries are participating in an effort to coordinate management of the Drin Basin – the Buna/Bojana forms part of the basin – along with FYR Macedonia, Kosovo and Greece, and an institutional structure has been established to implement the related Memorandum of Understanding (MoU).

Table 22: Ministries in charge of legal drafting for different sectors of environmental/natural resources management in Albania and Montenegro

Theme	Albania	Montenegro
Horizontal legislation*	ME	MSDT
Water management and protection	ME, MH, MARDWA, MTI, MEI, MUDT	MARD, MSDT
Nature protection	ME, MARDWA	MSDT, MARD
Waste management	ME, MTI	MSDT
Industrial activities and risks	ME, MI, MH	MSDT, MIAPA

Notes: *This body of law is not focused on a single aspect of the environment but instead applies to all environmental fields, for example, Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), Access to environmental information, etc.

The allocation of legal competencies as illustrated in the table must be treated with caution. Restructuring of institutional frameworks is ongoing and the table may not reflect recent developments.

Albania: ME = Ministry of Environment; MH = Ministry of Health; MARDWA = Ministry of Agriculture, Rural Development and Water Administration; MUDT = Ministry of Urban Development and Tourism; MEI = Ministry of Energy and Industry; MI = Ministry of Interior; MTI = Ministry of Transportation and Infrastructure; and MES = Ministry of Education and Sciences.

Montenegro: MSDT = Ministry of Sustainable Development and Tourism; MARD = Ministry of Agriculture and Rural Development; and MIAPA = Ministry of Internal Affairs and Public Administration.

83 Albania has been a candidate country for membership to the EU since 27 June 2014. A SAA with the country was signed on 12 June 2006 and entered into force on 1 April 2009. Montenegro has been a candidate country for membership to the EU since 17 December 2010. The accession negotiations with Montenegro started on 29 June 2012. A SAA was signed on 15 October 2007 and entered into force on 1 May 2010.

The following sections present the legal frameworks for governance of natural resources in the two countries.

12.2 Country analysis: Albania

12.2.1 Legal frameworks

Albania has developed a sound legislative base over the last 20 years with the support and assistance of the EU. Legislation in the country covers horizontal and sectoral issues related to the environment, natural resources management, basin management and coastal management. The key laws are presented in Box 8.

Albania is party to most of the Conventions and/or Regional Protocols related to the environment. The Albanian Parliament passed Law No. 10234 on Ratification of the ICZM Protocol on 18 February 2010. Implementation of this law is an issue.

Box 8: Selected laws for natural resources management in Albania

- Law on Water Supply and Waste Water Management (1996)
- Law on Management of Revenues Generated from the State Forest and Pastures (1998)
- Law on Concerning the Right of Access to Official Documents (1999)
- Law on Organization and Functioning of Local Government* (2000, amended in 2004)
- Law on Protection of Arable Land* (2004)
- Law on Usage and Exploitation of Arable Uncultivated Land* (2004)
- Law on Regulatory Framework of the Sector of Water Supply and Collection and Treatment of Waste Waters* (1996, 2005)
- Law on Efficiency of Energy* (2005)
- Law on Allowed Norms of Liquid Releases and the Zoning Criteria of Receiving Water Environments (2005)
- Law on Irrigation and Drainage (1999, 2008)
- Law on Protected Areas* (2002, amended in 2007)
- Law on Plant Protection Service (2005; amended in 2008)
- Law on Service of Plant Protection* (2005, amended in 2008)
- Law on Regulatory Framework in Water Supply and Waste Water Administration (2008)
- Law on Territorial Planning (2009)
- Law on Establishment and Operation of Soil Administration and Protection Structures (2010)
- Law on Usage of Chemical Fertilizers (2011)
- Law on Environmental Protection* (2011)
- Law on Environmental Impact Assessment* (2011)
- Law on Integrated Management of Waste* (2011)
- Law on Protection from Non-ionizing Radiation (2011)
- Law on Integrated Management of Water Resources* (2012)
- Law on Protection of Marine Environment from Pollution and Damage* (2002, amended in 2013)
- Law Concerning the Environmental Treatment of Polluted Waters* (2003, amended in 2013)
- Law on Chemical Substances and Preparations* (2003, amended in 2013)
- Law on Protection of Transboundary Lakes* (2003, amended in 2013)
- Law on Forest and Forest Service* (2005, amended in 2007, 2013)
- Law on Strategic Environmental Assessment (2013)
- Law on Protection of Biodiversity* (2006, amended in 2013)
- Law on Pastures and Meadows (2007, amended in 2013)
- Law on Protection of Wild Fauna (2008, amended in 2013)*
- Law on Hunting (2010, amended in 2013)
- Law on Environmental Permitting (2011, amended in 2013)
- Law on Fishing* (2012, amended in 2012, 2013)

12.2.2 Institutional framework

The **Council of Ministers** is the highest body in the administrative system of Albania responsible for the approval of national strategies and plans.

The institution responsible for **environmental** issues is the **Ministry of Environment** (ME). At the regional level, **Regional Environmental Directorates** (RED) under the ME are responsible for the implementation of environmental legislation. There are 12 REDs, one for each county, with different municipal offices; the Shkodra County RED is responsible for the Buna area. In addition, the Agency of Environment and Forestry, as the technical body of the Ministry, is envisaged to act as the central focus for environmental monitoring.

The institutional setting of **territorial planning and water resources management** is given below.

Although required by the ICZM Protocol, there are still no integrated structures for **coastal management**. A new institution entitled the National Coastal Agency was established in September 2013.. This institution is expected to play an important role in coastal management during the coming period. Taking into account the interlinkages and interdependencies between coastal and river basin areas, some form of integration of water and coastal management mechanisms should be considered (e.g. placing basin authorities and the authorities responsible for spatial planning under the same same institutional structure).

One of the key sectors relevant for coastal management is **territorial planning**. There are three levels of territorial planning in Albania: national, integrated/interregional and local/cross-local (municipalities, communes).

- **The Ministry of Urban Development and Tourism** (MUDT) is in charge of territorial planning issues. The National Council of Territory is the highest body for approval of national, integrated and interregional territorial plans. Local territorial plans and cross-local territorial plans are approved, respectively, by the Council of Local Government and local governments councils involved in the planning process.

- The new **Law on Territorial Planning** (Nr. 10119, dt. 23.4.2009) initiated operation of the **National Agency for Territory Planning** as the main technical body supporting horizontal and vertical coordination among national and local territorial planning authorities, in order to harmonize issues on territory planning and development.

- During 2014, the MUDT completed the drafting of amendments to the Law on Territorial Planning, which relate to understanding and simplifying the terminology and planning processes, the insertion of additional planning development control tools, and the definition of duties and responsibilities of local planning authorities, depending on the territorial administrative reform.

Different institutions and ministries deal with **water management** issues. In practice, there is a lack of coordination with some overlaps:

- The **Council of Ministers** is, among others, responsible for the approval of national strategies and plans.
- The **National Water Council** (NWC) is an inter-ministerial body in charge of determining water policy and taking major decisions related to water resources.
- The **Ministry of Environment** is the line ministry.
- The **Directorate of Water Policies** is responsible for water policies and databases through the cadastre.
- The **Technical Secretariat** is the executing agency of the NWC[84] and, as of 2014, falls under the direct responsibility of the Council of Ministers.
- The **Directorate of Environment** is another "water-related" directorate, which includes three Sectors: (i) Water, Air and Climate Change; (ii) Environmental Impact Assessment; and (iii) Waste, Chemical and Industrial Accidents.

The **Ministry of Environment** shares responsibilities with:

- the Ministry of Agriculture, Rural Development and Water Administration (MARDWA), which is responsible for water utilization for irrigation purposes and drainage. At the regional level related responsibilities are dealt with by the regional directorates of agriculture.
- the Ministry of Transportation and Infrastructure (MTI), which is responsible for the elaboration of policies related to water supply and sanitation. The General Directorate of Water Supply and Wastewater (GDWW) is a public institution under the MTI specialized in water infrastructure.
- the Ministry of Health (MH), which is responsible for setting drinking water quality standards and monitoring drinking and bathing water quality.
- the Ministry of Energy and Industry (MEI), which is responsible for hydropower production.

Six **River Basin Councils** (RBCs) have been established and charged with implementing the law and the duties charged by the NWC. Among others, these multi-stakeholder Councils are responsible for issuing water use permits and concessions for water use and gravel extraction.

The **River Basin Agencies** (RBA) are the executive units of the RBCs. They form part of the structure of the ME and are responsible for implementation of water-relevant legislation and the respective regulations, the decisions of the NWC and so on[85] in the basin of their competence. The Buna basin is part of the Drini-Buna River Basin.

Monitoring of waters is carried out by the following scientific institutes contracted by the Ministry of Environment on an annual basis: the Institute of Geoscience, Energy, Water and Environment (IGEWE);[86] the Albanian Geological Survey, which is responsible for groundwater quality and quantity monitoring; the National Environmental Agency (formerly the Institute of Environment), which monitors wastewater discharges; the State Sanitation Inspectorate, which is authorized to monitor the quality of drinking water; and the Institute of Public Health, which performs biological monitoring.

The **Water Sector Regulatory Entity** is a state entity responsible for issuing licenses and establishing tariffs in the water supply and sanitation sector.

Since 2002, local authorities (municipalities and communes) have been granted responsibility for the management of water supply, wastewater collection, drainage and flood protection.

Water User Associations (WUAs) can be established at local levels as private and financially independent entities to manage water for irrigation and related infrastructure, at and below the secondary irrigation network level. Creation of water schedules and distribution plans, maintenance of water distribution infrastructure, setting and collection of fees are among their responsibilities.

12.2.3 Management setting

This section provides a brief overview of the management setting in horizontal and sectoral areas.

12.2.3.1 Horizontal issues

In principle, an environmental permit is required to conduct any kind of activity considered to have a potential impact on the environment. Transposition of the EU legislation on Environmental Impact Assessment (EIA) was finalized under the Laws on Environmental Impact Assessment and Strategic Environmental Assessment (SEA).

84 The Technical Secretariat is responsible for: the development and implementation of national policy for waters; compilation of the central inventory (on quantity and quality) of water reserves according to rules decided by the NWC; the issuance of permits and authorizations regarding the use of water and discharges for activities performed in or that affect more than one basin; promotion of the participation of water users in the management of water resources; collection and assessment of water-related information and the preparation of reports; and supervision of work undertaken by the six River Basin Agencies.

85 They are also responsible for the preparation of meetings of RBCs; preparation of water inventories; preparation of water resources plans; collection of water tariffs; reviewing of plans, programmes and projects on irrigation and drainage protection of rivers and submission to the RBC for approval; proclamation of sanitary areas around water resources, etc. In addition they are involved in the process for the issuance of permissions, concessions and authorizations related to water use and to discharge of wastewaters to water bodies; and undertake studies and surveys on water pollution in collaboration with research and scientific institutions.

86 The Institute is recognized by the World Meteorological Organization as the National Meteorological and Hydro-meteorological Service for Albania. It monitors surface water quality and quantity. It forms part of the Polytechnic University of Tirana and is therefore under the remit of the Ministry of Education and Sciences (MES), and does not report directly to the Council of Ministers. The IGEWE is responsible for the network of surface hydrological and meteorological monitoring stations, as well as for issuing a daily meteorological bulletin.

A number of laws either advocate the use of economic instruments or specify precise details and charges. The low collection rates and levels of fines inflicted on transgressors of environmental legislation remain too limited to be a deterrent.[87]

The National Monitoring Programme (NMP) – the details of which are set by the Ministry of Environment and implemented in cooperation with other bodies – is weak due to low administrative and financial capacities. The established water monitoring system covers neither all river basins nor the total area of each river basin. The monitoring methodologies used and the data assessment mostly fall below appropriate standards.

The presence of environmental NGOs and civil society organizations (CSOs) is under development in Albania. Despite difficulties, their capacity to contribute to the management of natural resources is growing. Unfortunately, the same cannot be said for NGOs and CSOs in the area of the Buna River. NGOs working in the area are based in Shkodra town and Tirana. The most important group in the area is the Transboundary Forum for Lake Shkodra/Skadar, a coalition of several NGOs also active in the area of the Buna River.

12.2.3.2 Land use and territorial planning

The administration and use of public and private land is undertaken through regional plans, master plans, general regulatory plans and partial urban studies. However, the adoption and preparation of these plans is not mandatory. Only partial urban studies are required, and must be approved, for the issuance of site and construction permits. Shkodra County and the Buna area in particular are characterized by a general lack of urban studies, which, among others, leads to the mushrooming of unplanned illegal settlements.

Protected areas in the Shkodra and Buna areas have been designated as special planning areas for which detailed spatial plans must be developed and approved by the Government. These can supersede local/municipal level plans. The Regulation and Urbanization Plan of Shkodra (including the coast of Lake Shkoder) was developed in 1998. A physical plan for Velipoja has been also prepared.

12.2.3.3 Water management

A major part of the legislation enacted to ensure harmonization with the EU Water Framework Directive and other directives in this sector has yet to be adopted.

As regards water quality, alignment with EU standards is at an early stage. The new Law on Integrated Management of Water Resources (2012) does not address issues of coordination among the responsible institutions at national and the local levels. It also fails to establish a clear framework related to water uses and water quality monitoring.

87 The Law on Environmental Protection (2011) summarizes the general status of economic instruments and sets out a series of potential environmental violations, together with fines and administrative arrangements. Permits including lease rates are required for the exploitation of natural resources (e.g. excavation of stone, humus, sand, gravel, etc., in forests and riverbeds; wood coal, tinder and lime production; beehive cultivation; and quarrying). A total of 12 types of violation and related fines are defined. Fines are set by the Environmental Inspectorate (under the ME) and enforced in cooperation with the state police; the respective amounts are "channelled" to the state budget. Delays in payment of fines incur an additional daily penalty.

The river basin management plan (RBMP) for the Mati River is the first to be developed; two other plans for the Drini and Semani basins are under development.

Non-domestic water users and users of groundwater for domestic purposes must have a concession or obtain permission, authorization or license from the appropriate water authority. The process to obtain water use permits is considered to be complicated.

Box 9: Types of administrative authorization for water use in Albania

- **Permission.** Water authorities may grant administrative permission for: the use of underground water for any purpose; water supplied by permanent installations; and use of water for irrigation, livestock, aquaculture and industry. Permission is also required for the planting of trees and crops on riverbeds and the removal of solid material from riverbanks.
- **Authorization**. Authorizations for water use are necessary for the research, exploration and study of surface water and groundwater.
- **Concession.** Water authorities may grant concessions for the use of surface water and groundwater for public purposes, including hydropower production, supply of potable water and irrigation by agricultural enterprises.
- **License**. Commercial well drillers must obtain a license and separate permission for every well drilled.

Source: Law on Integrated Management of Waters, 2012.

In general, the use of surface water and groundwater remains, in most cases, difficult to monitor and control. Water users are not registered, the extracted quantities are neither measured nor reported, and abstraction taxes/charges are not paid, with illegal abstraction a common practice.

Law enforcement is an issue. The National Inspectorate, which incorporates all previous inspectorates (forest, environment and water) is understaffed and suffers from a lack of offices and basic equipment. In addition, the Inspectorate can record illegal activities, but lacks the power to stop them or collect fines and tariffs. This power lies with the National Inspectorate of Environment, Forest and Water, the related inspectorates of the 12 Regional Environmental Directorates, and inspectorates of other line ministries. Absence of coordination among the inspectorates is the main factor contributing to lack of enforcement. Task forces with the participation of inspectors from different inspectorates and the police are currently being formed to address specific issues.

With regard to water supply, most local authorities in Albania – ownership of utilities was transferred from the government to local authorities after 2008 – are ill prepared to take on related responsibilities. Human and financial capacity is insufficient to create and/or rehabilitate infrastructure or manage the utilities effectively. In many cases, water supply in villages is not managed directly by the utilities, and a single individual is responsible for maintaining the network and collecting tariffs. Due to the lack of a metering system, levels of consumption are not monitored.

The local authorities decide tariff levels, which should be consistent with general national policies. The notion of cost recovery is followed in principle. Water utilities tend to have high losses, low revenues and low collection rates. Illegal connections are common, especially among poor households.

Water pollution standards are defined under the law, "Allowed Norms of Liquid Releases and Zoning of Receiving Water Environments" (2005). According to the law, no business that discharges wastewater effluents will be granted a permit to operate unless it installs a water purification facility. Enforcement of this legislation has been very poor.

Flood management in the country is based on management of risk and mitigation of impacts. Management of risk is based mostly on technical works, while flood forecasting remains an issue due mainly to four factors: (i) financial and technical capacity of the responsible institutions; (ii) insufficient cooperation in terms of planning with KESH, which manages the cascade of dams; and (iii) lack of cooperation with the competent flood institutions and organizations that manage dams in neighbouring countries.

12.2.3.4 Waste management

Implementation and enforcement are at a very early stage, while investment needs to increase considerably. With regard to institutional capacities, the ME is seriously understaffed, especially with regard to solid waste management. In addition, the allocation of roles among the different authorities involved is unclear.

Currently, solid waste collection systems exist only in the main cities and towns. The only landfill in compliance with EU standards close to the Buna/Bojana is the Bushat landfill in the Shkodra/Buna area; however, it is not fully operational (see Chapter 11.2.3). Uncontrolled dumping and burning of waste still persist, particularly in rural areas. Substantial efforts are required to reduce waste generation and promote recycling.

12.2.3.5 Nature protection

Enforcement and, in particular, management of protected areas requires considerable improvement. Inspections and sanctions have to be implemented; and illegal logging and hunting, and unauthorized construction in nature reserves, remain significant concerns. In January 2009, the Government approved a decree on the criteria for establishment of a biodiversity inventory and monitoring network; however, an effective monitoring and information system has not yet been developed.

Protection is regulated by the Law on Protected Areas under six (6) categories in accordance with IUCN criteria. Zoning systems for protected areas and spatial planning (where these exist) do not always serve the objective of a balanced approach between the need for conservation of the ecological system and the need for economic development. The main reasons are inadequate system design (e.g. unclear criteria for categorization and enforcement of rules for the management of protected areas) and insufficient administrative capacity.

In Albania, management plans for all protected areas have been prepared; these include the Lake Shkoder protected area management plan (2012).

12.2.3.6 Forestry

Forestry is regulated under a six-level grading system comprising levels of protection and imposed restrictions. Forest areas within protected zones are separately classified and protected. Environmental permits are required for any activity not explicitly permitted or prohibited under the law. Private forests within designated protected areas can only be used in accordance with an approved management plan.

According to the law, logging, collection of secondary forest products and access to the forests (for recreation, health or general occupation) require the permission of the authorities. However, enforcement is limited due to lack of institutional and administrative capacity. This is attributed to a number of factors: the unclear status of forest personnel, communication shortcomings and the low salaries of forest service field staff. Inadequacies in the inspection system are also an issue – the same person is responsible for controlling harvesting and measuring harvested and transported timber volume. As such, there is no independent verification that documented and actual harvested volume and quality actually match.

12.2.3.7 Fisheries

Fisheries Management Organizations (FMOs) manage fishing activities and stocks, and issue fishing licenses. FMOs have been established in Lake Shkoder.

Law enforcement is minimal due to insufficient human resources – fishing inspectors – and the lack of financial resources and equipment. In addition, cooperation among the competent authorities (i.e. local authorities, FMOs, the fishing inspectorates and rangers) is an issue.

Fishing in the part of the Buna/Bojana basin that reaches up to Velipoja Lagoon falls under the jurisdiction of the FMO of Shkoder. A large number of illegal fishers operate in the area from the lagoon to the sea. Fisheries management is very poor resulting in the use of illegal fishing practices and disregarding of fishing bans. Licensed fishers regularly appeal to the authorities for support against illegal fishing. In Viluni Lagoon, declared as a core area within the category "Protected Water and Ground Landscape", fishing is also poorly administered.

12.3 Country analysis: Montenegro

12.3.1 Legal framework

The Montenegrin legal system is in the process of harmonization with EU acquis. Part of the relevant legislation is being modified, while other sections have been recently enacted. Montenegrin legislation has significantly improved as a result and further harmonization is imminent. More importantly, significant efforts are necessary to ensure efficient implementation; the necessary instruments include a sound information system with data management and observatory and reporting mechanisms. The key laws are presented in Box 10.

Box 10: Selected laws for natural resources management in Montenegro

- Law on Communal Affairs ("Official Gazette of Rep. of Montenegro", no. 12/95), proposal of new Law on Communal Affairs, 2012
- Law on State Administration ("Official Gazette of Rep. of Montenegro", no. 22/08, 42/11)
- Law on Public Maritime Domain ("Official Gazette of Rep. of Montenegro" no. 14/92, 59/92, 27/94; "Official Gazette of Montenegro", no. 51/08, 21/09, 73/10, 40/11)
- Law on Physical Planning and Constructions ("Official Gazette of Rep. of Montenegro", no. 51/08, 40/10, 34/11, 47/11, 35/13, 39/13); a new proposal for amendments to this Law is in the process of development
- Regulation on the detailed content and form of the planning document, the criteria of land use, urban regulation elements and unique graphic symbols
- Regulation on conditions that must be met at artificial (decorated) and built beaches ("Official Gazette of the Rep. of Montenegro", no. 20/08, 20/09, 25/09, 04/10, 61/10, 26/11)
- Law on Waters ("Official Gazette of Rep. of Montenegro", no. 27/07)
- Draft law on the legalization of informal buildings; in parliamentary process of adoption
- Law on Environment ("Official Gazette of Rep. of Montenegro", no. 48/08, 40/10, 40/11);
- Law on Nature Protection ("Official Gazette of Rep. of Montenegro", no. 51/08, 21/09, 40/11, 62/13)
- Law on Protection of Cultural Heritage ("Official Gazette of Rep. of Montenegro", no. 49/10)
- Law on Environmental Impact Assessment ("Official Gazette of Rep. of Montenegro, no. 80/05, "Official Gazette of Montenegro", no. 40/10, 73/10, 40/11, 27/13)
- Law on State Property ("Official Gazette of Rep. of Montenegro", no. 21/09, 40/11)
- Law on Concessions ("Official Gazette of Rep. of Montenegro", no. 08/09);
- Law on Ports ("Official Gazette of Rep. of Montenegro" no. 51/08, 40/11, 27/13)
- Law on Freshwater Fishery ("Official Gazette of Rep. of Montenegro", no. 11/2007)
- Law on Seawater Fishery and Aquaculture ("Official Gazette of Rep. of Montenegro", no. 56/09, 40/11)
- Law on Sea ("Official Gazette of Rep. of Montenegro", no. 17/07, 06/08, 40/11)
- Law on Agriculture and Rural Development ("Official Gazette of Montenegro", no. 56/09)
- Law on Environmental Impact Assessment ("Official Gazette of Montenegro", no. 80/05)
- Decree on the national list of environmental indicators ("Official Gazette of Rep. of Montenegro", no. 19/13)
- Law on Strategic Environmental Assessment ("Official Gazette of Rep. of Montenegro", no. 80/05 and "Official Gazette of Montenegro", no. 73/10, 40/11, 59/11)
- Law on Forestry ("Official Gazette of Rep. of Montenegro", no. 74/10)
- Law on Tourism ("Official Gazette of Rep. of Montenegro", no. 61/10); Draft new Law on Tourism is in the process of adoption
- Proposal for the Law on regional water supply of the Montenegrin coastal area; in parliamentary process of adoption
- Law on Geological Survey ("Official Gazette of Rep. of Montenegro", no. 28/93, 27/94, 42/94, 26/07, „Off. Gazette of Montenegro", no. 28/11)
- Law on Non-Governmental Organizations ("Official Gazette of Rep. of Montenegro", no. 39/11)
- Law on Inspection Control ("Official Gazette of Rep. of Montenegro", no. 39/03, "Official Gazette of Montenegro", no. 76/09
- Law on Financing of Water Management ("Official Gazette of Rep. of Montenegro", no. 65/2008)
- Law on Local Self Government ("Official Gazette of Republic of Rep. of Montenegro", no. 42/03, 28/04, 75/05, 13/06, "Official Gazette of Montenegro", no. 88/09, 03/10, 38/12)
- Law on Access to Information ("Official Gazette of Rep. of Montenegro", no. 44/12)
- Law on Waste Management ("Official Gazette of Rep. of Montenegro", no. 64/11)
- Law on National Parks ("Official Gazette of Rep. of Montenegro", no. 56/09, 40/11)
- Law on Hunting and Wildlife ("Official Gazette of Rep. of Montenegro" no. 51/08, 40/11)
- Law on Ratification of the Aarhus Convention ("Official Gazette of Rep. of Montenegro", no. 03/09)
- Decree on projects for which EIA is an obligatory instrument ("Official Gazette of Rep. of Montenegro", no. 47/13)

12.3.2 Institutional framework

The **Ministry of Sustainable Development and Tourism** (MSDT) is the backbone of the institutional structure in Montenegro. It is responsible for areas of key importance in the management of the Buna/Bojana transboundary area: spatial planning and construction, coastal zone management, environmental protection, communal infrastructure and water supply, sustainable development policy and natural resources management, and tourism.

The Ministry's responsibilities include an extensive series of tasks relevant for management of the transboundary area.

In the area of *spatial planning and construction*, the Ministry undertakes strategic spatial and environmental planning; drafting of state planning documents; provision of opinions and approval for local planning documents; maintenance of a documentation database to monitor the status of spatial planning documents; drafting of reports on spatial planning status; and drafting of spatial planning programmes.

In the area of *coastal zone management*, the Ministry undertakes drafting and adoption of plans for temporary facilities in the coastal zone and national parks.

In the area of *environmental protection*, the Ministry is responsible for a system of integrated environmental protection and sustainable exploitation of natural resources; impact assessment and strategic environmental impact assessment, integrated pollution prevention and control; protection of nature and air quality; climate change, ozone layer protection, chemicals management and integrated coastal zone management; integrated protection of seawaters against pollution; and industrial pollution control and risk management.

In the area of *communal infrastructure and water supply*, the Ministry undertakes implementation of new technologies and cleaner production technologies; waste and wastewater management; maintenance of a system of public utility services; coordination of regional water supply systems; and cooperation with international financial institutions and EU funds related to project implementation in the areas of environmental protection and public utility services.

In the area of *sustainable development policy and natural resources management*, the Ministry undertakes implementation of sustainable development programmes and projects within its competence; and the provides professional, organizational and administrative support to the work of the National Council for Sustainable Development.

In the area of *tourism*, the Ministry is responsible for development of tourism, hospitality, the touristic offer, correlation of coastal and continental tourism; development of a private tourism sector; establishment of tourism locations and areas; sustainable valorization of the ecological advantages of national parks and protected areas from the perspective of tourism development; implementation of investment programmes of interest for sustainable tourism development; monitoring of infrastructure projects for tourism development; and monitoring and promotion of investments in the tourism sector.

The Ministry also supervises the activities of the following administrative bodies relevant for the management of resources of the transboundary area: the Institute of Hydrometeorology and Seismology, the Environmental Protection Agency and the National Tourism Organization.

The **Institute of Hydrometeorology and Seismology** carries out tasks related to meteorology, climate, hydrology, seismology, hydrography, monitoring of water, air and soil status, and other related individual tasks.

The **Environmental Protection Agency of Montenegro** carries out professional and related administrative tasks in the area of environmental protection. The EPA issues permits, carries out monitoring of all environmental segments, establishes and operates the environmental information system, carries out analyses and drafts reports, and undertakes other related individual tasks.

The **Public Enterprise for Coastal Zone Management** was established for the purpose of coastal zone management. It carries out tasks of coastal zone protection, planning and improved use of marine resources; concludes agreements on marine resources exploitation; and carries out construction and maintenance of infrastructure facilities for the purpose of coastal zone management.

Management of beaches and beach infrastructure is a particularly important responsibility of Public Enterprise Morsko Dobro. It earns income by leasing parts of the public maritime domain to different clients/users with the income partially reinvested in activities to monitor, protect and improve the state of coastal infrastructure and beaches, bathing water and so on.

The Law on Ports stipulates the obligation of the Public Enterprise for Coastal Zone Management to administer ports of local importance (these are seven in number). This role implies competence in the management of other maritime infrastructure facilities such as moorings, docks, anchorages and berths.

According to the new draft of the Coastal Zone Law, which is in the procedure of adoption, the Government, for coastal zone management purposes, shall establish the Coastal Zone Management Agency (Article 12), in such a way as to transform the Public Enterprise into an Agency, which will also imply a wider range of tasks from the aspect of coastal zone protection, improvement and utilization.

The public enterprise **Regional Water Supply** and company **Vodacom** are enterprises supervised by the Government, which function as important water supply providers, in addition to local level providers in these areas.

The **Center for Ecotoxicological Researches "CETI" Ltd - Podgorica** is a single-member society founded by the Government of Montenegro, whose main tasks are technical research and analysis. Its scope of activities cover a wide range of tasks, such as: ecotoxicological and quality tests (physical and chemical tests and tests of radionuclide contents) for all environmental segments (water, air, soil, sediments, sea, etc.); control of health safety of food and consumer goods (physical and chemical tests and tests of radionuclide contents); dosimetry measurements, quality assurance and quality control (QA/QC); testing of waste gases – emissions; occupational environment testing; preparation and drafting of acts related to occupational risks; artificial fertilizer testing; pesticide testing; toxicology analyses of biological materials; waste categorization; noise and vibration testing in work and living environments; and the drafting of toxicological studies, analyses and programmes for state bodies, scientific research institutes, business companies and other entities.

The **Ministry of Agriculture and Rural Development** is of particular importance for the management of the Buna/Bojana area. It carries out tasks that, among others, relate to: agricultural policy and rural development including systemic approaches in agriculture, protection, exploitation and improvement of agricultural land; crop production; stock farming; organic production; phyto-sanitary areas; veterinary issues; food safety; apiculture; freshwater and marine fishing and mariculture; forestry; and the water supply industry (supply and exploitation of water, river basin land and springs for water supply purposes, water and watercourse planning and protection against adverse water effects, etc.).

Under the umbrella of the Ministry of Agriculture and Rural Development are bodies that carry out tasks relevant for the management of the Buna/Bojana transboundary area: the Forest Administration, the Water Administration, the Phyto-sanitary Administration, the Veterinary Directorate and the Tobacco Agency.

The **Water Administration** is the administrative body within the Ministry of Agriculture and Rural Development that, among

other things, carries out tasks related to: establishment and implementation of measures and activities related to water and watercourse planning; protection against adverse water effects and protection of waters against pollution; exploitation of water, materials from watercourses, river basin land and water facilities owned by the state by means of concessions and leases; and the establishment and management of the water information system, including the water cadastre, the monitoring of natural and other events for the purpose of data acquisition for protection against adverse water effects and so on.

The **Ministry of Transport and Maritime Affairs** is responsible for maritime policy, development of ports of state importance, and the safety and security of maritime transport, including navigation in the Bojana River and the establishment of indicators and prevention and emergency measures in case of sea pollution from ships and crafts. The relevant organizational units within the Ministry are: the Directorate of Transport, and the Directorate for Maritime Transport with Branch Units – Port Authority of Bar and Port Authority of Kotor. Administration bodies operating within this Ministry are the **Directorate for Transport,** the **Port Authority** and the **Maritime Safety Department**.

The **Ministry of Finance** plays a significant role in management of the Buna/Bojana transboundary area, as it administers and controls state properties on behalf of the Government and is in charge of tax policy. Relevant administration bodies of the Ministry are: the **Real Estate Administration,** the **Property Administration** and the **Tax Administration.**

The competences of the **Ministry of Interior** are also relevant from the perspective of: maritime security control, which includes the waters of the Bojana River, carried out by ships and crafts; risk management, environmental management, rescue in emergency situations and remediation management in emergency situations (e.g. earthquakes, fires and other natural and technical and technological disasters); and civil protection duties as a part of an integrated system of emergency situation management.

The **Ministry of Science** carries out tasks related to: implementation of programmes of common interest involving scientific research institutions in the European research area and international science programmes; professional advancement and mobility of Montenegrin researchers; regional cooperation and infrastructural interconnection in the area of research; and the implementation of national and international scientific and research projects.

The **Ministry of Culture** carries out tasks related to: development of cultural and artistic creation; protection, preservation, valorization and presentation of cultural heritage; advancement of public interest in the area of culture; drafting and implementation of strategies and programmes for the development of culture; research in culture and so on. The **Directorate for Protection of Cultural Heritage and Properties** is the administration body within the Ministry of Culture.

The **Ministry of Economy** carries out the following administrative tasks relevant for the Buna/Bojana transboundary area: preparation and assessment of development investment projects, implementation of the regional development policy of Montenegro, creation of conditions for sustainable and balanced growth, and development of the economy and economic competitiveness; electric energy and gas production, exploitation of minerals and rocks (exploitation of energy and other raw materials); implementation of policy and implementation of energy efficiency projects; a system of concessions and the awarding of concessions within the competences of the Ministry; exploitation of mineral and other raw materials; geological research; hydrocarbon research and production and so on. An important administrative body within the Ministry of Economy is the **Directorate for Development of Small and Medium-sized Enterprises**.

The **Geological Survey of Montenegro** is the public institution in charge of geological scientific and technical activities in Montenegro. The Institute implements geological research programmes and projects of interest for Montenegro, issued by the Ministry of Economy and financed from the Budget of Montenegro. It also acquires a part of its revenues from the market through the development and implementation of projects in various fields of applied geology.

Pursuant to the Law on State Administration, the work of inspection services has been merged into the **Directorate for Inspection Affairs**. Supervision and inspection affairs are divided between national and local levels. The Directorate includes, among others, the following inspection services of relevance for management of the transboundary area: urban planning and building inspection (controls the implementation of spatial plans adopted at the national level and respective building activities); environmental inspection (responsible for control of emissions, waste and protected areas); water inspection (responsible for works on water infrastructures and watercourses and protection of waters against pollution from land-based sources); tourist inspection; sanitary inspection; fisheries inspection; inspection for the protection of cultural properties and cultural heritage and others. Port authority and navigation safety inspections are not integrated into the competences of the Directorate.

Supervision of the legality and functionality of operations and the legality of administrative acts, in particular administrative areas within the competence of the **Directorate for Inspection Affairs**, is carried out by the respective ministries. The Government carries out supervision of the coordinated work of inspections within the Directorate for Inspection Affairs through the Ministry of Economy. Local governments perform building and communal inspections.

The **Ministry of Health**, among many responsibilities, is also responsible for health protection, including control of drinking water quality. The Public Health Institute undertakes the related monitoring.

Local competences pertinent to coastal and water management (e.g. for locally important water bodies) are performed through several secretariats (local administration bodies). The competences of **local self-administration bodies** relevant for management of the Buna/Bojana transboundary area are

implemented through the work of different bodies, including: secretariats for development (and in some municipalities development agencies); secretariats for planning, urban planning and construction; secretariats for communal issues and public utility services (water supply, waste, sewerage, etc.); and other numerous organs and bodies. Almost all municipalities in the coastal area have environmental protection departments or personnel (one person or more) in charge of environmental issues. Public communal enterprises[88] (utilities) are owned by municipalities and are responsible for the provision of water and waste services. Local level inspectorates perform urbanistic, construction and communal inspections. In accordance with the Law on Local Self-Government, municipalities are also responsible for the preparation of development plans and programmes, plans for capital interventions and investment policies, and similar strategic documents. The principal sources for financing activities of local administrations are own revenues (municipalities are authorized to collect revenues from a set of local taxes and charges) and national budget transfers.

12.3.3 Management setting

There is an apparent need to upgrade capacities at both national and local levels in order to increase law enforcement and implementation of integrated approaches. In terms of insufficient administrative capacities, the main area of the institutional framework in need of strengthening is local government.

A functional coordination structure is required to operate effectively in the plan area. During implementation of certain projects, individual administrative-coordinating bodies are often established with the aim of providing coordinated cross-sectoral monitoring of project activities (as was the case with the Commission for Lake Skadar). During implementation of the Programme of Integrated Coastal Zone Management of Montenegro (CAMP Montenegro) and the preparation of the National Strategy for Integrated Coastal Zone Management of Montenegro, a Steering Committee was established for the period 2011-14. The Steering Committee was attended by representatives of the relevant ministries, public enterprises for coastal zone management and coastal municipalities, while an Advisory Committee consisted of representatives of professional institutions at the national level and the professional services of local governments in coastal areas.

Based on the results of the Steering Committee Board, the Council for Integrated Coastal Zone Management was established as a part of the National Council for Sustainable Development, Climate Change and Integrated Coastal Zone Management and chaired by the President of Montenegro. A coordinating body for integrated coastal zone management was established to monitor implementation of the policy of integrated coastal zone management of Montenegro, and was chaired by the Minister of Sustainable Development and Tourism and co-chaired by the private enterprise "Marine Dorbo". This structure is also important for the improvement of vertical and horizontal coordination in the area of plan.

The following section provides a brief overview of the policy issues important for decision-making in horizontal and sectoral areas.

12.3.3.1 Horizontal issues

The **EU Directives on Environmental Impact Assessment (EIA)** and **Strategic Environmental Assessment (SEA)** have been transposed into national legislation with the latest amendments made in 2013.

Efficiency of coordination for environmental data and related **monitoring and reporting** systems should be improved. In some cases, data are not available/missing or erroneous. Availability of and access to existing data needs to be improved.

Information system weaknesses, in particular, lack of and/or unavailability of functional data for assessment of state, monitoring of changes, setting of goals and evaluation of the results of policy measures are among the most significant deficiencies of the coastal zone management system.

Scientific research is rare since it requires considerable technical and financial resources. Use of results from scientific research in decision-making is even more rare. Moreover, the scope of research in the context of **environmental monitoring** is insufficient. This weakness results in a **lack of systematically gathered and comparable time series of data** on important parameters of the state of environment, space, natural and anthropogenic hazards, and coastal processes, thus complicating management and increasing the risk of making wrong decisions. In addition, data are often not prepared and adjusted for use in other sectors (e.g. spatial planning). This considerably reduces their practical value.

The main shortcomings of this area also include **mutual incompatibility** between existing databases and unsatisfactory communication and data exchange between numerous entities competent for natural resources management. This refers primarily to data at the disposal of public administrations and scientific and professional institutions. Cases of data withholding and insufficient cooperation still occur.

Factors that have led to such situations include insufficent capacities (technical, human, financial) of institutions responsible for data collection and keeping.

Existing **financial instruments** and fees are insufficient to implement the "Polluter/user Pays" Principle or function as incentives or disincentives. The Environmental Fund is still not functional. The depleted economic power of the citizenry, current low levels of revenue, and the possible regressive effects of previously introduced financial instruments are the main obstacles to the introduction of new ones.

Environmental NGOs have developed significantly over the course of the last decade, both in terms of the number of active organizations and the scope of their activities. Important

88 The enterprises are responsible for preparation of the following plans: (i) General and operating plan of protection from the adverse effect of water, for waters of local importance (in agreement with the MARD); (ii) Operating plan for water protection against pollution from breakdown for waters of local importance (in agreement with the MARD); (iii) Plan of prevention measures and works to be taken by the owners and users of the land in erosion areas, with a view to protection from erosion and torrent; and (iv) Long-term, medium-term and short-term plans for activities in the area of water supply and drainage.

national NGOs, such as Green Home and the Centre for the Protection and Research of Birds, have been active in the plan area and enjoyed several successes.[89]

12.3.3.2 Land use and territorial planning

The most important practical regulators of resource use are **spatial plans**. Spatial planning is highly important in Montenegro as a key tool (besides sectoral and local development plans and strategies) for steering development. The spatial planning system has primary responsibility for integrating other ministries and sectors into the spatial planning process and facilitating their coordination.

Land uses, guidelines for sectoral development and specific urban development requirements are set through a hierarchy of spatial plans at national and local levels. Lower level plans have to be harmonized with higher level ones (the Spatial Plan of Montenegro being the highest one). Local governments are responsible for municipal spatial-urban plans, detailed urban plans and local location studies.

Further effort is needed to integrate environmental and sustainability requirements into spatial planning documents.

Box 11: Spatial plans at national and local levels in Montenegro

A. State planning documents (fall under the responsibility of the MSDT)
- Spatial Plan of Montenegro;
- Special purpose spatial plan (for national parks and public maritime domain/coastal zone);
- Detailed spatial plan (for areas where objects of national interest will be located or for projects that have regional character); and
- State location study (detailed plans for sites within areas covered by special purpose spatial plans).

B. Municipal spatial-urban development plans (related responsibilities lie with the municipal authorities)
- Detailed urban development plan;
- Urban development project; and
- Local location study.

Spatial plans have the power of law, but their implementation has traditionally met with difficulties. Capacities need to be upgraded at both national and local levels in this regard. Enforcement of construction provisions is necessary to prevent further unregulated development and inspection control need to be strengthened.

The spatial planning system, exposed to continuous pressures for **land use conversions**, has failed to produce adequate responses to existing unsustainable development patterns. Among the key problems and weaknesses of the spatial planning system the following can be singled out:

- Insufficiently successful economic policies **invalidate investment criteria for the preservation** of natural, cultural, landscape and environmental values.

- The spatial planning system, which regulates spatial development and sets out requirements from the preservation perspective, is increasingly perceived as an **administrative barrier to development**. At the same time, perceptions are diminishing of the system as an important regulation mechanism ensuring long-term sustainable development and creating conditions for movement towards development that will provide opportunities for future generations to enjoy and use values of natural, cultural and landscape heritage.

- In the absence of other economic opportunities at the local level, individuals seized those offered by **land trading**. Significant earnings were possible due to the increased value of areas converted into construction land, often ten times higher than the actual land value. The purchase of cheap agricultural and other types of land at attractive locations and their conversion into construction land thus emerged as a significant means of generating profit.

- Unfortunately, this led to **uncontrolled and dispersed expansion of construction areas** where financing of **the costs of communal infrastructure** becomes impossible. This fragmented consumption of space is characterized by interventions and investments in hundreds of sites and zones.

- There is limited cooperation and coordination between sectors in the planning process.

- There is insufficient compliance with and **inadequate implementation of regulations and planning documents**. Illegal construction has contributed considerably to spatial degradation in the coastal zone. This has still not ceased entirely and measures to mitigate the negative impacts of illegally built structures were not implemented.

- **Declarative planning** approaches have led to planning directions and goals that are not elaborated into graphically and normatively clear, specific, measurable and, where possible, quantified provisions for the implementation of planning solutions.

- There is a clear lack of quality sectoral baselines and utilization of measurable indicators.

- Application of technical criteria and methods when making decisions on the use of space (primarily environmental ones) is insufficient.

- There is inadequate understanding of the participatory process.

Ultimately, the problems and weaknesses described above have considerable impact on the quality of planning documents.

89 These include policy changes, awareness raising regarding environment and sustainable development, promotion of protected areas, cross-border cooperation, implementation of projects to address pollution and waste management problems, significant contributions to research regarding biodiversity, improvements in spatial planning and cultural heritage protection, etc.

The two framework national level spatial plans relevant for the Buna/Bojana basin are the:

- **Spatial Plan of Montenegro** (SPM, 2008), which sets spatial development goals and determines principal land uses and development directions for the entire country; and;
- **Spatial Plan of the Special Purpose Area Public Maritime Domain** (SP *Morsko dobro,* 2007).

Other relevant spatial plans developed at the national level, with MSDT as the plan proponent, include state studies of locations.[90] In 2011, MSDT initiated preparation of a new spatial plan to cover the entire area of the six coastal municipalities (coastal zone), including the area currently designated as public maritime domain (the new plan will supersede SP *Morsko dobro*). The **New Coastal Area Spatial Plan**, supported by the Coastal Area Management Programme, is in the process of finalization.

12.3.3.3 Water management

One of the main issues affecting water management is coordination between the Ministry for Water Management (MARD) and the Ministry of Sustainable Development and Tourism (MSDT).

Alignment with the **EU Water Framework Directive** is at a relatively advanced stage (about 65% of all provisions have been transposed and the expected completion date is end-2016 according to some official reports). Transposition of other directives, such as the Marine Framework Strategy Directive, the Bathing Water Directive, the Urban Water Directive and the Flood Risks Directive, is of equal importance.

No significant measures have been taken since 2007 regarding **implementation of the EU WFD**. Two River Basin Districts (RBDs) have been established as the basic spatial units for water management: the Black Sea RBD and the Adriatic Sea RBD (including the Shkoder/Skadar and Buna/Bojana watersheds along with their tributaries). River basin management plans [91] for each of the RBDs should be prepared for a period of six years within nine years of the date of entry into force of the Law on Water (i.e. until 2016). The RBD authorities were established in 2011 but are not yet operational.

12.3.3.4 Waste management

Waste management regulates a set of policy issues of strategic importance for spatial development and social and economic development of the area. The process to ensure an **operational integrated waste management system** has not yet been completed. Alignment with European standards is low. Financial and administrative limitations have delayed implementation of the Waste Management Law.

Two sanitary landfills (built according to EU standards) have been constructed in Bar and Podgorica and are currently operational. Development of the new **State Waste Management Plan** is ongoing and will encompass a strategic and operational plan for waste management up to 2020, with further directions for 2030.

Cost recovery is an issue due to the low waste collection coverage rate (from 50-95%) and low fee collection rate.

Lack of financial resources and the low capacities of local authorities are major issues.

12.3.3.5 Nature protection

Protected natural resources are categorized under six categories.[92] Preparatory activities for establishment of the **National NATURA 2000 network** have started and the complex process to identify areas of importance for the NATURA 2000 network is expected to begin shortly. Improved databases are needed for the designation and management of protected areas (including Natura 2000 sites).

Management settings for protected areas (i.e. management tools, categories of protection of natural areas, prohibited activities and licensing, etc.) are prescribed by law. Under the 2008 **Nature Protection Law**, responsibilities for the proclamation and management of certain categories of protected areas (namely regional/nature parks, natural monuments and landscapes with outstanding characteristics) were delegated to local authorities. The proclamation of new protected areas with the support from international organizations (UNDP Montenegro and GEF) is underway. The establishment of a sustainable management framework at local level is expected to be a challenge. To date, the only protected areas with operational management structure are national parks.

Relevant problems and weaknesses that characterize management of protected areas are as follows:

- Although biodiversity databases are a priority under the National Strategy for Biodiversity (2010-2015), they are not operational.
- Due to the lack of data on certain natural assets and areas, implementation of the **regulation on conditions for nature protection** has not begun yet.
- A significant contributory factor is the **lack of systematic mapping and expert baselines** on the distribution and state of habitats and species. Combined with insufficient capacity, these deficiencies lead public administrations to respond improperly to pressures from high real estate demand (particularly in the most attractive locations), leading to urbanization and construction not adapted to the natural surroundings.

90 These are detailed plans that regulate development in specific locations judged to be of national interest.

91 According to the law, water management plans for the river basin must set out the elements of water management and identify the water bodies intended for water supply, review significant effects of human activities on the status of surface and underground waters, describe the list of priority objectives of environmental protection in respect of surface and ground waters, and describe the programmes of measures, etc.

92 These are strict and special nature reserves, national parks, regional parks and nature parks, natural monuments, protected habitats and areas with exceptional characteristics.

- There is a **lack of assessment of the acceptability** of actions and economic activities in the context of preserving the integrity of the ecological network and ecologically significant sites in accordance with the provisions of the *Law on Nature Protection*.

- A particularly notable set of deficiencies relates to **protected natural areas.** Practical application of the associated legal provisions is rendered difficult by problems including incomplete information about the boundaries and status of protected natural areas, incompatibility of earlier procedures for designation of protected natural areas with newly prescribed protection categories, etc. Protection measures for valuable ecosystems outside of protected areas are hardly ever implemented.

- The model of protected areas management in the public maritime domain is questionable from the perspective of the preservation of integrity of protected areas that expand or will expand beyond the boundaries of the public maritime domain, since Public Enterprise Morsko Dobro is the manager of protected areas only for the public maritime domain. Particular concern is raised by the fact that the existing protected areas system **is not representative** (it does not include all valuable ecosystems, with marine protected areas not designated) and that goals concerning designation of new protected areas are not achieved within the set time limit.

- **Illegal logging** and widespread unauthorized construction, particularly in the coastal area, remain significant concerns.

- Knowledge and information about the **values of ecosystem services** are not sufficiently developed.

- **Incentives for the development of green economy activities**, which contribute to the preservation of ecosystem stability, are not developed, leading to the persistence of resource intensive activities (either through pollution or consumption/take up of resources).

- Implementation of the **European Landscape Convention** is not satisfactory, while related harmonization of legislation in the areas of spatial planning, nature protection and cultural heritage has not been finalized. Moreover, **landscape policy** has not been adopted.

- **Enforcement of legislation** needs to be strengthened. Although there are related provisions with regard to inspection, inspection measures and sanctions have not yet been implemented to the extent necessary.

- Further **awareness-raising** efforts are necessary, especially with regard to the benefits as well as the ecosystem services provided by those areas.

12.3.3.6 Forestry

Addressing the issue of **illegal logging** is of crucial importance, as is the development of a system of concessions enabling controlled use of forest resources by the local population.

According to provisions of the Law on Nature Protection, if coverage of an area of importance for NATURA overlaps with forestry management unit, a common management structure will be established.

Enterprises that resulted from the merging of forest enterprises with former state-owned wood industries have undertaken certain forest management functions through long-term contracts. Almost all of these enterprises (85%) have been privatized. In some cases, local authorities and NGOs have highlighted unsustainable logging as a major issue.

12.3.3.7 Fisheries

According to the **Law on Freshwater Fishery**, commercial fishing may be practised in designated fishing areas, while commercial and sport fishing activities are permitted with the appropriate permissions.

Administrative capacity of fisheries is very limited and inspection and control measures are weak. There is a need to improve data collection with regard to fishing fleets, catches, landings and the biological state of fish stocks.

12.3.3.6 Hunting

Hunting areas extend over almost 90% of the territory of the country, and are poorly managed by local hunting associations. Hunting is not allowed in areas of special importance for the state (five national parks and the coastal zone) and urban settlements. **Illegal hunting** is an issue of concern. Hunting control and enforcement of related legislation need to be strengthened.

12.4 Transboundary cooperation

A number of legal documents regarding cooperation on natural resources management have been signed between Albania and Montenegro. Most of them concern Lake Shkoder/Skadar.

There are three documents of importance for the Buna/Bojan area. These can either be used as inspiration or as basis for management arrangements that will extend into both countries:

- **Agreement between the Government of the Republic of Montenegro and the Council of Ministers of the Republic of Albania for the Protection and Sustainable Development of the Lake Shkodra/Skadar and its Watershed**, signed in 2008. This document serves as the legal instrument for the implementation of a joint Strategic Action Plan. The Lake Shkodra/Skadar Commission was established under this Agreement and commenced work in 2009. The Commission has six permanent members, three from each country. It consists of representatives of the Government, local authorities/protected areas authorities and civil society. Four working groups support the Commission's functions: Planning and Legal, Monitoring and Research, Communication/Outreach and Sustainable Tourism, and Water Management. A Joint Secretariat, consisting of two individuals (secretary and assistant) based in Shkodra, Albania, provides technical assistance to the Commission

and working groups. There were no meetings in 2013 due to financial constraints.

- **Memorandum of Understanding on Cooperation in the Field of Environmental Protection and Sustainable Management of Natural Resources between the Ministry of Spatial Planning and Environment of Montenegro and the Ministry of Environment, Forestry and Water Management of Albania** was signed in June 2010, replacing the previous MoU from 2003. It states that Parties shall further strengthen cooperation in specific areas:

  - integrated protection and promotion of preservation of all segments of the environment;
  - harmonizing of national legislation with *Acquis Communautaire* of the European Union within the framework of the Stabilization and Association Process to the EU;
  - sustainable management and protection of shared natural resources: Lake Skadar, the Bojana River, the Adriatic Sea and the massif of Prokletije;
  - implementation of relevant sectoral international and regional agreements related to environmental protection, particularly in cases of possible cross-border impacts on the state and quality of the environment;
  - coordination of government departments of both countries to protect and permanently preserve environmentally sensitive ecosystems and natural resources;
  - strengthening of institutional and human capacity in the sector of environmental protection and management of natural resources;
  - functioning of cross-border activity structures, such as the Committee for the Lake Skadar and the Working Groups of the Committee, and enhancement of the institutional framework for the strengthening of cross-border and inter-state cooperation in the field of environmental protection;
  - support to research institutions and centres, in order to develop high-quality policies for the management of natural resources;
  - cooperation of local governments in both countries;
  - educational activities and the strengthening of public awareness regarding the importance of the preservation and rational use of common natural resources; and
  - any other specific area of environmental protection, jointly accepted as adequate.

Cooperation between the Parties under this Memorandum shall be implemented through the following:

  - Develop a system for effective coordination and cooperation in specific areas, as defined in Article 2 of this Memorandum, on the level of relevant government departments of both countries, government institutions, research centres, local governments and national experts.
  - Further strengthen the work of established inter-governmental structures, such as the Committee for Lake Skadar and the Working Groups of the Committee.
  - Expand and strengthen the framework for cross-border and intergovernmental cooperation in the area of environment.
  - Prepare and implement international and regional projects aimed at applying the principles of integrated environmental protection and sustainable use of natural resources.
  - Develop mechanisms for timely exchange of information and relevant documents in the case of assessment of any likely transboundary environmental impacts.
  - Coordinate participation and appearance in regional and global initiatives of common interest.
  - Establish "ad hoc" working bodies in cases of development of environmentally sensitive programmes and projects.
  - Establish a system for early warning for the purpose of coordinated and effective response in case of natural hazards, such as floods.
  - Organize bilateral meetings, conventions, seminars and conferences, which will be attended by the representatives of government departments and state institutions, experts and the civil sector.
  - Other forms of cooperation that are mutually agreed.

This MoU establishes the basis for strengthening bilateral cooperation among countries, emphasizing the importance of transboundary cooperation and related institutional mechanisms.

- **Memorandum of Understanding for the Management of the Extended Transboundary Drin Basin** was signed by the Ministry of Environment, Forestry and Water Administration of Albania; the Ministry of Environment and Physical Planning, FYR Macedonia; the Ministry of Environment and Climate Change, Greece; the Ministry of Environment and Spatial Planning, Kosovo; and the Ministry of Agriculture and Rural Development, Montenegro. The Parties committed to promote joint action for the coordinated integrated management of the shared water resources in the Drin Basin, as a means to safeguard and restore to the extent possible the ecosystems and the services they provide, and to promote sustainable development across the Drin Basin. An institutional structure has been established including the Meeting of the Ministers, the Drin Core Group mandated to coordinate implementation of the MoU, and three expert working groups. A GEF project of USD4.5 million has been

approved to support implementation of the MoU and the related Action Plan approved by Ministers in May 2013.

- **A Commission for Water Management** was established to promote cooperation between the two countries in the field of water management, but has not been functional for some time.

Additional efforts at the transboundary level have promoted cooperation for management of the Buna/Bojana basin:

- The "**Joint Forum of Lake Shkodra/Skadar**" was established in 2008, as a main civil society platform for transboundary dialogue between Montenegro and Albania on Lake Shkodra/Skadar at different levels, in particularly among civil society organizations, research and scientific bodies, regional offices, etc.

- A Declaration on the Occasion of Designation of "**Lake Day**" was signed by the Minister of Environmental Protection and Physical Planning of the Republic of Montenegro and the Minister of Environment, Forests and Water Administration of the Republic of Albania in 2006. Celebrated during the third week of June, "Lake Day" has become a special event related to environmental protection involving all stakeholders.

Despite the existence of the above agreements on cooperation and an intermittent functioning body for cooperation in a cross-border context, usually for a specific project, at present t**here is no permanent body to enable functional transboundary cooperation in all areas of importance for the two countries or areas that have been identified in this plan**. It is necessary to define an institutional model of transboundary cooperation, so as to ensure continuity in the functioning and representation of all relevant departments at the state level and within local governments in both countries.

In accordance with the results achieved to date for cooperation between Albania and Montenegro and the needs identified in the preparation of this plan for the cross-border area of Buna/Bojana, and in order to establish a comprehensive and functional structure for cooperation between the two countries, it is necessary to agree upon and sign an agreement on comprehensive cooperation in the cross-border area which, among others:

- determines the thematic areas which are the subject of cooperation, such as: sustainable development, environmental protection, tourism, spatial planning, integrated coastal zone management, energy, agriculture, water management, forestry, fisheries, transport, emergency and scientific collaboration;

- establishes a Commission that shall have the international legal capacity of an intergovernmental institution for the exercise of its responsibilities, duties and functions. The Commission should exercise its duties with support of the Working Groups to be established in the thematic areas that are the subject of cooperation. The Commission will be comprised of members from Albania and Montenegro representing the ministries, authorities of the protected areas within the area, the highest level of local government, NGOs, relevant international organizations, etc.; and

- establish a Joint Coordination Committee to ensure inter-sectoral coordination between the two Parties for the implementation of actions and measures for the realization of the Agreement. The Committee shall convene sessions prior to the meeting of the Commission. The Committee shall be composed of the representatives of the ministries responsible for the thematic areas that are the subject of cooperation.

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Annexes

ANNEX 1: BUNA-BOJANA DPSIR ANALYSIS

DRIVING FORCES	PRESSURES	STATE	IMPACTS
Lack of transboundary coordination Setting of developmental priorities Structural issues in agricultural sector Weak administrative and technical capacity/Insufficient law enforcement Lack of awareness of environmental issues and values, and sustainable management practice Climate change (due to narrow variation amplitude of biological diversity particularly in temperature and the water regime) EU accession	Intensive urbanization Unsustainable agricultural practices Unsustainable forest management Unsustainable fishing/illegal fishery Illegal (bird) hunting	Degradation (fragmentation) of coastal habitats, primarily the dunes at Velika Plaža and the Rrjolli part; deterioration of the Skadar Oak forest in Štoj Loss of rare species in the halophyte vegetation belt Decrease of bird populations is estimated in the range 10-20% (although there is no monitoring programme in place to verify the estimation) Fishery practices impede fish migrating routes in the Bojana/Buna river Decrease of fish catch in the river by 20-80% over the past 25 years (percentage depends on species, according to the Albanian fisheries association) Local (agricultural) varieties and breeds are declining and disappearing Degraded landscape value of the area	Considerable number of waterfowl species in the Buna/Bojana Delta are threatened and included on the lists of endangered species at local, regional and international level Significant biodiversity loss concentrated in the coastal zone Significant decrease in the economic potential of fisheries Decreased potential for nature-based tourism development
Lack of transboundary coordination Structural economic weaknesses and market transition; low per capita GDP functions as a disincentive for sustainable use of natural resources Setting of developmental priorities The attractiveness of the coast – intense market pressure for development of apartments, houses, residential apartments and alike; migration Policy framework not properly addressing unsustainable urbanization Weak administrative and technical capacity; lack of law enforcement EU accession	Uncontrolled urban (including illegal) development Planned (urban) development exceeding carrying the capacity of the area (Montenegro) Lack of formal plans (Albania)	Insufficient communal infrastructure, in particular related to transportation, water and wastewater systems Significant areas degraded with unplanned (in particular in Albania), informal (illegal), low-quality development. In Albania, at least 60% of all buildings are illegal (80% in Velipoja). In Montenegro, 12.7% of all illegal buildings in the country are located in Ulcinj. Linear urbanization with: 7.5% of the 1 km coastal zone built in Ulcinj, with growing trend up north; 10% of 1 km coastal zone built in the Albanian part 12% of the coastline urbanized in Ulcinj (35% Bar) Dispersed urbaniwation, often over arable and land with high natural values	Landscape and nature degradation High cost of infrastructure to serve dispersed settlements (including linear urbanization)/increased infrastructure development costs Loss of potential for high value or nature-based tourism Reduction of arable land Potable sources are at risk of contamination

DRIVING FORCES	PRESSURES	STATE	IMPACTS
Lack of transboundary coordination Insufficient infrastructure – lack of communal infrastructure (e.g. sewerage, sanitary landfills, etc.) Weak administrative and technical capacity/insufficient law enforcement Lack of monitoring EU accession	Intensive urbanization Unsustainable solid and liquid waste management Unsustainable agricultural practices Stockbreeding, predominantly in the Albanian part	Eutrophication is increasing in both freshwater and marine waters Nutrient and, probably, heavy metal pollution (according to analysis of samples from three sampling periods – data series are insufficient to establish trends) Poor chemical, ecological and biological status in accordance with the Water Framework Directive The chemical-physicochemical quality of the Buna/Bojana River, in accordance to the WFD, deteriorates from its sources to its mouth, ranging from "moderate" to "poor", due to elevated ammonium and BOD5 concentrations Limited data on groundwater pollution (field investigations indicate areas with high nitrate levels in groundwater up to 13.9 mg/l); areas assessed as having high and very high groundwater pollution risk cover 4.6% of the plan area Extensive waste deposits on riverbanks, in drainage and irrigation ditches, and on beaches	Degradation of chemical-physicochemical quality of water bodies Biodiversity decline and threat to endangered species Potential reduced sanitary drinking water quality, with consequent risk to human health, livestock and wildlife mortality Reduced sanitary bathing water quality in the Port Milena area Severe visual and potentially sanitary impacts on riverbanks, in drainage and irrigation ditches, and on beaches and in the sea; in combination with rivers and coastal water pollution these pose a risk to human health and wildlife mortality. Tourism potential is deteriorated
Economic development including urbanization and tourism, causing growing demand for drinking water and water for other domestic uses EU accession	Introduction of polluted groundwater from submarine coastal discharge	High chloride concentrations in some springs during the summer period in Montenegro Possible groundwater level decline/ potential decreased quantities of submarine groundwater discharge	Loss of groundwater yields Impairment of drinking water quality Loss of ecosystem services and native species; potential impact on coastal wetland functioning and brackish water habitats that support important biodiversity resources and fishery nursery areas
Lack of transboundary coordination Climate change and variability Hydropower generation Lack of financial resources for maintenance of flood protection infrastructure Weak administrative and technical capacity/insufficient law enforcement Lack of awareness of environmental issues and values, and sustainable management practice Lack of water consumption meters and respective charging by consumption for all water uses (domestic, agricultural and industrial) Lack of a common environmental monitoring and information exchange system between the two countries EU accession	Alteration of the water flow regime in the Drin–Shkoder/Skadar–Buna/Bojana system Hydroelectricity production in upstream Drin Basin Gravel extraction along the river and removal of plant coverage Blockage of former natural secondary channels in the delta area Poor maintenance of drainage channels and floods, preventing construction on the Albanian side, and of embankments on the Montenegrin side Abstraction of surface water from some small lakes and wetlands for irrigation in Albania Water over-consumption for some uses (e.g. agriculture)	Disturbance of the sediment distribution regime Erosion of land adjacent to the river Increased floods risks (two floods in 2010 were the most severe recorded in the last 80 years) Degradation of small wetland zones Regime of coastal dynamics has altered with erosion in some parts of the coast (inland progression of the sea has advanced in some areas about 500 m since 1936 and about 50 m in the past 20 years) and deposition of sand in others Possible decrease in underground water storage Early warning and mitigation flood risk system not in place	Deterioration of ecosystems in the Buna/Bojana delta, as well as in wetland zones Significant change in the Buna/ Bojana coastline over the last 100 years Reduction in the availability of water storage of good quality Destruction of aquatic ecosystems and associated services Floods with corresponding risk to life and infrastructure and economic damage/high vulnerability of citizens and resources High uncertainty in development planning Tourism potential is deteriorated

ANNEX 2: DRAFT FRAMEWORK AGREEMENT FOR THE SUSTAINABLE MANAGEMENT OF SKADAR/SHKODRA LAKE BASIN AND BUNA/BOJANA AREA

The Government of Montenegro represented by the … and the Government of the Republic of Albania represented by the… hereinafter referred to as "the Contracting Parties"

PREAMBLE

Mindful of the Berlin Process established by the Western Balkan Conference held in Berlin, 28 August 2014;

Mindful of the Agreement Between the Ministry of Tourism and Environment of Republic of Montenegro and Ministry of Environment, Forestry and Water Administration of Republic of Albania for the Protection and Sustainable Development of the Skadar/Shkodra Lake of 25 February 2008;

Mindful of the Memorandum of Understanding for the Management of the Extended Transboundary Drin Basin signed in Tirana, 25 November 2011 in which the signatory parties "commit to promote joint action for the coordinated integrated management of the shared water resources in the Drin Basin, as a means to safeguard and restore to the extent possible the ecosystems and the services they provide, and to promote sustainable development across the Drin Basin";

Mindful of the Memorandum of Understanding on cooperation in the field of environmental protection and sustainable management of natural resources between the Ministry of Spatial Planning and Environment of Montenegro and the Ministry of Environment, Forestry and Water Management of Albania was signed in June 2010, replacing the previous one from 2003;

Mindful of the outcomes of the Global Environment Facility supported "Lake Shkoder/Skadar Integrated Ecosystem Management Project";

With full appreciation of and *taking into consideration* the outcomes of the work of the Skadar/Shkodra Lake Commission and the Commission for Water Management;

Based on the outcomes and outputs of the Global Environment Facility / United Nations Environment Programme Mediterranean Action Plan MedPartnership project and more specifically the Integrated Resources Management Plan for the Buna/Bojana area prepared by Priority Actions Programme/ Regional Activity Centre, Global Water Partnership-Med and United Nations Educational, Scientific and Cultural Programme's International Hydrological Programme; .

Considering the international importance of the Skadar and Bojana basins and coastal areas in Montenegro and the Shkoder and Buna basins and coastal areas in Albania as areas of high biodiversity including habitats that are vital for the conservation of numerous rare species, many of which are endemic and/or globally endangered;

Confirming our commitment to sustainable development that can be brought about in a coherent way through transboundary cooperation, in accordance with the principles of the European Union integration process;

Considering ecosystem protection and conservation, and sustainable use of the natural resources to be an integral part of the development process aimed at meeting the needs of the present and future generations on an equitable basis;

Recognizing that development in the area should include a balanced and reconciled development of vital economic sectors such as tourism, agriculture, energy production, fisheries and forestry;

Considering the value of Integrated Water Resources Management, Integrated Coastal Zone Management, and Nexus approaches for the management of natural resources and economic development;

Convinced of the need for stakeholder participation in the sustainable management of natural resources;

Recognizing the need for the Parties to comply with obligations arising from relevant international agreements, particularly the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, March 17, 1992 (hereinafter referred to as "UNECE Water Convention") and its Protocols, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, February 2, 1971), the **Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (June 10, 1995)** and its Protocols the *acquis communautaire of* the European Union, and taking into consideration provisions of the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, May 21, 1997;

Acknowledging the contribution of the Priority Actions Programme/Regional Activity Centre and Global Water Partnership-Med in reaching the signing of this Agreement.

Hereby agree as follows:

DEFINITIONS

For the purpose of this Agreement:

The "Skadar/Shkoder" is the geographical area of the catchment of the lake named Skadar in Montenegro and Shkoder in Albania;

"Buna/Bojana" is the geographical area of the catchment of the river named Bojana in Montenegro and Buna in Albania;

The "coastal area of the Buna/Bojana" is the geomorphologic area either side of the seashore in Albania and Montenegro at least to the limits of the catchment area of the Buna/Bojana River. It encompasses the adjacent marine area directly affected by the landward economic activities and the freshwater outflow of the Buna/Bojana River. If appropriate, the boundaries of the competent administrative units (being coastal and immediate border ones between the two countries at the same time) shall be applied.

The "Skadar/Shkoder and Buna/Bojana area" (the Area) consists of all or part of the integrated geographical areas of the Skadar/Shkoder area, the Buna/Bojana area, the coastal area of the Buna/Bojana and the marine area;

The "Skadar/Shkoder and Buna/Bojana system" is the system of surface and ground waters of Lake Skadar/Shkoder and Buna/Bojana River constituting by virtue of their physical relationship a unitary whole, and flowing normally into a common terminus, the Adriatic Sea and the dependent ecosystems;

The Skadar/Shkoder and Buna/Bojana system is integral part of the Area;

"Ecosystem" is defined as a dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit;

"Transboundary impact" means any effect to the environment within the areas under the jurisdiction of a country, including adverse effects in human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors, as well as effects on cultural heritage or socio-economic conditions, resulting from alteration to those factors, caused by a change the physical origin of which is situated wholly or in part within the area under the jurisdiction of another country.

The Contracting Parties or the Parties to this Agreement mean the Government of Montenegro and the Government of Republic of Albania.

OBJECTIVE

To cooperate for the integrated sustainable management of the Skadar/Shkoder and Buna/Bojana area, as a means of achieving sustainable development leading to the creation of jobs and social welfare, and the safeguarding and, to the extent possible, restoration of the Area's ecosystems and the services that they provide.

PRINCIPLES OF COOPERATION

1. Utilization of Natural Resources

   - The Parties shall in their respective territories utilize the natural resources of the Area with a view to attaining sustainable utilization thereof and benefits therefrom consistent with this Agreement. In particular, the Parties shall utilize the water resources of the Area in a reasonable and equitable manner.

2. Transboundary Impact

   - To take all appropriate measures to prevent, control and reduce any transboundary impact;

3. Polluter Pays Principle

   - By virtue of which costs of pollution prevention, control and reduction measures shall be borne by the polluter;

4. Precautionary Principle

   - By virtue of which action to avoid the potential transboundary impact of the release of hazardous substances shall not be postponed on the ground that scientific research has not fully proved a causal link between those substances, on the one hand, and the potential transboundary impact on the other hand.

5. Ecosystem protection

   - To ensure conservation, and where necessary, restoration of ecosystems, and maintain and restore the ecological functions and services of these systems as an essential basis for sustainable development, including, inter alia, forests, freshwater wetlands and floodplains and marine ecosystems.

6. Emergency

   - In the case of emergency stemming from extreme flood and pollution events, the Contracting parties shall work jointly, making use of the [COMMISSION] established under this Agreement as described in Article 8 paragraph 2, for their evaluation and mitigation.

OBLIGATIONS

For the fulfilment of the objective under Article 1 the Parties shall:

1. Work jointly for the sustainable development of the economic sectors of tourism, agriculture including livestock, fishing and navigation that are largely reliant on shared natural resources, including through the implementation of joint and/or coordinated actions, fully respecting principles of sovereign equality and territorial integrity;

2. Work jointly to minimise the adverse effects of the sectors of tourism, agriculture including livestock, fishing and navigation to the natural and anthropogenic environment, and for the sustainable use of the shared natural resources these sectors utilise including land, water, fisheries, energy [OTHER?];

3. Improve management and disposal of solid wastes;

4. Cooperate with a view to achieving undisturbed navigation throughout the Area, for transportation, communication, to promote regional cooperation. In their effort to achieve this, the Parties will not proceed to any related actions unless procedures are followed in line with Article 3 paragraph 5;

5. Minimise effects of hydro-morphologic interventions that alter the nature of the hydrologic system and the supported ecosystems resulting in their deterioration;

6. Work closely to minimise floods and droughts, and their effects;

7. Protect the quality of landscape and work, in the extent possible, to remediate the adverse effects of unsustainable physical and spatial development;

8. Improve the ecological and chemical status of inland, underground, transitional and marine waters by reducing and if possible preventing nutrients, hazardous substances, such as heavy metals and pesticides, sea and land based pollution;

9. Protect, conserve and enhance biodiversity especially by protecting the endemic, rare, threatened or endangered species of flora and fauna.

MEASURES TO IMPLEMENT THE AGREEMENT

To meet the obligations under Article 4 the Parties shall at a minimum:

1. Develop an action plan for the implementation of the Agreement (Action Plan) that will function as the Action Plan for the Sustainable Development of the Area taking fully into consideration and using Transboundary Integrated Resources Management Plan for the Buna/Bojana area developed in 2015. The Action Plan should be revisited by the [COMMISSION] established under this Agreement as described in Article 8 paragraph 2 and revised if necessary after a period of five years;

2. In line to the Action Plan under paragraph 1 of this Article, detail and implement strategic programme of actions on the:

   (a) development of each of the sectors of tourism, agriculture including livestock, fishing, navigation and transport;

   (b) sustainable utilization of the natural resources, guiding actiona at local level and being compatible with the related EU Directives.

   (c) Management of the protected areas ;

Strategic programme of actions should be renewed every 5 years.

3. Coordinate spatial, urban and other land-use plans. In this regard the Parties shall harmonize related criteria and standards, strategies and regulations;

4. Establish a Transboundary Protected area of Nature. In this regard the Parties will harmonize protection standards and regimes across the protected area;

5. Develop a flood risk management plan that will include financing schemes to, where appropriate, compensate individuals, organizations, institutions and enterprises that may suffer any harm or loss as a result of floods or, any action aimed at preventing or minimising the negative impacts of flood events;

6. Develop and improve access to comprehensive data and adequate information to fully understand the current state of the natural and anthropogenic environment including the water resources and the hydrologic system of the Area, and take appropriate measures to use this information in the planning documents prepared at the transboundary, national and local levels;

7. Establish and maintain effective coordinated monitoring systems for the natural and anthropogenic environment applying international standards and techniques.

8. Promote public participation and stakeholder engagement, and ensure the full and effective realization of the Area's community individuals' rights under the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, and related EU Directives and national laws.

9. Approve and apply in good faith the environmental criteria, standards and limits as described in Article 6 among others for the preparation and implementation of the strategic documents and plans described in this Article.

10. Cooperate with a view to agree measures, that will be included in separate Protocols or amendments to this Agreement, to secure elimination or reduction of existing or future Transboundary impacts. In particular, to cooperate on developing and applying appropriate environmental impact assessment procedures in the Area, in accordance with the Espoo Convention on environmental impact assessment in a transboundary context.

ENVIRONMENTAL STANDARDS

The Parties, with the assistance of the [COMMISSION] established under this Agreement as described in Article 8 paragraph 2, shall set out the exact criteria, standards and limits for the protection, conservation and development of the Area in accordance with Article 3 and Article 4. These criteria, standards and limits should be in accordance to the EU *acquis communautaire* and the Convention for the Protection of the Mediterranean Sea Against Pollution (16 February 1976) and its Protocols, and coordinated with those criteria, standards and limits developed under the process for the implementation of the Drin Memorandum of Understanding.

INFORMATION AND DATA EXCHANGE

1. The Parties shall establish and maintain a system of information and data exchange. The information and data to be exchanged shall include but is not restricted to:

   (a) Results of the monitoring systems referred to in Article 5 paragraph 7;

   (b) Legal documents, regulations and measures adopted or to be adopted by the Parties that relate to the implementation of this Agreement;

   (c) Any available data and information regarding on-going or planned programmes, projects and activities in the Area or beyond the implementation of which may have a significant adverse effect on the Area.

MECHANISMS OF COOPERATION IMPLEMENTATION AND MONITORING

1. Ministerial Meeting

   The Ministers responsible for Development, Environment, Coastal Zone and Water resources management representing the Parties shall meet to review progress in the implementation of the present Agreement, its objective and provisions, and the work of the [COMMISSION] established under this Agreement as described in Article 8 paragraph 2. The meetings shall take place on an annual basis unless otherwise decided by the Parties, or at the written request of any Party, at a venue rotating between the Parties.

2. [COMMISSION]

   (a) In order to ensure the effective implementation of this Agreement and its provisions the Albania and Montenegro hereby establish the [Skadar and Buna OR Shkoder and Bojana OR Skadar and Bojana OR Shkoder and Buna OR Skadar/Shkoder and Buna/Bojana OR Skadar/Shkoder and Bojana/Buna OR Shkoder/Skadar and Bojana/Buna OR Shkoder/Skadar and Buna/Bojana] Commission, hereinafter referred to as "Commission", that shall have the international legal capacity of an intergovernmental institution for the exercise of its responsibilities, duties and functions.

   (b) Responsibilities and Duties

   The Commission is responsible for the implementation of this Agreement . In this regard the Commission suggests to the Parties the necessary measures and actions in line with Article 2, Article 3, Article 4, Article 5, Article 6 and Article 7 and coordinates their implementation, and identifies potential areas of non-compliance.

   (c) Composition

   The Commission will be comprised of: three members from Albania and Montenegro representing the Ministries responsible for Development, Environment, Coastal Zone and Water resources Management; One member from each Party representing the authorities of the protected areas within the Area; The head of the highest level of local government in the Area in each Party.

   There shall be non-voting members representing: the European Union Delegation in each country; one NGO representative from each country; Secretariat of the Barcelona Convention; The Drin Core Group.

   Depending on the theme of the meeting the Commission may invite relevant experts to attend its meetings.

The institutions and bodies participating in the Commission may alter their representatives in the Commission through a formal letter to the Secretariat of the Commission established under this Agreement as per Article 8 paragraph Possible changes in the set-up, functions and responsibilities of the Commission is decided by the Parties via an amendment to this Agreement.

The Commission shall be formed within six months on signing this Agreement by the Parties.

(a) Meetings

The Commission shall meet in ordinary meetings annually on specific months that will be specified through a decision of the Commission. An extraordinary Commission meeting shall be called at the request of a simple majority of its members upon submission to the Secretariat established under this Agreement as per Article 8 paragraph 3 of a written request including explanation of the reasons for such meeting, which shall be promptly distributed to all Commission members.

The meetings will be held in Albania and Montenegro interchangeably unless otherwise decided by the Commission. The meetings shall be chaired by the representative of the Party in the territory of which they are held.

(b) Decisions

The decisions will be taken by the members of the Commission representing Albania and Montenegro on the basis of consensus.

Each Party shall implement the Commission decisions in accordance with national law and report regularly to the Commission on measures taken for their implementation.

In the event that a Party is unable or only partly able to implement a Commission decision, it shall inform the Commission to this effect, explain the reasons for the non-application and propose the way and the time of the implementation.

The Commission will keep a register of the decisions taken.

(c) Working Groups

The Commission exercises its duties, on the basis of prior provision of opinion by the Working Groups to be established in the fields of [Tourism, Integrated Water Resources Management that will also tackle the issue of floods, Protected Areas Management, Integrated Coastal Zone Management OTHER?]. The composition, membership, obligations and rules of operation of each Working Group will be decided by the Commission.

(d) The Commission shall become an official intergovernmental body immediately after Agreement entered into force in the two Parties.

(e) The Commission shall prepare with the assistance of its Secretariat established under this Agreement as per Article 8 paragraph 3 in conformity to the aforementioned in this article and in accordance to the requirements stemming from this Agreement its internal rules of operation that should be approved by the Ministerial Meeting.

(f) Each Party shall bear the expenses associated with the participation of its representatives in the meetings of the Commission and its Working Groups.

3. Secretariat of the COMMISSION

(a) A Secretariat is established to assist the Commission fulfilling its responsibilities and duties described in Article 8 paragraph 2.

(b) The Secretariat shall be a technical body subsidiary to the Commission, shall act in the name and on behalf of the Commission and shall coordinate actions on behalf of the Commission for the implementation of the measures and activities as per Article 8 paragraph 2 point (b). It shall provide technical and administrative support for the functioning of the Commission and its Working Groups as well as for the organization of the meetings of the Commission and its Working Groups. It shall prepare or coordinate the preparation of the strategic programme of actions described in Article 5.

(c) The work of the Secretariat will be guided by the Commission.

(d) The Secretariat submits the report of its work for the period between the two meetings in each meeting of the Commission.

(e) The internal regulations and rules of operation of the Secretariat shall be prepared and adopted in the first meeting of the Commission.

(f) The Secretariat consists of its Head and of an equal number of technical and scientific staff from each State Party. The technical and scientific staff shall be of such number as necessary for the Secretariat to fulfil its functions and duties.

(g) The Head of the Secretariat is the Secretary of the Commission. The Head of the Secretariat will supervise the work of the Secretariat.

(h) The nationality of the Head of the Secretariat will be of the other Party than this that the Secretariat will be based at.

[OR]

(i) The Head of the Secretary will be Albanian. The Secretariat will be established in Montenegro.

[OR]

(j) The Head of the Secretary will be Montenegrin. The Secretariat will be established in Albania in the city of Shkodra in Albania.

(k) The full operational costs of the Secretariat including costs of equipment and all necessary technical goods and means needed for as well as the costs arising from the work to fulfil its functions and duties will be covered by the budget of the Commission in which the two Parties will financially contribute equally.

(l) The budget of the Commission shall be prepared by the Secretariat on an annual basis and shall be subject to the approval of the Commission.

(m) The Secretariat shall seek additional financial contributions from donors and work to secure projects for the implementation of the objective of this Agreement.

4. Joint Coordination Committee [to be decided if JCC shall remain part of the structure]

(a) A Joint Coordination Committee, hereinafter referred to as the "Committee" shall be established to ensure inter-sectoral coordination between the two Parties for the implementation of actions and measures for the realization of the Agreement decided by the [COMMISSION].

(b) The Committee shall be composed of the representatives of the Ministries responsible for Interior affairs, Development, Infrastructure, Economy, Finance, Coastal Management, Agriculture, Industry, Tourism, Environment, Spatial Planning, Waters, Cultural Heritage, Research, Education and Justice from each Party. The representatives of the Ministries should not be at a level lower than this of a State Secretary.

(c) The Committee shall convene one regular session every year, but at least three months prior to the meeting of the Commission, unless otherwise decided by the Parties, or at the written request of the [COMMISSION], at a venue rotating between the Parties. Representatives of subordinate institutions to the Ministries may participate as necessary depending on the agenda of the meeting.

(d) A Chairman of the Committee shall be designated by the Party chairing the first meeting of the COMMISSION each year, for a term of one year.

(e) Any decisions of the Committee shall be taken by consensus.

(f) The rules of procedures of the Committee will be prepared by the Secretariat of the [COMMISSION] and approved by the [COMMISSION].

DISPUTE SETTLEMENT

In case of a dispute between the Parties regarding the interpretation or application of this Agreement, the Parties shall seek a solution in the framework of the [COMMISSION] and in case the dispute is not resolved, the Parties shall seek a solution by negotiation or by any other means of international dispute settlement acceptable to them.

AMENDMENTS TO THE AGREEMENT

1. Any Party may propose amendments to the present Agreement.

2. Any amendment to the present Agreement must be agreed by both contracting parties. Amendments shall enter into force in accordance with the procedure set forth in Article 2.

PROTOCOLS

1. The Parties may prepare Protocols to this Agreement to detail and clarify the obligations under Article 4 and/or agree on specific means and measures with the aim to implement these obligations.

2. The Parties shall define rules on notification, consultation and data exchange, in subsequent Protocol(s).

ENTRY INTO FORCE

1. [SHOULD THE PARTIES WISH TO RATIFY THE AGREEMENT] This Agreement will be subject to ratification according to the domestic procedures of each Party.

2. The Agreement shall enter into force on the date of the last written notification of fulfilment by the contracting parties of their national procedures required for its entry into force.

RELATION WITH OTHER AGREEMENTS

1. This Agreement supersedes all agreements and memoranda of understanding signed by the Parties regarding the Area, related to water resources management and ecosystem management including those referred to in this Agreement under the Preamble.

2. Nothing in this Agreement shall affect the rights or obligations of a Party arising from EU legislation.

3. For the implementation of this Agreement the Parties may enter into other agreements or arrangements, which shall not be in conflict with this Agreement.

DURATION AND WITHDRAWAL

1. This Agreement shall remain into force indefinitely unless one of the Parties notifies its wish to withdraw from it, in which case the Agreement shall be terminated six months after the date of such written notification. Unless otherwise agreed, such a termination shall not affect the validity of any ongoing arrangements or project made under this Agreement.

2. This Agreement has been prepared in the English, Montenegrin and Albanian languages. In the case of divergences between the texts, the English language version shall be regarded as authentic.

INTEGRATED RESOURCES MANAGEMENT PLAN (IRMP) FOR THE BUNA/BOJANA AREA

(Albania and Montenegro)

The Transboundary Integrated Resource Management Plan for the Buna/Bojana Area, prepared in the framework of the MedPartnership project, is the practical application of the Integrative Methodological Framework (IMF) in the transboundary area of Albania and Montenegro. The Plan considers upstream impacts from agriculture, tourism and urbanisation on coastal and water resources, and marine impacts on the river delta and coastal aquifers. This multi-sectoral approach resulted in measures for strengthening cooperation for restoration and safeguarding of the Area's ecosystems, increasing resilience to climate change and supporting creation of jobs and social welfare.

The central measures relate to the establishment of a transboundary governance mechanism to ensure that relevant issues of transboundary importance are considered and acted upon bilaterally. Furthermore, the project resulted in drafting and initiating official consultations between the two countries on a Framework Agreement for the Sustainable Management of Skadar/Shkodra Lake Basin and Buna/Bojana Area. This is one of the few international examples of a legal agreement for an integrated approach for the management of river basins, coastal and marine areas thus demonstrating the new water management paradigm - " from source to sea" - on a transboundary level.

The UNEP/MAP - GEF MedPartnership (2009 – 2015) was a collective effort of leading organizations (regional, international, non-governmental, etc.) and countries sharing the Mediterranean Sea, towards the protection of the marine and coastal environment of the Mediterranean. The MedPartnership was led by UNEP/MAP and the World Bank and financially supported by the Global Environment Facility (GEF), and other donors, including the EU and all participating countries.

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