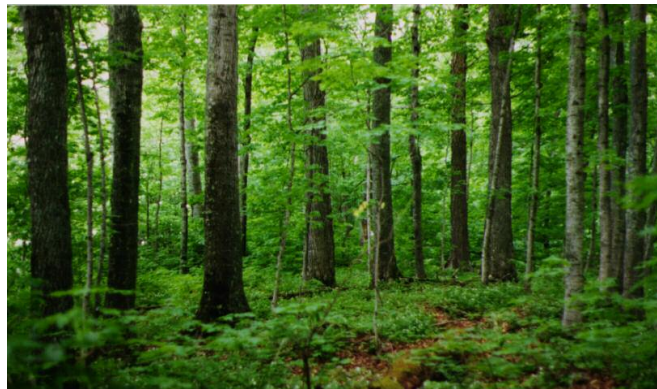




**FOREST AND MOUNTAIN  
PROTECTED AREAS PROJECT**

**Environmental Assessment /  
Environmental Management  
Plan Framework**

**- FINAL REPORT-**



**Sarajevo, June 2007**

## GENERAL INFORMATION

This document has been prepared under a contract by the Ministry of Agriculture, Waterworks and Forestry of the Federation of Bosnia and Herzegovina – Project Implementation Unit Forestry and Agriculture FBiH, and Ministry of Agriculture, Waterworks and Forestry of Republika Srpska – Project Implementation Unit Forestry RS.

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## EXECUTIVE SUMMARY

The main long term objective of the Forest and Mountain Protected Area project is to facilitate overall extension of Bosnia and Herzegovina's area under formal protection. The project-financed activities will range from developing and implementing new management plans in the existing Protected Areas (PAs), and analyzing options for their expansion, to establishing new PAs. The selected six priority project locations include four existing PAs - Sutjeska, Kozara, Janj, Lom, and the two newly proposed ones - Bjelašnica-Igman-Treskavica-Visočica and Una River, representing small virgin forests, existing National Parks, and newly proposed PAs. This project, rated environmental Category B by the World Bank, comprises three components: 1. *Physical Improvement of Existing Protected Areas and Establishment and Operationalization of Critical New Priority Areas*, 2. *Strengthening of Capacity of Local, Entity and State Levels for Biodiversity Conservation and Sustainable Land Use Practices*, and 3. *Generation of Alternative Rural Livelihood Opportunities through Wise Multiple-use of Protected Areas (Small Grants Program)*. The Project Component 1 will support improvement of the available and installation or minor construction of new physical infrastructure required to allow efficient management of existing PAs. This will include limited reconstruction, construction or installation of structures and equipment such as offices, gates, benches, signs, trails, fire extinguishers, etc.

This Environmental Assessment/Environmental Management Plan Framework document prepared in accordance with the World Bank safeguard policy OP/BP 4.01, analyzes and describes the administrative framework, national legislation on environmental assessment and other legislation of relevance for the issues of PAs, as well as the applicable World Bank safeguard policies. The Study preparation team also considered the findings of other available, related studies and literature when describing the baseline physical, biological and socio-economic features of the project areas, as well as the project alternatives on each location. In conjunction with this, maps showing the existing priority PAs and their surrounding, and proposed locations of new PAs were prepared (provided in Chapter 4 - Description of Baseline Conditions). These maps also indicate particularly sensitive and high value areas in terms of biodiversity. However, it should be noted that Bosnia and Herzegovina has not adopted a national Red List of endangered species, and no official inventories of wildlife have been compiled yet. Therefore precise quantification of habitats or species was not possible at the time of the preparation of this document. In view of this, it will be necessary to conduct as soon as possible thorough research activities, results of which will then represent a basis for proper monitoring of biodiversity.

Though to a varying extent, there are similar threats to biodiversity in all the project areas considered. These include uncontrolled and excessive logging, hunting and fishing, overexploitation of pastures, use of pesticides, improper disposal of hazardous waste, unexploded land mines remaining from the recent war, and discharges of untreated wastewater.

The key part of this document is the analysis of possible project related environmental impacts on aesthetics, watercourses, hydrology, biodiversity and habitats, residents and development of the project areas, and the Environmental Management Plan Framework with recommendations of impact mitigation measures and monitoring methodology, applicable to the existing, but also any new project locations that may be identified during later stages. These chapters also provide the essential institutional strengthening and arrangements for efficient monitoring and implementation of impact mitigation measures, and suggest *Environmentally Sound Clauses for Contractors* (Appendix 1), with some basic measures to be applied by construction contractors in order to avoid or minimize negative environmental

impacts that may arise during the construction or reconstruction phase of the project, as well as a *Screening Process* for the activities to be nominated for the Small Grants Program.

The contents of the Draft 1 document were disclosed to public and discussed with various stakeholders during the public consultations process. Two central public consultations were organized, one for each BiH's Entities – on June 7, 2007 at Bjelašnica Mountain near Sarajevo for the Federation of Bosnia and Herzegovina, and on June 14, 2007 at Kozara National Park for Republika Srpska. The feedback from the attendees was taken into account during the consequent preparation of the Draft 2 and Final Reports. The minutes of the public consultations are provided in Appendix 2.

The overall, short-, mid- and long-term positive environmental impact of this project, whose main goal is to preserve the biodiversity and improve the use of natural resources, largely supersedes the identified possible negative impacts, which are mostly of local, short-term, or temporary character and of minor intensity. These negative impacts can be completely avoided or minimized by consistent implementation of the proposed mitigating measures. By accomplishing efficient management of the protected areas and natural resources, emissions of pollutants onto soil, into watercourses and air will be reduced and prevented on a long term basis, which will ultimately lead to a reduction of negative impacts on flora and fauna, as well as on humans living in the wider surrounding.

## INTRODUCTION

Forest based natural resources and biodiversity of Bosnia and Herzegovina are among the richest in Europe in terms of extent and variety of stock relative to the surface of the country. As much as 30% of all endemic flora of the Balkans is represented in the flora of Bosnia and Herzegovina. However, the recent war and subsequent unregulated development resulted in heavy damage to many aspects of nature and wildlife. Improper land, forest, and waste management practices, illegal logging along with forest clear-cuts resulted in degradation of natural environment. In addition to this, a substantial portion of forested areas is under landmines, which poses a serious obstacle to implementation of forest protection and rehabilitation activities. With all this in mind, it can be concluded that the sustainability of forest management and the stability of forest ecosystems are threatened.

Existing protected areas in Bosnia and Herzegovina include Sutjeska, Kozara, Lom, Janj, Hutovo blato, Bardaca, Blidinje, Skakavac and Vrelo Bosne. The main objective of the Forest and Mountain Protected Area project is to expand the country's formally protected area and help conserve globally significant biodiversity in critical forests and mountain systems in BiH. This project will work to develop different strategies for biodiversity conservation appropriate to the current BiH's complex natural and institutional structure. It will institute operational systems for sustainable land management and conservation on six priority sites and promote replication of best practices with the goal to establish a BiH-wide network of protected areas. The four existing priority protected areas (PAs) - Sutjeska, Kozara, Janj, Lom, and the two new ones - Bjelašnica-Igman-Treskavica-Visočica and Una River, representing small virgin forests, existing National Parks, and newly proposed PAs, were selected through a participatory discussion. The map showing the six PAs is given on page 9. The experience gained with these PAs will later on be used to evaluate the opportunities to expand the total area protected for the sake of better protection of biodiversity, thereby also improving the image of the PAs as to attract more visitors.

The project comprises the following components:

- *Component 1 - Physical Improvement of Existing Protected Areas, and Establishment and Operationalization of Critical New Priority Areas*, financing development and implementation of new management plans emphasizing ecosystem approaches and approaches for participatory land use planning, new „soft“ infrastructure, and limited small-scale building rehabilitation, necessary for improving the operations of existing PAs or for the newly created PAs. In addition, the Project will finance some limited goods for PAs operation, technical assistance, support for improvement of tourism capacity, promotion and marketing activities, and assist with introduction of a standardized visitor fee structure for individual PAs.
- *Component 2 -Strengthening of Capacity at Local, Entity and State Levels for Biodiversity Conservation and Sustainable Land Use Practices*, which will finance capacity building, learning and skill development at local, Entity and State levels in order to strengthen the institutions responsible for planning, establishment and management of PAs and to ensure the sustainability of the expanded PA network. Additional support will be aimed at building the institutional and technical capacity to access the different EU funding programs and instruments to finance nature

conservation once BiH will become eligible to take advantage of these funds. In addition to the biodiversity monitoring system, the Project will under this component establish a Monitoring and Evaluation (M&E) system, based primarily on the GEF Protected Area Management Tracking Tool for Biodiversity. Component 2 also finances Project management and operating costs.

- Component 3 - *Generation of Alternative Rural Livelihood Opportunities through Wise Multiple-use of Protected Areas*, which will provide financing to establish and operate a Small Grants Program (SGP) to support stakeholders living in and around PAs in small-scale tourism development activities directly or indirectly contributing to biodiversity conservation, and to provide incentives for stakeholders to change current unsustainable land use practices having adverse impacts on the natural resource base in or adjacent to the PAs and pose a threat to biodiversity. Sub-projects funded under the SGP will be targeted towards developing new livelihood options which promote ecologically friendly tourism and improve land use practices in support of the Project's overall objective of increasing PA sustainability. Sub-projects could include small-scale waste management and recycling initiatives, habitat restoration, alternative energy promotion, environmental and cultural education, ecotourism programs and facilities, and community-based monitoring. To ensure sustainability of the SGP, the Project will help beneficiaries with business planning advice, market research, and links to other tourism or rural development initiatives.

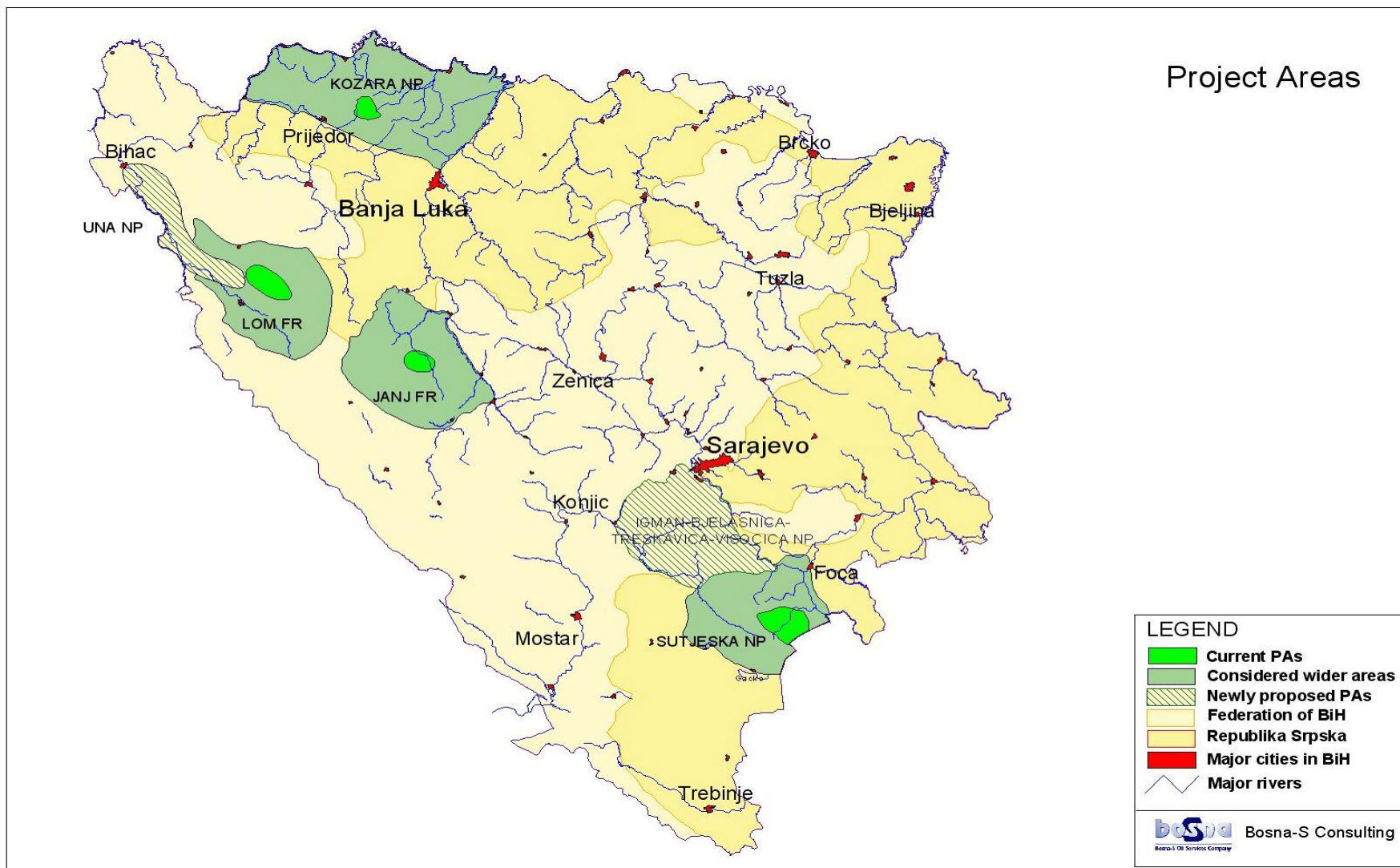
Based on the expected overall likelihood and magnitude of environmental impacts, this project has been rated Category B with respect to the Environmental Assessment requirement of the World Bank OP/BP 4.01 safeguard policy. The objectives of this Environmental Assessment/Development of Environmental Management Plan Framework assignment are to:

- analyze the policy, legal and administrative framework relevant to establishment and expansion of PAs,
- analyze available baseline data on the relevant environmental issues and their trends,
- identify the possible positive and negative environmental impacts of the project and propose appropriate mitigating measures where required,
- define key criteria for environmental quality monitoring in the project implementation areas, develop guidelines for environmentally sound development of project-financed infrastructure, and
- assist in the public consultation process.

Based on available information on the six priority project locations and the identified possible environmental impacts of the project, the resulting Environmental Management Plan Framework should also be applicable to project activities on any other locations that may be decided upon during later stages.



## Project Areas



# REVIEW/DESCRIPTION OF THE LEGAL AND ADMINISTRATIVE BiH FRAMEWORK

## Administrative Framework

The existing institutional structure of Bosnia and Herzegovina (BiH) does not include state-level institutions dealing with environmental issues, which are thus in the jurisdiction of the Entity Governments, i.e. Ministries responsible for environmental protection. These are the Ministry of Environment and Tourism<sup>1</sup> of the Federation of Bosnia and Herzegovina (FBiH), and Ministry of Physical Planning, Urbanism, Construction Works and Ecology of Republika Srpska (RS). The lower level of environmental management in FBiH is with the cantonal ministries. International agreements and conventions on environmental protection are in the jurisdiction of the state Council of Ministers, i.e. the Ministry of Foreign Trade and Economic Relations of BiH. The main institutions in charge of protected areas issues are the Ministry of Agriculture, Waterworks and Forestry of RS and Ministry of Agriculture, Waterworks and Forestry of the FBiH, as well as cantonal Ministries of Agriculture, Waterworks and Forestry within the FBiH.

## Environmental (Impact) Assessment Legislation

### FBiH

Environmental Impact Assessment procedure in the FBiH is regulated by the *Federal Law on Environmental Protection* (Official Gazette of FBiH, No. 33/03) and its *Regulation on facilities subject to obligatory EIA, and facilities which may be constructed and operated only with a valid environmental permit* (Official Gazette of FBiH, No.19/04). The whole EIA procedure is managed by the Federal Ministry of Environment and Tourism (until recently the Ministry of Physical Planning and Environment), while responsible cantonal institutions participate in the decision making process. Based on the Ministry's judgement and in accordance with the above legislation, the procedure includes some or all of the following elements:

### Preliminary EIA

The investor submits a request for preliminary environmental impact assessment to the Ministry of Environment and Tourism of FBiH (Ministry). The request should contain the following information:

- Project description with information on location, purpose and size of plant or facility,
- Description of measures for prevention, abatement or, if possible, remediation of significant adverse effects,
- Data required for identification and assessment of basic environmental impacts,

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<sup>1</sup> successor of the Ministry of Physical Planning and Environment of the FBiH

- Description of project alternatives and the alternative chosen,
- Excerpt from the physical plan of the area, and
- Non-technical summary.

The Ministry discloses the contents of the request to other authorities in charge (other ministries, cantonal and municipal governmental institutions, etc.) and stakeholders for review and provision of comments and objections within 30 days from the date of the request receipt. The purpose of preliminary EIA is to inform the public (institutions, NGOs, residents) on the project, while the public in turn contribute with their suggestions in the process of defining the EIA contents and extent, as well as in the selection of the most appropriate project alternative and mitigation measures. Should the preliminary EIA identify serious obstacles to project implementation, the Ministry decides to stop and dismiss the procedure. If on the other hand the feedback is positive and the project acceptable, the Ministry issues a Decision on the preparation of an EIA Study within 30 days from expiry date of the period previously given for provision of comments and objections.

### EIA Study

The Ministry issues a Decision on the preparation of EIA Study (Article 59 of the Law) specifying the EIA Study contents (based on the preliminary EIA), list of institutions or companies accredited for the preparation of EIA studies, and EIA Study appraisal fee. The contents of the EIA Study are defined by the *Federal Regulation on facilities subject to obligatory EIA, and facilities which may be constructed and operated only with a valid environmental permit*. When prescribing the contents, the Ministry takes into account the results of the preliminary EIA for each individual case.

### Plants, facilities and activities whose EIA requirement is subject to evaluation by the Ministry

In this regulation the Ministry provides a list of plants and facilities, which undergo individual evaluation concerning the EIA requirement. If such an individual evaluation shows that no EIA is required, the Ministry issues an environmental permit based on the documents already submitted. When evaluating the EIA requirement, the Ministry takes into account individual project characteristics (plant/facility size, waste generation, pollution, etc.), project location and environment sensitivity, as well as characteristics of potential impacts (impact extent, probability, etc.).

### EIA Study approval

The Ministry can approve the EIA Study after public consultations. The decision on approval or rejection is to be reached within 30 days from the completion of the Study evaluation (appraisal). The EIA Study can not be approved if substantial environmental impacts are likely, if the project is not in accordance with the Inter-Entity Environmental Protection Program, Entity environmental protection strategies and National Environmental Action Plan, or any obligatory international environmental requirements.

Based on a Decision on the EIA Study approval, the investor is granted an environmental permit for the plant or facility. The Environmental permit and EIA Study are then used to

obtain further "Urbanism" Consent and Construction Permit. The Environmental Permit is issued within 60 days from the date of EIA Study submission.

#### Public participation and access to information during the EIA procedure

According to Article 36 of the *Law on Environmental Protection*, the Ministry must ensure participation of interested public/stakeholders in the EIA procedure (preliminary EIA and EIA Study), as well as in the procedure of Environmental Permitting for plants and facilities.

The Ministry arranges public consultations in a place close to the project location, announcing them at least 15 days in advance. The outcome of the public consultations is to be taken into account when making the final decision. In the case of projects with possible transboundary environmental impacts, the Ministry must allow participation of the public representatives from the other Entity or other state of concern.

Finally, it should be considered that the current federal legislation specifies the environmental impact assessment procedure primarily for industrial plants and facilities typically with substantial negative environmental impact, while the category of protected areas is not mentioned in this context. Subject to Ministry's judgement, requirement for a *Strategic Environmental Assessment (SEA)* may be set as a part of the procedure of adopting physical plans for *special areas*. Among other, a SEA evaluates the degree to which a project may impact or improve the state of the environment, as well as damage that could be inflicted upon the environment, including the residents, in the case that the project is not implemented. However, precise SEA procedure is not specified by the legislation yet, and there are uncertainties as to how to interpret the current general provisions of the framework law.

#### **Relevant environmental legislation on the canton level**

Besides the mentioned federal (Entity) legal framework, the environmental protection legislation of the cantons should also be taken into account. For plants and facilities which are not subject to EIA requirement, and plants and facilities with parameters below the thresholds defined by the federal *Regulation on facilities subject to obligatory EIA, and facilities which may be constructed and operated only with a valid environmental permit*, the Environmental Permit is issued by the cantonal ministry in charge. The environmental legislation of the cantons is equivalent to the federal legislation. The following cantonal environmental legislation, applicable in the Project areas, is currently available:

- *Law on Environmental Protection* of the Herzegovina-Neretva Canton (Official Gazette of Hercegovacko-neretvanski Canton - HNC, No. 07/2004)
- *Regulation on activities, plants and facilities* that can be built and operated only with a valid environmental permit issued by the HNC (Official Gazette of Hercegovacko-neretvanski Canton, 19/04)
- *Regulation on plants and facilities which can be constructed and put in operation only with a valid Environmental Permit* of the Sarajevo Canton (Official Gazette of Canton Sarajevo, No. 19/04)

## RS

*Law on Environmental Protection of RS* (Official Gazette of RS, No. 53/02), amended in 2005 (Official Gazette of RS, No. 109/05), regulates: the preservation, protection, restoration, and improvement of ecological quality and capacity of environment, and the quality of life; the measures and conditions for management, preservation and reasonable use of natural resources; the legal and administrative framework for the issues of preservation, protection, and improvement of environment; the financing of environmental activities, including those in sole responsibility of the authorities. According to this law, the components of environment (soil, water, air and ecosystems) must be protected individually, as well as within the protection of other components, taking into account their interdependence. Besides this Law, the recently enacted *Law on Amendments of Law environmental protection* (Official Gazette RS, 109/05), as well as the *Refined Text of the Law* (Official Gazette RS, 28/07) should be taken into account.

This law, as well as its implementing *Regulation on facilities which may be constructed and put in operation only with a valid Environmental Permit* (Official Gazette of RS, No. 07/06), introduce obligatory Environmental Permitting for all facilities potentially endangering the environment. It specifies the contents of the request (application) for a permit, as well as the mode of public participation in the procedure, and the involvement of other entity or a neighbouring state in the case of possible trans-boundary impacts. The key provisions of this Law, including those on EIA, are in line with those of the current FBiH legislation. Besides this, *Regulation on applications for environmental permits for plants and facilities holding permits granted before enactment of the Law on Environmental Protection* (Official Gazette RS, br 24/06) regulates the applications for environmental permits and sets deadlines for submission of applications. *Regulation on Projects subject to EIA and Criteria for Establishing the EIA Requirement and Extent* (Official Gazette of RS, No. 07/06) lists primarily plants, facilities and projects with substantial negative environmental impacts subject to mandatory EIA, however, it also specifies that the Ministry decides upon the EIA requirement for individual Protected Areas projects.

Concerning the issue of protected areas, the Ministry is entitled to judge if an EIA or a *Strategic Environmental Assessment* (SEA) is required for each individual case. There are vague interpretations in this respect and the latter is deemed more appropriate for the projects such as this one. However, the Ministry reportedly requires more details on the actual project scope and activities planned in order to reach a decision with regard to this.

## Other relevant legislation

### FBiH

#### Law on Nature Protection (Official Gazette of FBiH, No. 33/03)

This law determines the conditions and methodology of restoration, protection, preservation and sustainable development of landscapes, natural areas, plants, animals and their habitats, minerals, fossils, and other nature components on the territory of FBiH. This includes the general nature protection measures (protection of landscapes, wild animals and plants, the Red List, protection of habitats) and special protection by means of protected areas establishment (in jurisdiction of the FBiH: protected natural areas and national parks; in jurisdiction of cantons: protected landscapes and monuments of nature), as well as the management of protected areas, activities in protected areas, accession to the network of European protected areas - Natura 2000 Program.

Article 47 of the the Law on Nature Protection specifies that the owner of an area proclaimed protected is entitled to compensation for any restrictions on use of the natural wealth/setting/environment of the area imposed by the act of proclamation. The extent of compensation must correspond to the loss of income/revenue imposed, subject to agreement of the authorities and the owner.

Besides this Law, it is important to have in mind the following new regulations: *Regulation on Conditions of Access to Protected Areas* (Official Gazzete FBiH, No. 69/06), *Regulation on Contents and Methodology for Preparation of Protected Areas Registries* (Official Gazzete FBiH, No. 69/06), *Regulation on Contents and Methodology for Preparation of Protected Area Management Plan* (Official Gazzete FBiH, No. 65/06), and *Regulation on New Research and Conservation Measures aimed at preventing negative impacts on animal species due to capturing or killing* (Official Gazzete FBiH, No. 65/06).

#### Regulation on Conditions of Access to Protected Areas (Official Gazzete FBiH, No. 69/06)

This Regulation defines the conditions for accesses to protected areas, as well as the obligations of the owner of the land within the territory of the PA. of obligations of owners that have lands and assets on the protected area territory. This regulation also addresses visits to protected areas, activities that can not be performed inside PA, and defines the right of access to the PA core zone.

#### Law on Fund for Environmental Protection (Official Gazette FBiH, No 33/03)

This Law establishes Fund for environmental protection FBiH, and defines the constitution, organization, management and disposition of the Fund, assets and operation of Fund, sources of financing, prupose and use of Fund.

Law on Physical Planning and Land Use (Official Gazette FBiH, No. 02/06), which recently superseded the Law on Physical Planning (Official Gazette SR BiH No.13/74, 9/87)

This Law ensures planned use, protection and management of the FBiH territory. Apart from physical plans (plans for FBiH, individual canton, groups of two or more cantons, areas of special features – areas of great natural or cultural-historical importance, the cities of Sarajevo and Mostar), the Law on Physical Planning also defines "urbanism" plans and detailed physical plans (regulatory plans and urbanism projects). These documents specify and prioritize the spatial use of land surfaces (whereby borders of construction, agricultural or forestry land are determined), whether for dwelling, works, recreation, sports or tourism purposes, but also address the issues of nature and cultural heritage protection, environmental protection measures, special protection zones, zones of reconstruction and rehabilitation, and the communal (municipal), traffic, waterworks and energy sector infrastructure. Construction of buildings or facilities is subject to approval based on the physical planning documents, special regulations and provisions, and "urbanism" consent.

Law on Agricultural Land (Official Gazette of FBiH, No. 2/98)

This Law defines "the notion, management, protection and setting up of agricultural land" (Article 1), and delegates the responsibilities over these activities to cantons and municipalities. It also contains provisions regarding the water sector, essentially concerning the creation of agricultural land by construction of irrigation systems (Articles 48 to 52). Article 21 of this Law prohibits discharges of dangerous and harmful material onto agricultural land in quantities that can affect the productivity of agricultural land or the quality of agricultural products, as well as inappropriate usage of mineral and organic fertilizers, herbicides and pesticides.

Regulation on Maximum Permitted Quantity of Harmful and Dangerous Substances in the Soil and Methods of Monitoring (Official Gazette of FBiH, No.11/99)

This regulation defines the harmful and dangerous substances, including sludge from wastewater treatment, and the threshold concentrations for various soil types. Furthermore, it provides methods of sampling and monitoring organic and mineral waste, pesticides and herbicides concentrations.

Law on Forests (Official Gazette of FBiH, No. 20/02)

This law regulates the preservation and protection of forests, strengthening of their ecological functions, planning in forestry, management of forests, economic aspects, and financing of restoration and upgrade of forests. It also contains provisions on the use of non-timber forest products and protection of endangered species. According to this law, an EIA is mandatory for all projects of forest clearing (felling and clearing of land aimed at creating land for other uses, except for the construction of forestry buildings or installations), and forestation on areas greater than 5 ha. In the cases of forestation on smaller areas, the Ministry of Agriculture, Forestry and Waterworks evaluates each individual case in consultation with the Ministry of Environment and Tourism.

Law on approval and protection of sorts of agricultural and forest plant varieties (Official Gazette of FBiH, No. 31/00)

This Law regulates the approval and protection of new and foreign agricultural and forest varieties (cultivars).

Law on Hunting (Official Gazette of FBiH, No. 4/06)

This Law regulates the organization of hunting and hunting ground, breeding, production, usage of wild animals, cadastre of hunting grounds, hunting guard service, administrative and inspectoral supervision of implementation of the Law, and other issues important for hunting on the FBiH territory.

Law on Waters of FBiH (Official Gazette of FBiH, No.18/98)

This Law regulates the water management issues, including the management of waterworks facilities, use of public water wealth, and water protection. According to the provisions of this Law, the following waterworks documents are issued aimed at ensuring appropriate water management: Waterworks Requirements (stipulations), Waterworks Consent, Waterworks (Water Management) Permits, and Waterworks Orders. Meanwhile a new Law on Waters has been adopted (Official Gazette of FBiH, No. 70/06), however, since it will be implementable only after Water Management Agencies are established, the Laws from 1998 and 2003 are still in force.

Water Protection Law (Official Gazette of FBiH, No. 33/03)

The framework Law on Water Protection determines all aspects of water management, including the protection of watercourses/water bodies and associated ecosystems. It also regulates wastewater releases and compensations (charges) for activities which may alter water quality or quantity. Article 23 of this Law specifically limits the use of herbicides and nutrients, while Article 31 specifies the minimum biological rate of flow. This Law introduces the category of water management agreement, and defines inspection and monitoring procedures. However, specific secondary legislation to this Law is still missing and needs to be developed.

Law on freshwater fishing (Official Gazette of FBiH, No 64/04)

This Law regulates the freshwater fishing: fishing waters, fishing, aquaculture, fish protection, fishing-guards service, administrative and inspectoral supervision of the Law implementation, and other important issues. Fish in fishing waters are to be used in a sustainable way contributing to the conservation of biological diversity and ecological systems.

Law on Air Protection (Official Gazette of FBiH, No. 33/03)

This Law regulates the technical conditions and measures for the prevention or reduction of air emissions caused by human activities, to be met/applied during the manufacturing



processes on the territory of FBiH, as well as the planning of air quality protection, special sources of emission, cadastre of emissions, quality of air, etc.

Law on Utility (Communal) Services (Official Gazette of SR BiH No. 20/90)

This law regulates “utility services of special social interest” (Article 1), such as water production and distribution through water supply networks, up to and including the users' water consumption meters (Article 2/1/1); purification and evacuation of wastewater (Article 2/1/2); and stormwater drainage (Article 2/1/12).

Law on Waste Management (Official Gazette of FBiH, No. 33/03)

This Law and its implementing regulations classify different types of wastes, and regulates activities of waste management. Its scope does not include radioactive waste, gases released into atmosphere or wastewater.

Law on Protection of Cultural, Historical and Natural Heritage (Off. Gaz. of SRBiH, No. 20/85)

Based on this law, the Agency for Protection of Cultural, Historical and Natural Heritage of BiH has been established, whose successor is the Agency of Protection of Monuments of FBiH. Upon the signing of the Dayton Peace Accord in 1995, the cantons have established their own Agencies for Protection of Cultural, Historical and Natural Heritage, whereas no such institution exists on the Federation level. These agencies are consulted during permitting processes. Their judgements in this context are based on available data, as well as direct insights on the spot. If a project is not expected to impact cultural or historical heritage and in the event that sudden discoveries of valuable items, or natural values emerge later on (during project activities), the investor is obliged to immediately notify the responsible agency and the municipal authorities in charge and arrange temporary protective measures. The provisions of this law related to nature have been superceded with the enactment of the Law on Nature Protection.

### **Other relevant cantonal legislation**

Besides the described federal legislation, the following cantonal legislation has to be taken into account:

- Law on Physical Planning of the Herzegovina-Neretva Canton (Official Gazette of HNC, No. 04/2004)
- Law on Utility Services of Herzegovina-Neretva Canton (Official Gazette of HNC, No. 04/2004)
- Law on Physical Planning the Sarajevo Canton (Official Gazette of SC, No. 13/99 and 19/99)

## RS

### Law on Fund for Environmental Protection (Official Gazette RS, No. 51/02)

The Fund propose iis to collect and distribute financial funds for environmental protection on the territory of RS, in accordance with the commitments and obligations to the international community.

### Law on Nature Protection (Official Gazette of RS, No. 50/02)

This Law regulates the restoration, protection, preservation and sustainable development of landscapes, natural areas, plants, animals and their habitats, soil, minerals, fossils, and other components of natural environment. Among other, it defines the special protection measures for different categories of protected areas: natural protected areas, established for research purposes or aimed at wildlife protection; national parks, established to protect ecosystems and recreation; monuments of nature, established with the aim of preserving specific natural features; and protected landscapes, established to preserve inland landscapes and coastal areas, and recreation. This law also prescribes the procedure of proclaiming an area protected, as well as the obligatory requirement to develop a corresponding management plan. Article 45 of this law specifies that the owner of an area proclaimed protected is entitled to compensation for the imposed restrictions on the natural resources use in the area.

### Law on National Parks (Official Gazette OF RS, 01/96)

This Law addresses the issues of protection, development and management of protected areas. Among other, it specifies precise restrictions and prohibitions related to protected areas, such as restrictions on logging, collection of herbs or other forest products, exploitation of mineral resource, etc. It also defines responsibilities with respect to general monitoring of protected areas. This Law has been amended by the *Law on Amendments of Law on National Parks* (Official Gazette RS, No. 84/02 and 14/03).

### Law on Physical Planning (Official Gazette OF RS, 84/02 i 14/03)

This Law deals with physical planning as a group of measures and activities of construction, physical and urban planning, architectural and construction design and construction, in order to coordinate between the needs of population for shelter, work and recreation in a healthy and protected natural environment, creating conditions and prerequisites for smooth and coordinated development of Republika Srpska and all the areas therein with coordination of general and specific interests of all users of space. In a separate chapter, this Law deals with the protection of the environment within physical planning and construction. Along with the establishment of organization, arrangement and use of space, the plans also specify the protection measures and conditions for improvement and protection of nature, natural values, cultural and historical structures and their surroundings. In order to implement efficient protection and improvement of the environment, commercial and other activities that might endanger the environment are subject to a special control mechanism and are entered in a separate registry.

Law on Protection of Cultural, Historical and Natural heritage (Official Gazette SR BiH, No 20/85)

Until the Law of Nature Protection is not amended, this Law remains in force in RS, as well as is in FBiH. However, its provisions on the protection of cultural goods are not applicable since the introduction of the *Law on Cultural Goods* (Official Gazette RS, No. 11/95). It is important to mention in this context the Committee for Protection of National Monuments acting at the state BiH level. Besides this, Institute for Protection of Cultural, Historical and Natural Heritage of RS, also plays an important role in monuments protection.

Law on Agricultural Land (Official Gazette of RS, 14/04, 22/04 and 49/04)

This Law regulates the following issues: protection, use, improvement and management of agricultural land, trade and rent, agricultural activities and common pasture land. This Law prohibits releases and disposal of any harmful and hazardous matter on agricultural land and in irrigation canals, in amounts that can harm or change the production capacity of the agricultural land and the quality of water used for irrigation. Improper use of mineral and organic fertilizers or plant protection chemicals is also prohibited, i.e. in the event that it would lead to an increase in concentrations of hazardous materials in plants, agricultural cultures, land, groundwater and surface water.

Law on Forests (Official Gazette of RS, No.66/03)

This law specifies the economic forestry areas and the establishment of a forests cadastre, and regulates the reproduction, exploration and protection of forests.

Law on Hunting (Official Gazette of RS, No.4/02)

This law regulates the measures to protect and "raise/breed" wild animals, physical arrangements of hunting grounds and reasonable use of wild animals and hunting grounds. It also defines the wild animals protected by a permanent, periodical or temporary ban on hunting.

Law on Plants Protection (Official Gazette of RS, No. 13/97)

This Law establishes the requirements on plant protection, including protection from diseases, pests and weeds. The Law also regulates the control for plant health in domestic and international trade, as well as the trade of pesticides. According to this Law, the Ministry prescribes the maximum allowed levels of contamination in seeds and seedlings.

Law on Fishfarming and Fishing (Official Gazette of RS, No.4/02)

The Law on Fishfarming and Fishing regulates the establishment and use of fishing or fisheries' areas, fish farming, fishing and fish protection. It also imposes the obligation for users of fishing or fishery areas within a national park to synchronize their midterm, annual or temporary program for upgrade of fishing and fish farming with the national park's protection and development program. The users of neighboring fishing and fish farming areas on the same watercourse of water body also have to adjust their programs in terms of

operation, fish protection measures, fish farming, fishing, and protection of water bodies used for fishing.

Law on Waters (Official Gazette of RS, Nos.10/98 i 51/01)

This Law addresses protection of water, protection from negative impacts of water, water use and management, conditions and manner of renewing Water Management Activities, organization and financing of waterworks, Water Management Consent and Permit, limiting rights of users, and monitoring the implementation of the provisions of the Law.

Law on Water Protection (Official Gazette of RS, No. 53/02)

This Law regulates protection of water from pollution and irrational use, which includes maintaining and regulating required water quantities of sound quality, maintaining coastal and river bank areas, and bringing about decisions on rational and sustainable resource use. General provisions of the Law are related to: water protection goals, principles of water protection (based on the EU Water Framework Directive) - which are equivalent to those applied in the Law on Environmental Protection and all complementary legislation, responsibilities in water protection, planning and implementation of water protection, as well as to the fees charged for discharges into water bodies.

Law on Communal Services (Official Gazette of RS, No. 11/95, 51/02)

This Law regulates the services related to communal (utility) services of special public interest, organization of communal services and the financing. Among other, services of special public interest are: production and delivery of water, treatment and disposal of wastewater (including collection of wastewater released into a sewage system, drainage, treatment and release from the system, as well as emptying/cleaning of septic tanks), and collection and drainage of precipitation from public areas.

Regulation on Protection Measures, Establishing and Maintenance of Safety Zones for Water Sources, Other Water Structures and Water Used for Human Consumption (Official Gazette of RS, No. 7/03)

This regulation sets forth implementation of protective measures in areas of sources of water designated for human use or water supply, which need to be protected from intentional or accidental pollution and other negative impacts affecting the water quality. The guidelines also include establishment of a safety zone for sanitary protection of water bodies, structures and main ducts for supply of water intended for human consumption, as well as sanitary protection measures for such type of water.

Regulation on Collection and Treatment of Wastewater in Urban Areas and Settlements Without Public Sewer Systems (Official Gazette of RS, No. 68/01)

This regulation addresses individuals, legal entities and authorized officials involved in planning, constructing, monitoring, collecting and treating wastewater in urban areas or in settlements without a public sewer system, or without conditions for establishing a collection system. The aim of these guidelines is to protect water from pollution and enable its

unaffected use, to protect the health of population, animal and plant life, and protect the environment through control, restrictions and bans on introducing harmful matter into water.

Decree on Classification of Water and Waterways (Official Gazette of RS, No. 42/01)

This decree establishes the criteria for classification of waterways, including surface water, groundwater, and other waterways. It specifies classes according to quality based on ecological parameters and different types of aquatic systems, as well as water use to meet current and planned needs. This Decree addresses all types of surface water (rivers, lakes, artificial and modified waterways), groundwater and mineral and thermal water.

Regulation on Methods for Maintenance of Riverbeds and Riverbanks (O. G. RS, No. 34/03)

The guidelines of this regulation are to be used for the planned removal or dislocation of alluvium, obstacles or riverbed vegetation aimed at preventing erosion of the riverbed, enabling facilitated transfer of alluvium, preventing unwanted sedimentation of alluvium in specific watercourse areas, providing protection from flood water and its safer transfer into the recipient bodies, preventing or minimizing alterations in rate of riverflows, and eliminating or preventing river meandering or uncontrolled flow changes and damage to the river banks through floods and erosion.

Regulation on Conditions for Gravel, Sand and Crushed Rock Exploitation (Official Gazette of RS, No. 5/04)

This regulation defines the conditions and manner of surface exploiting mineral raw materials (gravel, sand and crushed rock) on locations where the reserves of the mineral raw material allow for exploitation of up to 10.000 m<sup>3</sup> without mining.

Law on Sanitary Inspection (Official Gazette of RS, No. 14/94)

This law establishes the inspection of the implementation of the legislation and prescribed measures related to sanitary, hygienic and anti-epidemic protection of population. Sanitary inspection can be applied to all structures, activities, products and individuals which can endanger or negatively impact human health.

Regulation on Hygienic Properties of Potable Water (Official Gazette of RS, No. 40/03)

This regulation prescribes the hygienic properties of water rendering it suitable for drinking and human consumption.

Law on Waste Management (Official Gazette of RS, No. 53/02)

This Law regulates the issues of all types of solid waste categories, all types of activities, operations and facilities in waste management. The provisions of this Law are applicable to the wastes generated during research activities, extraction, treatment and storage of mineral resources, including wastes from quarries; liquid wastes; animal wastes and other non-hazardous wastes of natural origin which can be used in agriculture; and waste explosives.

This Law does not address radioactive waste, gaseous wastes released into the atmosphere or wastewater.

## **REVIEW/DESCRIPTION OF APPLICABLE WORLD BANK SAFEGUARD POLICIES**

### **OP/BP 4.01 Environmental Assessment**

The World Bank's safeguard policy OP/ BP 4.01 is considered the umbrella environmental assessment policy of the World Bank. Environmental Assessment (EA) is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations. EA evaluates a project's potential environmental risks and impacts in its area of influence, examines project alternatives, identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts, and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

An EA takes into account the natural environment (air, water, and land), human health and safety, social aspects (involuntary resettlement, indigenous peoples, and cultural property), and transboundary environmental impacts, as well as country-specific overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects.

The Bank classifies the proposed project into one of four categories (A,B,C or FI), depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. A project is classified Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. A project is classified Category B if the potential environmental impacts are smaller than those in the case of Category A projects. In most cases, mitigation measures for such projects can be more easily designed than those for Category A project impacts. The extent of EA for Category B projects can vary from project to project, but in any case it is smaller than the extent of and EA for Category A projects.

### **OP 4.36 Forestry**

This safeguard policy is applied in the case of projects that have or may have impacts on the health and quality of forests, projects with negative impacts on the rights or standard of living of forest dependent persons, and projects aimed at introducing changes in forest management, protection or use. The World Bank in principle does not finance projects involving substantial conversion or degradation of critical forest areas or the associated

critical habitats. If it is established that a project involving substantial conversion or degradation of forests or the related non-critical natural habitats has no feasible alternatives in terms of location, and if a detailed analysis shows that the overall positive effects of the project strongly outweigh negative environmental impacts, the World Bank may decide to finance the project provided that adequate measures are adopted to mitigate the negative impacts.

#### **OP/BP 4.04 – Natural Habitats**

The Bank supports the protection, maintenance and rehabilitation of natural habitats since conservation of natural habitats is essential for long-term sustainable development. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. This policy is triggered by any project with the potential to cause significant conversion (loss) or degradation of natural habitats whether directly (through construction) or indirectly (through human activities induced by the project).

Natural habitats are land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the areas primary ecological functions. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems.

The Bank does not support projects that, in the Bank's opinion, involve significant conversion or degradation of critical natural habitats. The environmental assessment process should identify any critical natural habitats within a proposed project's area of influence. For other natural habitats, the Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs. If the project significantly converts or degrades natural habitats, the project includes mitigation measures acceptable to the Bank. Such measures normally include, as appropriate, minimizing habitat loss, and establishment and maintaining an ecologically similar protected area. If, as part of the environmental assessment process, environmental screening indicates the potential for significant conversion or degradation of critical or other natural habitats, the project is classified as Category A; projects otherwise involving natural habitats are classified as Category A or B, depending on the degree of their ecological impacts.

#### **OPN 11.03 – Draft OP 4.11 Physical Cultural Resources**

Cultural heritage includes locations of archeological, paleontological, historical, religious, and unique natural value. This for instance includes remains of sanctuaries, locations of historic battles and natural specificums such as canyons or waterfalls.

In the case that the extent of damage to cultural heritage related to a project is determined, the Bank, if possible, relocates the project or project structures. In some cases the benefits of a project may be great, while the authorities establish that damage is inevitable, minor or

in other way acceptable (whereby the project documentation should quote sufficient arguments to support such claims). If a project triggers this safeguard policy, the borrower estimates the impact of the project on physical cultural resources within a separate chapter of the Environmental Assessment document. This chapter has to contain information on the conducted research of physical cultural resources that may be subject to negative impacts, characteristics and importance of such resources, as well as an assessment of kind and extent of impact on such resources, and Environmental Management Plan with impacts mitigation measures that includes the cultural resources component.

#### **OP/BP 4.12 Involuntary Resettlement**

The World Bank financed projects involving resettlement components are subject to the World Bank Operational Policy (WB OP) 4.12 Involuntary Resettlement, revision April 2004, and Bank Procedure (BP) 4.12 of December 2001, which describe instruments and procedures for eliminating negative economic, social and environmental issues that may arise. The policy is triggered not only with physical relocation, but any loss of land resulting in relocation or loss of shelter, loss of assets or access to assets and loss of income sources and means of livelihood. This policy requires that, in the case of restrictions of access to natural resources in protected areas, a Process Framework be prepared establishing the process of participation of affected residents in the project activities designing, identification of compensation measures and individual eligibility for such measures, as well as in monitoring of relevant project activities. In this sense, a Process Framework for this project will be prepared under a separate ToR.



# DESCRIPTION OF BASELINE CONDITIONS

## SUTJESKA NATIONAL PARK

### Physical Characteristics

Sutjeska National Park was established in 1962 and it currently stretches over an area of 17,250 ha. It is positioned at 18°37' eastern longitude and 43°19' northern latitude, in the bordering area between BiH and Montenegro, entirely within RS. The management of the Sutjeska NP also supervises the neighboring hunting grounds of 54,000 ha. The National Park is surrounded by mountains of the Dinara Massif - Maglić (2,386 m - the highest peak in BiH), Volujak (2,337 m), Zelengora (2,014 m), Lelija (2,032 m), Plateau of Vučevska (400 - 1,700 m), Čemerno Saddle (1,300 m), as well as the Pivska Mountain and the Piva River Canyon, and farther the Tara River Canyon, the deepest European Canyon belonging to the Durmitor National Park in the neighboring Montenegro. In the wider surrounding of the Sutjeska NP, there are towns of Foča/Srbinja, Gacko, Nevesinje and Kalinovik. This area is of a high-mountainous type, with a relatively small number of settlements and inhabitants. The NP encompasses the largest European primeval forest, Perućica (1,291 ha), while some of the most beautiful canyons can be found in the wider surrounding. The network of the existing main and local roads provides a relatively good access from the directions of Sarajevo, Mostar, Foča and Dubrovnik (Croatia). International road route Belgrade – Višegrad – Foča—Tjentište – Trebinje – Dubrovnik passes through this area.

Mountainous and moderate-continental climate is characteristic for this area. Average annual temperature at Čemerno (1,300 m) is 5.9 °C, and in the nearby town of Foča it is 10 °C. Total annual precipitation at Čemerno amounts to 1,817 l/m<sup>2</sup>, and 938 l/m<sup>2</sup> in Foča.<sup>2</sup>

Watercourses of the Sutjeska NP belong to the Black Sea Basin and the Adriatic Basin. The River Sutjeska passes through the Park of the same name. The Rivers Piva and Tara (the latter one, along with its canyon, being a protected area in the neighboring Montenegro) and the River Drina are among the most significant water courses of the wider area. The River Drina is formed by the joining of Piva and Tara, near Bastas ( $Q_{av}=164 \text{ m}^3/\text{s}$ ), and in its downstream it mouths, from the left side, the River Sutjeska with Hrčavka (a total of  $14.9 \text{ m}^3/\text{s}$ ), the River Bistrica ( $Q_{av}=11.5 \text{ m}^3/\text{s}$ ), and, from the right side, the River Čehotina ( $Q_{sr}=16.0 \text{ m}^3/\text{s}$ ). The average rate of flow of the River Drina in Foča is  $212 \text{ m}^3/\text{s}$ . There is also the River Neretva and a part of the River Trebišnjica Basin. Neretva springs in the area of the Čemerno Saddle, and it traverses through the Borač Valley towards the settlement of Ulog and farther northeast, towards the town of Konjic. The upper horizons of the River Trebišnjica Basin start in the area of Gacko-Nevesinje. The watercourses from the Gacko Valley discharge underground into the River Zalomka and the Nevesinje Valley, and farther again underground towards the Neretva and Trebišnjica Basin.

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<sup>2</sup> "Framework Waterworks Basis", Public Enterprise „Vodoprivreda Bosne i Hercegovine – Zavod za vodoprivredu, Sarajevo, 1994

This area is of continental (hilly-mountainous) and sub-Mediterranean (karst) types. Its complex make up involves rocks from different geological eras and formations, primarily rocks and sediments of Mesozoic, Paleozoic, Triassic, Verfen and Quaternary. Tertiary and Upper-Cretaceous flysch appear in the south. The watercourses from the southern slopes therefore flow towards the Gacko Valley, whose rim features Triassic and Jurassic limestone structures. This area has not been found to have significant quantities of minerals and ore. Three soil types can be observed in the area - those on carbonate, acidic silicate and volcanic rocks.

Among many landmarks and structures of cultural and historic heritage, the most famous are Tjentište, a memorial center of the World War 2 Sutjeska Battle, and remains of the pastoral settlements katuni, one of the oldest known mountainous construction styles.

### **Biological Characteristics**

Heterogeneity of the abiotic features of the Sutjeska NP (diversity of geological base, types of soil, eco-climate, relief and hydrographic network) has allowed development of extraordinary bio-diversity at all levels, especially of diversity of species (opulence of plants, animals and mushrooms) and ecology (opulence of biocenoses), as well as in relation to eco-systems or geo-biocenoses. This area accommodates more than 2,500 species of vascular plants, more than 500 species of macro-mycetes, several thousands animals, among which the largest number of insects from groups of Psihodydae, Ephemeroptera, Placoptera, Trichoptera, Phopalocera, Gollembola, as well as a variety of birds and mammals.

Primeval forest communities of spruce, abies and beech *Abieti-Fagetum moesiacar* in the area of Perućica, one of the best preserved primeval forest reservations in Europe, represent a distinctive characteristic of this area. Besides these communities, which yield the largest production of bio-mass, the area of Perućica also features significant communities of wild oak and common hornbeam *Querco-Carpinetum illyrico-moesiaum*, forests of sycamore maple and European ash *Aceri-Fraxinetum excelsioris* (along the numerous watercourses), forests of moesian beech *Fagetum moesiacae montanum*, sub-mountainous forests of spruce *Piceetum abietis*, beech and maple *Aceri-Fagetum subalpinum* (on carbonates), as well as *Luzulo-Fagetum subalpinum* (on silicate rocks and acidic soils of ranker type). The rim of the forest vegetation is made of Dinaric pine *Pinetum mugii dinaricum calcicolum* (on carbonates) and *Pinetum mugii silicicolum* (on silicate rocks). There are also numerous forest communities which do not appear in bands. Thus, shallow soil, warm habitats, hilly and lower part of the mountainous band features distinctive communities of hop hornbeam, European ash, *Fraxino orni-Ostryetum*, hop hornbeam and *Seslerio-autumnalis-Ostryetum carpinifoliae*. On rather steep acclivities, and often in the crevices of rocks, there are relic forests of Illyrian dark pine *Pinetum illyricum*. The mountainous band is characterized by the presence of meadows and mountainous pasture-grounds on carbonates of endemic, south-Dinaric alliance *Oxytropoidion dinaricae* and *Jasionion orbiculate* (on silicates). Mountainous meadows belong to the endemic Dinaric alliance *Pancicion*. Communities that are the richest in terms of endemic and relic plant and animal species are those in the interstices of rocks, alliances *Amphoicarpion autariti*, *Amphoicarpion neumayeri*,

Edraianthion tenuifolii, communities on crumbled rocks Peltarion alliaceae, Bunion alpinae. Although fragmented, communities at low peat grounds in the sub-mountainous band of Caricon fuscae alliance, spring communities Cardaminio-Montion, and, at highest elevations the communities of Salicion retusae, also have great biological value.

Of the endemic and tertiary or glacially relic plant species in this area, the following have the greatest significance: Edraianthus sutjeskae, Campanula balcanica, Arenaria biflora, Cerastium dinaricum, Moehringia malyi, Aubretia croatica, Hesperis dinarica, Viola elegantula, Viola zoysii, Saxifraga caesia, Saxifraga prenja, Geum molle, Potentilla palustris, Oxytropis dinarica, Eryngium palmatum, Crepis dinarica, Pedicularis hoermaniana, Teucrium arduinii, Micromeria croatica, Knautia sarajevoensis, Achillea aizoon, Achillea lingulata, Amphoricarpus autariatus, Crepis bosniaca, Iris bosniaca, Kobresia myosuroides, Dactylorhiza bosniaca, Gymnadenia frivaldii, Pancicia serbica, Lilium bosniacum. The bushes and shrubs include: Daphne malyana, Daphne cneorum, Picea omorika, Pinus illyrica, Corylus colurna, Quercus daleschampi, Berberis illyrica, Dryas octopetala, Sorbus chamaemespilus, Petteria ramentacea, Cytisanthus radiatus, Genista ovata, Acer heldreichii, A. intermedium, Cervispina malyana, Arctous alpina, Viburnum maculatum, and other.

According to the proposed Red List of vascular flora for BiH<sup>3</sup>, the following species, to some extent endangered based on the IUCN categorization, can be found in this area: Picea omorika, Corilus colurna, Oxysiria dgyana, Cerastium decalvans, Moehringia malyi, Trollius europaeus, Hepatica nobiis, Ranunculus scutatus, Helleborus multifidus, Hesperis dinarica, Viola zoysii, Potentilla palustris, Daphne malyana, Picea omoica, Menyanthes trifoliata, Gentiana symphyandra, and other. The Management Plan for the NP Sutjeska (2002) states that three of the sensitive plants are currently commercially exploited on the territory of this National Park – Abies alba, Picea abies, and Acer pseudoplatanus.

Concerning animals, a significant genetic fund comprises representatives of a still pure line of creek trout Salmo trutta m fario, Salvelinus alpinus, Phoxinus phoxinus and other representatives of salmonids and ciprinids; the species of amphibians and reptiles (numerous species of Lecerta), viperides (Vipera berus bosniacus); a number of bird species, of which the most endangered are Crex crex and Tetrao urogalis. The specific value of fauna-diversity is reflected in over 36 mammals from 18 families. The following ones are currently very much endangered: Erinaceus erinaceus, Glis glis, Canis lupus, Liny inx, Lutra lutra, Capreolus capreolus, Rupicarpa rupicarpa and Ursus arctos. This area also features a number of butterflies, which represent an indicator of environmental quality.

Map of the Sutjeska NP and the wider area considered, indicating particularly sensitive and high value areas in terms of biodiversity, is provided on page 26. The marked sensitive areas represent areas with ecosystems of minor resilience towards anthropogenic impacts, as well as refuges and relic ecosystems. In the case of the Sutjeska NP, these are crevices, in higher sections, and canyons and forests in lower sections.

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<sup>3</sup> Šilić, Land Museum Gazette, PN, NS., 1992-95; 31: 323

### **Basic socio-economic characteristics**

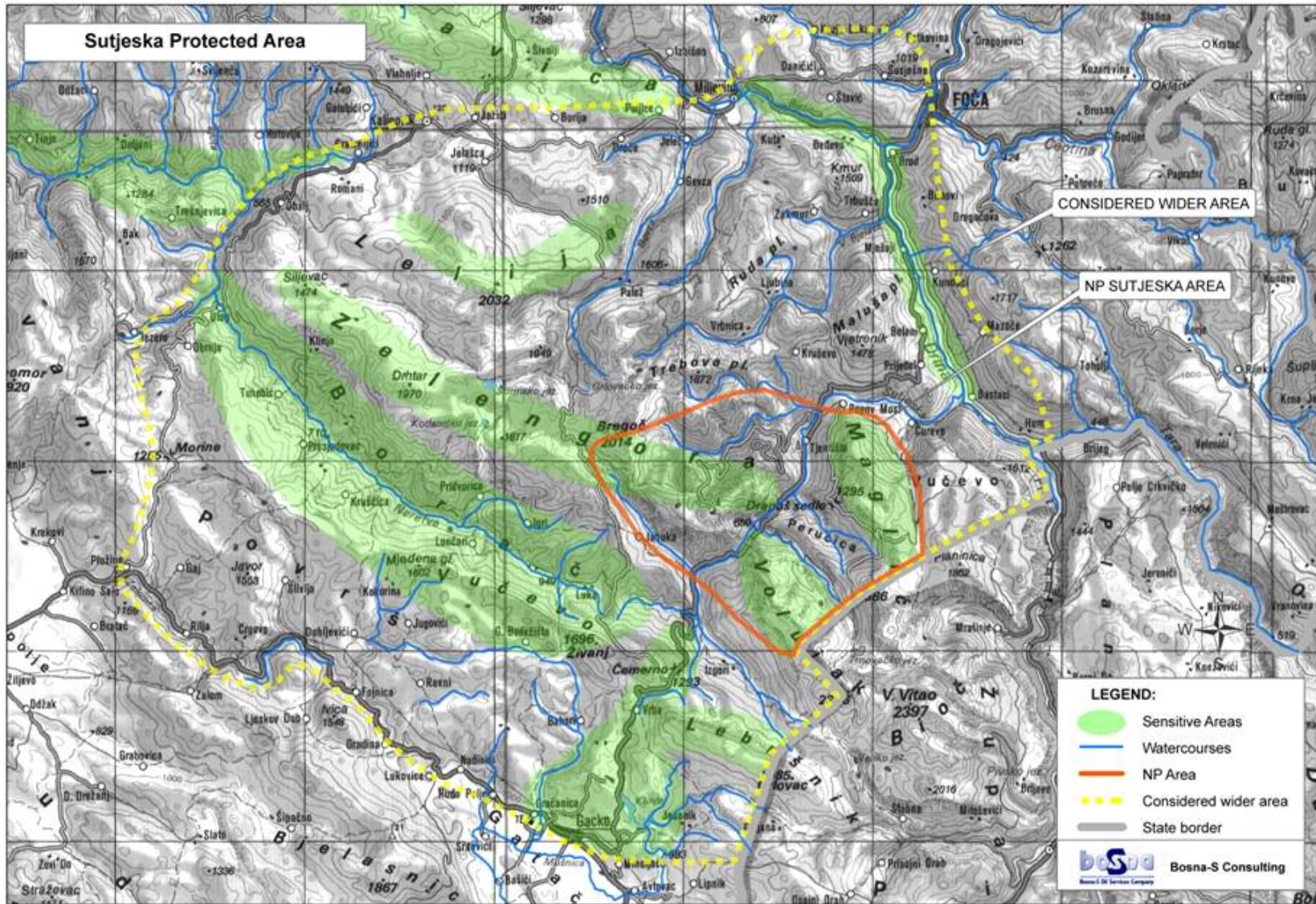
Forestry, as the main commercial activity, and, to some extent, agriculture (325 ha of arable soil, which is strictly controlled in terms of pesticide use and infrastructure construction), and animal raising (1,500 ha of meadows and pastures, which are used for the pasture of sheep and cows during summer), are the major economic activities in the area. The potential for the development of tourism is significant, but the existing infrastructure is underdeveloped.

The majority of the population (31%), consists of the elderly, while the next largest group is made up of persons between 19 and 35 years of age (21%). More than a half of the population is unemployed (69%). Among those who are employed in the wider surrounding of the NP, the majority (39%) are engaged in the sectors of trade and manufacturing.<sup>4</sup>

The center of the Sutjeska NP is the Tjentište settlement, which has been fully neglected over the past years when it comes to reconstruction and development. The lack of incentives necessary for tourism development in this area is evident.

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<sup>4</sup> Data from Social Assessment Report for Forest and Mountain PA Project, 2005



## KOZARA NATIONAL PARK

### Physical Characteristics

The Kozara NP was established in 1957. It is located at 16°45' eastern longitude and 45°05' northern latitude, in the northwestern part of the country – entirely within RS, currently covering an area of approximately 3,400 ha. Of this, around 3,000 ha are intended for commercial exploitation of wood, while approximately 430 ha have been reserved for tourism development. This national park is situated between the municipalities of Prijedor, Kozarska Dubica and Gradiška. In its wider surrounding there are the rivers of Sava (in the north), Vrbas (east), Una (north-west) and Sana (south-west), the hilly range of Malo Pastirevo (408 m) and Veliko Pastirevo (465 m), and farther towards Banja Luka, the Kozara Mountain (with the peaks of Mrakovica - 804 m and Projsa – 871 m). Northwards from Kozara, along the Sava River, there is the Prosara mountain (363 m), which represents the remains of the ancient Panonian massif. In the adjacency of the Kozara NP, there is a hunting ground of approximately 16,700 ha.

The climate of this area is moderate and of a rather favorable continental character. The average annual air temperature in the town of Banja Luka is 10.6°C, while the average precipitation at the nearby town of Prijedor is 913 l/m<sup>2</sup>.<sup>5</sup>

There is a remarkable wealth of surface water courses at the Kozara and Prosara Mountains. Over 70 permanent and occasional springs have been registered at Kozara, along with more than 60 creeks. Major quantity of this water flows down the Kozara slopes to the lower areas. The average rate of flow in the Sana River Basin, as measured at the water-measuring station of Prijedor, is  $Q_{av}=81\text{m}^3/\text{s}$ , reaching 800 m<sup>3</sup>/s (1970) and 600 m<sup>3</sup>/s (1972) during high water periods. While the quality of water in the Sana River, upstream from Prijedor, complies with the specified class II, downstream from Prijedor the situation is totally different (the quality of water is outside the specified class<sup>6</sup>). There are plans to construct two water reservoirs (accumulations) on the Mlječanica River, as well as to commence flood protection works and implement measures aimed at reducing alluvium on the Jablanica River.

Rocks of different geological eras and formations from the earliest Palaeozoic to the most recent Quaternary can be observed in the geological structure of the Kozara NP. The waterproof Eocene material, as the main structural material of the Kozara Mountain, causes complete drain of surface water to the lower areas. In the wider adjacency, northwards - towards the Sava River, there are phyllites and shales of the Carbon period of Paleozoic, and farther to the south, Miocene limestone, flysch, oligo-Miocene freshwater sediments, Cretaceous-Jurassic sandstones, mostly porous rocks, and significant structures of alluvium near Prijedor.

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<sup>5</sup> "Framework Waterworks Basis", Public Enterprise „Vodoprivreda Bosne i Hercegovine – Zavod za vodoprivredu, Sarajevo, 1994

<sup>6</sup> Based on Population Equivalent (PE) pollution load, water quality in BiH is categorized in classes I to V, class I being the least polluted

The most famous cultural-historical landmark of this area is the memorial complex Mrakovica. There are also some churches and monasteries in the wider area, including the Moštanica Monastery, one of the most beautiful in BiH.

### **Biological Characteristics**

The strong penetration of continental climate, highland relief and abundance of surface water, but also ground water in the surrounding lower areas, have contributed to rather specific flora and fauna in the area of the Kozara National Park. So far, approximately 1,000 species of vascular plants, as well as a substantially larger number of animals and microphytes have been registered here. In terms of ecological and landscape diversity, this area features rather developed forests of beech and fir, with lime *Abieti-Fagetum tilietosum argenteae*, forests of silver lime and fir *Tilio-Abietetum abietis* in peri-Panonian canyons (Moštanica River). Moving along the vertical profile, alternating flourishing forests can be observed on the north side: forests of white willow *Salicetum albae*, forests of willows and poplar *Salici-Populetum*, forests of red oak and gorse *Genisto elatae-Quercetum roboris* (on soils under strong influence of ground water). Outside the areas strongly influenced by ground water, there are communities of red oak and common hornbeam *Carpino betuli-Quercetum roboris*, forests of wild oak and common hornbeam, *Querco-Carpinetum betuli*, beech forests *Fagetum montanum*, beech forests on acidic soils *Luzulo-Fabetum*, fir and spruce forests *Abieti-Piceetum* in the coldest habitats, as well as forests of beech and fir *Abieti-Fagetum dinaricum*.

Moving up the warmer, southern and western slopes of the hilly band, there is apparent domination of the thermophilic communities of wild oak and cerris *Quercetum petraeae-cerris*, forests of dark ash and cerris *Orno-Quercetum cerris*, forests of downy oak and dark hornbeam *Querco-Ostryetum carpinifoliae*, forests of vetches/sweet vetches and wild oak *Lathyro nigrae-Quercetum petraeae*, locally endemic communities of grass-like iris and *Iridi graminifolii-Quercetum pubescentis*, as well as communities of heath and wild oak *Calluno-Quercetum petraeae*.

In terms of unique biological diversity, the various types of hydrophilic meadows, of the Molinion and Deschampsion alliance, and neutrophylic *Arrhenatherion* are very valuable. Still, the greatest significance is attributed to the acidophilus, thermophilic communities of *Festuco-Agrostion* alliance, and the thermophilic communities of the *Mesobromion erecti* alliance. Particularly valuable habitats in the lowland areas are the swamp-alliance of *Phragmition*, *Mognocaricion* and *Glycerio-Sparganion*.

The plant species of specific value for the Kozara NP's biodiversity are *Iris graminea*, *Iris florentina*, *Leucojum aestivum*, *Tilia argentea*, *Pinus nigra*, *Pinus silyvestris*, *Calluna vulgaris*, *Helleborus odorus*, *Gentiana cruciata*, *Centaurea pannonica*, *Dianthus croenthus*, *Dianthus* sp. Besides the flora, there a large variety of mushrooms can be observed in this area. The Basidiomycota are dominant, especially during the autumn months.

The most significant species of autochthonous wild animals are: boar, roebuck, wild rabbit, wildcat, fox, badger, pine marten, stone marten, squirrel and weasel. During migrations, brown bear, wolf and deer can also be observed in the ecosystems of Kozara. They usually

come from the neighboring mountainous areas. There are also habitats of many bird species in the Kozara's ecosystems, such as: the thrush nightingale, the great woodpecker, the goshawk, the sparrow hawk, the wood pigeon, the stock dove, the turtle dove, and others. Reptiles characteristic of this area are the copperhead snake, the Montpellier snake, the adder and the horned viper, as well as mountain lizards, and, when it comes to amphibians, salamander and different frogs. The rainbow trout is often found in the cold creeks and smaller rivers of Kozara. The group of invertebrates is characterized by a high diversity. When it comes to crickets and grasshoppers, this area is characterized by the significant endemic species of *Ectobius balcani* Rine *Bicolorana bicolar* Phil, *Miramela bos. Milish*, *Poecilimon ornatus*.

Map of the Kozara National Park and the wider area considered, indicating particularly sensitive and high value areas in terms of biodiversity, is provided on page 30. The marked sensitive areas correspond primarily to those featuring fir at the Kozara Mountain, as well as Panonian forests and swamp habitats in the surrounding lower areas.

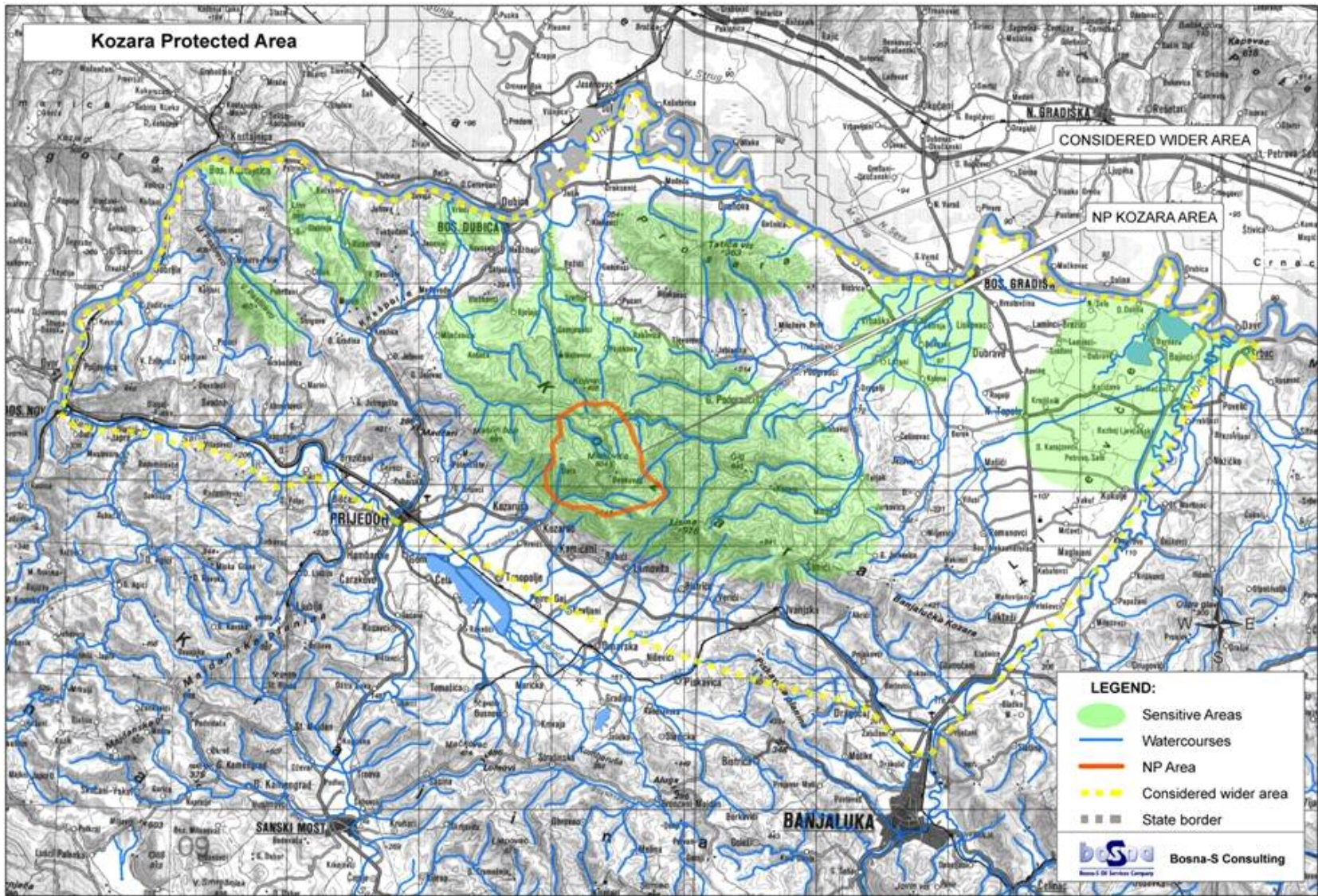
### **Basic socio-economic characteristics**

Population older than 56 years of age makes 29% of the total population of this area. The rate of unemployment is rather high (73%) in the wider area. The majority of employed persons work in the sectors of servicing and trade (together amounting to over 60%). Conditions for development of agriculture are currently weak, primarily due to the poor sales prices of agricultural products. Owing to the closeness of urban settlements, the wider area of the National Park has a good potential for development of educative and recreational activities.<sup>7</sup>

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<sup>7</sup> Data from Draft Social Assessment Report for Forest and Mountain PA Project, 2005





## FOREST RESERVATIONS LOM AND JANJ

### Physical Characteristics

Forest Reservation Lom was established in 1956, and it belongs to the Lom-Klekovača unit of the Forest-economic Area of Petrovačko. It represents a strict natural reservation without anthropogenic influence. It currently covers an area of 298 ha, with a protection band of 20 m, and it is located between 16°27' and 16°30' eastern longitude and between 44°27' and 44°28' northern latitude in the western part of the country, entirely within RS. This area extends between the altitudes of 1,250 and 1,522 m. It belongs to the Klekovača Mountain (1,961 m), precisely to the Lom Mountain Massif. In its wider surrounding there are the springs of the Sana and Unac Rivers, the Una River, and the mountains of Lunjevača (1,707 m), Osječenica (1,795 m), Srnetica (1,379 m), Babija (1,465 m) and Jadovnik, (with its peak Lisin at 1,656 m), as well as towns of Petrovac and Drvar. This area used to have a railway from Lanište to Srnetica and Drvar. Near the settlement of Čuppa, there is the Čuppa accumulation, which was once used by the former cellulose factory in Drvar. The traffic network and access to the Lom area are relatively good when it comes to main roads, while the local roads are insufficient and inadequately maintained.

The average annual air temperature is between 5°C, in the lowest areas, and 3.5°C at the elevation of 1,522 m. The average annual precipitation is approximately 1,600 mm.<sup>8</sup> Continental climate is dominant.

Forest reservation Lom is located within the western-Bosnian limestone and dolomite area of inner Dinarides. The geological structure of this area features rocks of different formations. Between the Palaeozoic anticline at north-eastern and Triassic-Jurassic at south-western border of the Lom area, there is a large Cretaceous synclinorium of the mountains of Grmeč, Srnetica, Osječenica and Klekovača. In the depression of Petrovac there are Triassic dolomites belonging to the Upper Cretaceous. Karst and absence of permanent surface water courses is typical of the Lom NP. Actually the prevailing karst structures are the very reason that this area lacks permanent surface water. It is only at the border of the reservation that two springs are found, of which one is the spring of the Lom River. The primeval forest's character of the reservation is characterized by a significant presence of row humus (lignohumus), which provides for the spreading of specific low-growing plants.

In the wider adjacency, close to the settlement of Preodac, there is a rather old stone septum-dam, which, in the past, used to direct the water of the Unac River to mills and washing facilities. The town of Drvar is a significant historical site from the Second World War.

Janj Forest Reservation was established in 1954, and it is located between 17°15' and 17°17' eastern longitude, and between 44°07' and 44°10' northern latitude, in the area of Šipovo municipality, entirely within RS. It currently extends over an area of 295 ha (including

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<sup>8</sup> "Framework Waterworks Basis", Public Enterprise „Vodoprivreda Bosne i Hercegovine – Zavod za vodoprivredu, Sarajevo (1994)

a strictly protected core of 57.2 ha) across the western slopes of the Stolovaš Mountain, between the altitudes of 1,180 and 1,510 m. This area belongs to the Gornji Janj unit of the Forest-economic Area of Šipovsko. In its wider surrounding, there is the Pliva River with the Pliva Lake (Plivsko jezero), the rivers of Vrbas, Sana and Janj, and the mountains of Lisina (1,333 m), Podovi (1,084 m), Čemernica (1,631 m), Vitorog (1,906 m), Hrbina (1,543 m) and Crni Vrh (1,514 m). The physical features of the wider area include the closed karst valleys, of which the most important is the Čardak Meadow, and karst fields (Poljas), of which the largest is the Kupreško Polje, where substantial quantities of atmospheric water are collected and flow farther underground towards the springs of the Sana, Pliva, and Janj Rivers, as well as towards the near-by Glamočko Polje. This area also encompasses the borderline of the Black Sea and Adriatic Sea Basins, which is not permanent or spatially defined since it depends on the precipitation and quantity of groundwater. According to the geological-tectonic structure, individual authors suggest different locations of this borderline. Some of them believe that the whole Glamočko Polje belongs to the Adriatic Basin, while others claim that the borderline of the two Basins actually transverses it. The network of existing main and local roads provides relatively good access to this area.

Average annual air temperature is between 5°C (Ivik peak: 1,151 m) and 6.5°C (in the lowest sections). Average annual precipitation is approximately 1,200 mm.<sup>9</sup> The climate is mountainous and submountainous of a moderate continental type.

Like the Forest Reservation Lom, Forest Reservation Janj is located within the western-Bosnian limestone and dolomite area of inner Dinaric mountains. In geological terms, the area is characterized by a dominant presence of dolomite rocks of Triassic. It is because of dolomite, that carbonates are present in the soil. This area also lacks surface water courses (the closest spring is at a distance of some 200 m from the north-west border of the Reservation). Substantial presence of the characteristic raw humus, as a result of primeval forest's character of the reservation, provides for the wide spreading of low-growing plants.

The cultural and historical characteristics of the wider area include the remains of the medieval structures, the monastery of Glogovac and Hadžidedo's Rock. Currently there are no infrastructural objects at either of the two forest Reservations.

### **Biological Characteristics**

The primeval forests of beech, fir and spruce contribute to the fundamental biological value of these Reservations. Depending on the relation of the dominant species, the following communities can be distinguished: forests with beech and fir *Abieti-Fagetum dinaricum*, forests of fir and spruce *Abieti-Piceetum illyricum*, and mixed forests of beech and fir, with facieses of spruce *Abieti-Fagetum piceetosum abietis*. In these communities, the building species rise up to 40 m in height, and they provide the largest production of biomass. Janj Reservation has the largest quantity of wood mass – 1,037 m<sup>3</sup>/ha in the core-area of the Reservation and an average of 818 m<sup>3</sup>/ha with regard to the entire area of the Reservation. In the case of the Lom Reservation, the density of wood mass amounts to 735 m<sup>3</sup>/ha, while

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<sup>9</sup> "Framework Waterworks Basis", Public Enterprise „Vodoprivreda Bosne i Hercegovine – Zavod za vodoprivredu, Sarajevo (1994)

the average of the whole Reservation amounts to 729 m<sup>3</sup>/ha. The share of the deciduous trees in the area of the Janj FR is 22%, while with 32% this share is somewhat higher in the Lom FR.<sup>10</sup>

The flora of high biological value in these ecosystems includes the *Lilium martagon*, *Vicia oroboides*, *Dentaria enneaphyllos*, *Gentiana asclepiadea*, *Saxifraga roundifolia*, *Listera cordata*, *Goodyaera repens*, *Platanthera bifolia*, *Galanthus nivalis*, *Polygonatum latifolium*, and over 50 kinds of macro-mycetes.

The ecosystems of Janj and Lom reservations still represent permanent or occasional resort and shelter to many species of wild animals, of which many are endangered. Among them there are the brown bear (*Ursus arctos*), the wolf (*Canis lupus*), the lynx (*Lynx lynx*) and the black cock (*Tetrao urogallis*). The endangered birds include the hazel hen (*Tetrastes bonasia* L.), the goshawk (*Accipiter gentilis* L.), the falcon (*Falco peregrinus* T.), and the maned pigeon (*Columba palumbus* L.- a migratory bird which nests in these areas). Other mammals present in the area of the Reservations are the roe deer (*Capreolus capreolus* L.), the rabbit (*Lepus europaeus* Pall.), the dormouse (*Glis glis* L.), the fox (*Vulpes vulpes* L.), the pine marten (*Martes martes* L.), and, occasionally, the wild boar (*Sus scrofa* L.).

Maps of the Janj and Lom Forest Reservations and the wider areas considered, indicating particularly sensitive and high value areas in terms of biodiversity, are provided on pages 34 and 35. The marked sensitive areas primarily relate to sensitive and valuable forests, and highland meadows.

### **Basic socio-economic characteristics**

The whole area of the Lom and Janj FR Forest Reservations is on average under-populated. The distance between the two areas is approximately 30 km. The development of tourism is limited due to the sensitivity and strict regime of forest protection.

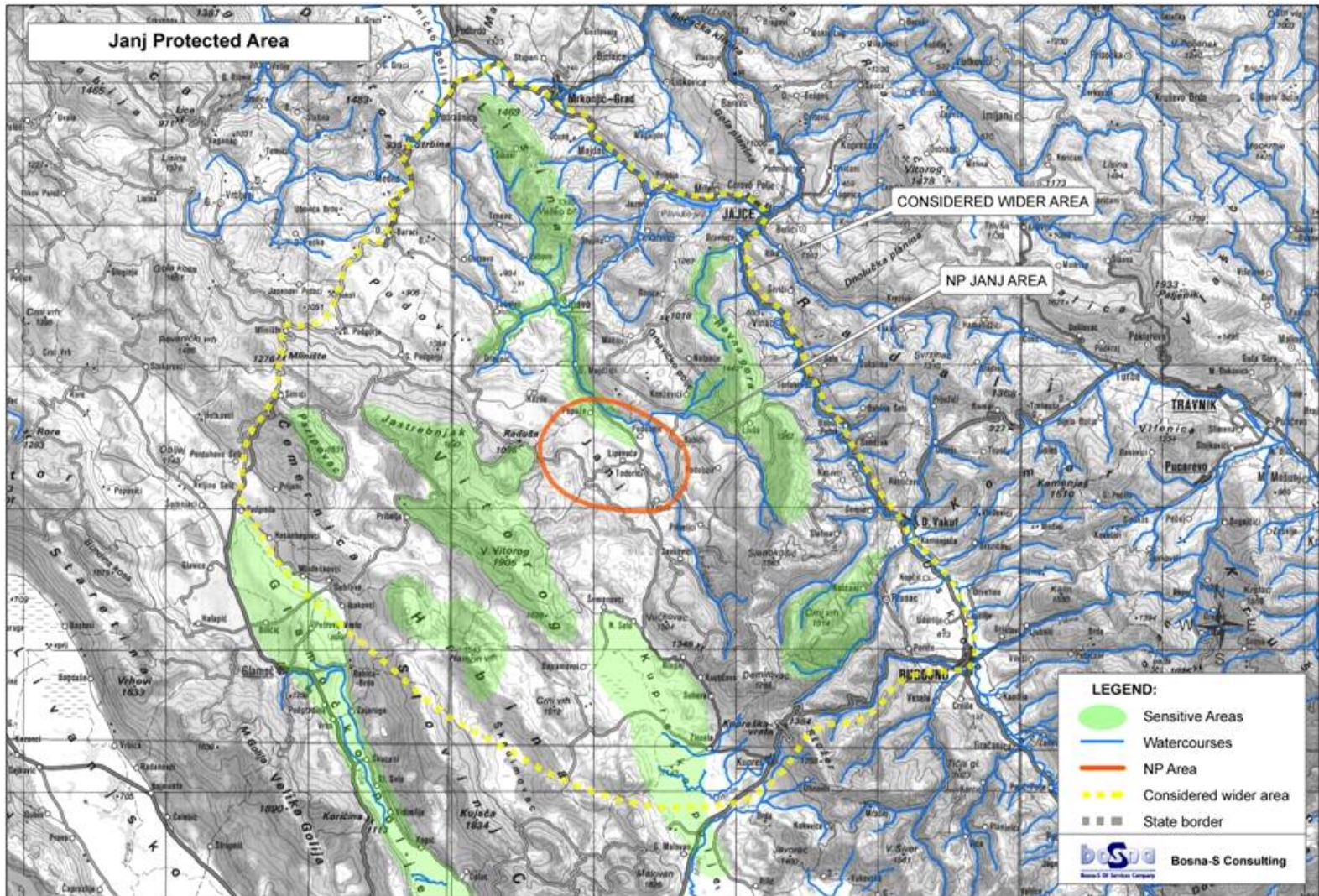
In the wider surrounding of the Lom FR, the majority of the population is involved in forestry. The rate of unemployment amounts to 57%. Population older than 56 years of age makes up the largest age group (34%), while the gender structure is balanced. According to the Study FR Janj and Lom (dr. Zoran Maunaga et al, 2001) the potential for the development of hunting tourism, agriculture and cattle breeding in the area of Drini□municipality is evident.

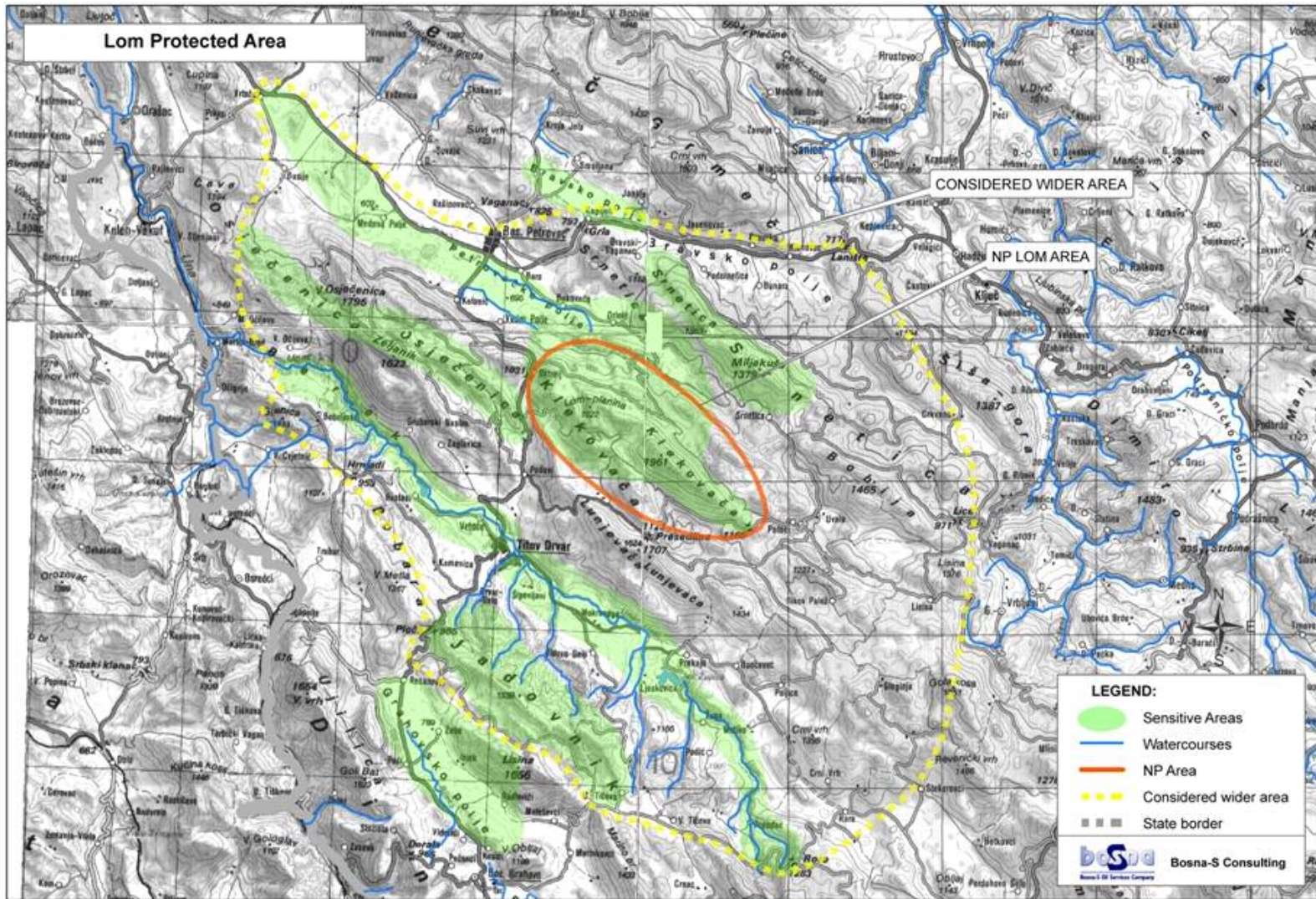
67% of the population is unemployed, and those employed work in servicing sector (18%), while others are involved in agriculture, forestry and manufacturing. With respect to the age breakdown, the wider area of Janj Forest Reservations (FR) differs significantly from other project areas. The population of the age group 19 – 35 makes 28%, while persons younger than 18 years of age make 24% of the total population.<sup>11</sup>

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<sup>10</sup> Study on Forest Reservations Janj and Lom - Dr. Zoran Maunaga et al (2001)

<sup>11</sup> Data from Social Assessment Report for Forest and Mountain PA Project, 2005





## UNA NATIONAL PARK

### Physical Characteristics

According to the Feasibility Study for the Una National Park (Elektroprojekt, 2005), the proposed National Park would have an area of 19,800 ha in total, of which approximately 13,500 ha would be under strict protection, while 6,300 ha would be dedicated to controlled development. It would extend between 44°49' and 44°23' latitude, and between 15°52' and 16°19' longitude within the Una-Sana Canton of FBiH. It would include the upstream section of the Una River, i.e. a 0.5 to 8.5 km wide strip from the settlement of Martin Brod to the settlement of Ripač. The section from the town of Kulen Vakuf to the settlement of Klisa features an extended (wider) valley of the Una River. Downstream from Klisa, the Una River enters the canyon traversing the border between BiH and Croatia. On the right side of this section, there is the Ljutoč Mountain (1,168 m), as well as the Štrbački Buk, a waterfall of distinctive beauty. Further downstream from the border crossing Ripač, the Una River flows mostly through the canyon, which ends just upstream from the settlement of Ripač, where the Una River enters the valley towards the town of Bihač. Elevation of the Una River is approximately 320 m at Martin Brod, and 214 m in Bihač. The rate of flow of the Una River is  $Q_{av}=52.3 \text{ m}^3/\text{s}$  in Martin Brod, where it mouths the Unac River. In its further stream up to the settlement of Ripač, the Una River has no tributaries, except for about fifteen springs on the right bank.

The network of roads is partially paved. The railway Bihač-Split passes through the project area. The largest settlements are Martin Brod, Kulen Vakuf, Orašac, Ripač and Pritoka.

This area has mountainous, sub-mountainous and moderate continental climate, with some influence of the Mediterranean climate. Average annual precipitation is above 1,300 mm. Average temperatures are within the range from 10.4°C in sections under the influence of moderate continental climate, and 8-10°C in sections with sub-mountainous climate, down to 4-6°C in sections with mountainous climate.<sup>12</sup>

In terms of geological structure, downstream from Martin Brod, towards Ripač, there are mostly rocks of Upper and Mid Triassic, almost exclusively limestone, lias-limestone, freshwater oligo-Miocene sediments and, alluvium. This area is characterized by unique karst formations, as well as a large number of springs (according to Feasibility Study for the Una National Park by Elektroprojekt, 2005, seven springs yielding over 100 l/s, seven yielding between 10 and 100 l/s, and 47 with the yield between 1 and 10 l/s). The features of the Una River include the length of its travertine (limestone rock formed by the sedimentation of calcium carbonate on the river bed), as well as a number of related phenomena of high value (almost exhausted stock of porous limestone rock tufa, waterfalls, very old sediment travertine barriers of 0.5 to 1.0 m in height, and travertine islands, etc.), unusual shape of valleys (at Martin Brod, Kulen Vakuf, Klisa and Lahova), canyon-like ravines (upstream and downstream of Martin Brod, downstream from Štrbački Buk). A part of the Unac River, which passes through the area proposed for the establishment of a protected area, also features

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<sup>12</sup> Feasibility Study for Una National Park – Elektroprojekt, 2005

characteristic karst structures. This river passes through a canyon in this section, where it sinks and then surfaces again in several places. The ultimate of these springs is the Crno Vrelo Spring, which is characterised by distinctive beauty. Other characteristics of this area include a large waterfall of Una close to Martin Brod, cave in Martin Brod, spring of the Ostrovica River near Kulen Vakuf, and the Štrbački Buk waterfall of the Una River. In the wider surrounding, there are also the springs of the Bestašica River, near Drvar, and the Klokot River near Bihać, rainforest at Plješevica Mountain (1,657 m), as well as the spring of the Una River.

The structures of cultural and historical significance in this area include old forts in the Una Valley and watermills. In the wider area, there are archaeological sites close to Bihać (Bihać, Ripač, Privilica) and Drvar (Drvar, Bastasi). There is a high concentration of suspected unexploded land mines in this area, particularly around Kulen Vakuf, Ripač, Golubac, Orljani, etc. Therefore, the BiH Mine Action Center (MAC) must be consulted regarding site specific up-to-date information prior to commencement of any physical project activity.

### **Biological Characteristics**

Besides the high geological and hydrological diversity, the watershed of the Una River is characterized by a high biological and ecological diversity. The main indicator of the unique ecological diversity, including the great diversity of landscapes, can be found in the presence of biocenoses containing a number of endemic and relic species of plants and animals. These are: communities in canyon refuges, in cracks of rocks of the Mediterranean alliances *Edraianthion*, western Dinaric community of *Micromerion croaticae* alliances, as well as the alpine community of *Potentillion caulescentis* alliances. The communities crumbled rocks of *Peltarion alliaceae* and *Bunion* alpine alliances, as well as thermophyllic forests and underbrushes of *Quercion cerris*, *Seslerio-Ostryon*, *Aceri obtusasti-Fagenion*, and *Fagenion illyricae* alliances are also characteristic. The habitats at the waterfalls substantially differ from other freshwater habitats. The tufa structures also represent specific habitats.

The floristic features include the presence of a range of vascular plants of endemic and steno-endemic character, such as *Campanula pyramidalis*, *Campanula unenisis*, *Campanula wettsteinii*, *Iris illyrica*, *Edraianthus tenuifolius*, *Iris bosniaca*, *Calianthemum* sp., *Gentiana symphyandra*, *Sesleria tenuifolia*, *Festuca bosniaca*, *Cytisanthus radiatus* and other. Most of the area planned for the national park is covered by different types of forests.

The most significant animals present in the area are a large number of salmonide fish species, crab, water insects from groups of Plecoptera, Trichoptera, Ephemeroptera, Psychodidae, as well as Mollusca and large mammals. The fauna rarities include the fish *Proteus anguinus*, inhabiting many caves in this karst area.

Map of considered possible Una National Park location, indicating particularly sensitive and high value areas in terms of biodiversity, is provided on page 37. The marked sensitive areas primarily relate to the sensitivity of the Una River itself, as well as forests and highland vegetation in the areas of Osječnica and Jadovik.



## **Basic socio-economic characteristics**

The whole area of the proposed national park is relatively scarcely populated. There are approximately 10,000 residents in the area planned for the establishment of the protected area.<sup>13</sup>

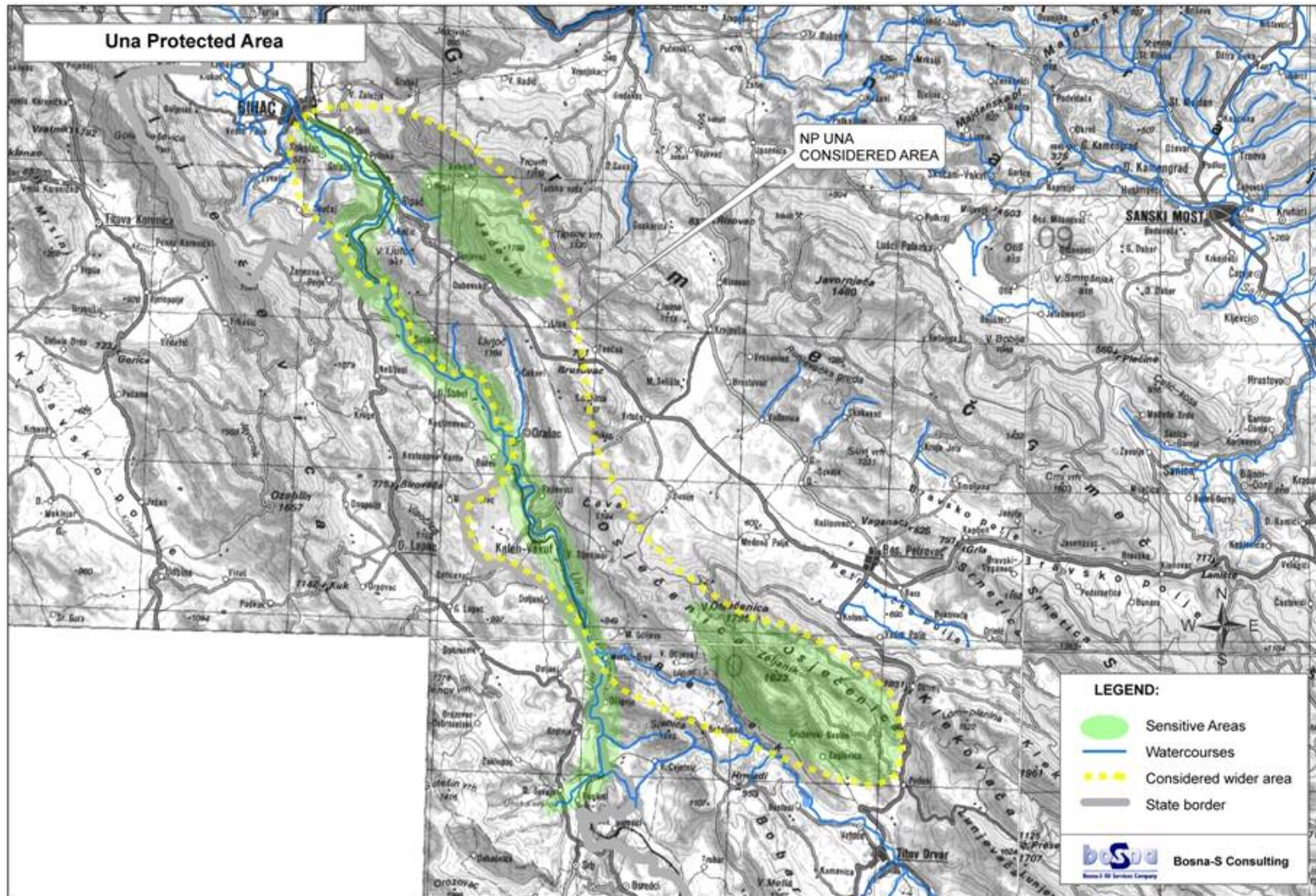
In the wider area, persons older than 56 make 30%, and those younger than 18 make 24% of the population. Rate of unemployment is over 60%.<sup>14</sup> The largest part of the employed population works in the sectors of servicing, science, health and culture. According to Feasibility Study for the Una NP (Elektroprojekt, 2005), only 30% of the land is cultivated. The residents are strongly involved in fishing, hunting and forestry.

*Remark:* even though the FBiH Government has developed a Law on Una National Park and forwarded it to the Parliament, the Law has not been subject to consideration by the Parliament yet.

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<sup>13</sup> Feasibility Study for the Una National Park, Elektroprojekt, 2005

<sup>14</sup> Data from Social Assessment Report for Forest and Mountain PA Project, 2005



## **BJELAŠNICA-IGMAN-TRESKAVICA-VISOČICA NATIONAL PARK**

### **Physical Characteristics**

The territory of Igman-Bjelašnica-Treskavica-Visočica, covering 82,000 ha, was declared the area of specific interest by the Parliament of FBiH in 2004. This area stretches between 17°58' and 18°24' longitude, and between 43°30' and 43°50' latitude, southwards from Sarajevo, within the Sarajevo and Herzegovina-Neretva Cantons of the FBiH. Large mountains in this area include Igman (Crni vrh 1,804 m), Bjelašnica (Observatory 2,066 m - Hranisava 1,964 m - Krvavac 2,066 m), Treskavica (Đokin toranj 2,086 m), Visočica (Đamija 1,967 m), and Crni Vrh (1,788 m). One of the main water courses is the Čeljeznica River, which springs near the settlement of Trnovo and flows in the direction South-East/South-West towards the Sarajevsko Polje, where it discharges into the Bosna River. In the south-western part of the wider surrounding, there is the Neretva River. From its spring in the area of Čemerno, this river flows in the direction south-east/north-west, towards Konjic, where it makes a turn southwards. On the left side of Neretva, there is the Boračko Lake, which drains into the Šištica River, and the latter further into Neretva. The Rakitnica River flows from the area of villages beneath the Bjelašnica Mountain, Tušilo and Umoljani, along a deep canyon reaching over 800 m in depth close to Blace, ultimately discharging into the Neretva River. The section of the Neretva River from Glavatičevo to Konjic currently presents an attractive rafting route. There are plans to construct a dam and a hydroelectric power plant in the area of Glavatičevo, within the project "Upper Neretva". Major part of this area is surrounded by the main road Sarajevo-Konjic-Mostar, and the road from Sarajevo to Foča and Kalinovik. However, the mountainous massifs within this area and the belonging settlements lack good local roads.

Climate of this area is mountainous and sub-mountainous, of moderate continental type, with variations from relatively mild climate influenced by the Mediterranean in the valleys of the South-West, to rather sharp climate at mountain peaks, with temperatures of sinking to -42°C. Average annual temperature in the nearby city of Sarajevo is 9.6°C, and average annual precipitation is 931 l/m<sup>2</sup>.<sup>15</sup>

All the four mountain massifs of this area were formed mostly of the Triassic limestone, with dolomite in the West. This area encompasses the mountain massifs between the altitudes of 495 m (Vrelo Bosne, at the rim of the area) and 2,086 m (Đokin toranj on Treskavica), with wide-spread karst characteristics. The mountain massifs within this area are practically without any surface water. However, with the karst make-up, presence of groundwater reservoirs, which feed the springs at the rim of the massif and the water bodies in the alluvion of Sarajevsko Polje, is significant.

This area has been inhabited for a long time, and therefore features the presence of remains from various historic eras, including the Roman period. The strong presence of unexploded landmines, which remained after the latest war, represents a major problem of this area. Similar to the situation in the proposed Una NP, suspected unexploded land mines are

<sup>15</sup> "Framework Waterworks Basis", Public Enterprise „Vodoprivreda Bosne i Hercegovine – Zavod za vodoprivredu, Sarajevo (1994)

widespread in this area, in particular on the Mountains of Igman and Treskavica, along the Neretva River, etc. Therefore, the BiH Mine Action Center (MAC) must be consulted regarding site specific up-to-date information prior to commencement of any physical project activity.

### **Biological Characteristics**

In geo-morphologic terms, the area of Igman-Bjelašnica-Treskavica-Visočica is complex and diversified, and it consequently also has rich flora and fauna. Many communities, of which some appear in bands while others do not, are characteristic of this area's ecological diversity. Moving up the northern slopes of this area, one can observe regularly alternating oak-hornbeam forests *Querco-Carpinetum illyricum*, beech forests *Fagetum moesiaceae montanum*, beech-fir forests *Abieti-Fagetum illyricum*, sub-mountain forests of beech and maple *Aceri-Fagetum subalpinum*, lonicero pine *Pinetum mugii dinaricum*. The feature characteristic of this area only are the primeval forests of beech, fir and spruce, on silt in the area of Igman and Bjelašnica. The most significant communities which do not appear in bands are alder forests *Alnetum glutinosae*, fragments of willow *Salicetum albae-fragilis*, forests of dark hornbeam and downy oak *Querco-Ostryaetum carpinifoliae*, beech and Bosnian maple forests *Aceri obtusati-Fagetum moesiaceae*, mountainous forests of maple and ash *Aceri-Fraxinetum excelsioris*. The "frost" forests of spruce in the region of Malo Polje and Veliko Polje on Igman (*Piceetum abietis inversum*), the spruce and fir forests *Abieti-Piceetum*, and, at the outskirts, the forest of silver pine with spruce *Piceo-Pinetum silvestris*, represent a special phenomenon. Some of these forest types have suffered huge losses during the recent years due to anthropogenic activities.

The sub-mountainous and mountainous band is characterized by abundant communities of mountainous pasture-grounds or meadows on carbonates from the endemic Dinaric alliance *Seslerion tenuifoliae* and *Festucion bosniacae*, and farther southeast, the community of *Oxytropidion dinaricae* alliance. In colder habitats, there are the *Caricion Ferrugineae* alliances, which add on to the communities of mountainous pasture-grounds alliance *Panicion*.

The southern side, with its unique, deep canyons and numerous cliffs and crumbled rocks, features poly-dominant communities in the canyons (refuges of tertiary flora, fauna and vegetation), of which the most significant are *Aceri-Tilietum mixtum*, *Seslerio autumnalis-Ostryetum carpinifoliae*, *Aceri-Ostryetum carpinifoliae*, forests of *Pinetum heldreichii*, *Pinetum nigrae*, and the communities with *cerris Querquetum cerris mediterraneo-montanum*. As the peaks of these mountains used to be covered with snow, there are fragments of communities *Salicetum retusae*

Interstices of rocks and crumbled rocks have the highest presence endemic and relic species. They feature numerous endemic communities from the Dinaric alliance *Amphoricarpion autariti*, *Micromerion croatica*, *Saxifragion pnnjae*, *Bunion alpine*. The floristic specifics and the uniqueness of this area are reflected in the many plants, animals and mushrooms. Among those, many are currently endangered, vulnerable and rare.

The plant species contributing to the specific characteristics of this area are *Gentiana dinarica*, *G. symphyandra*, *Saxifraga prenja*, *Gentianella crispara*, *Potentilla persicina*, *P. clussiana*, *Moltkaea petraea*, *Peucedanum neumayeri*, *Lilium cattaniae*, *L. bosniacum*, *Pinus heldreichii*, *Corylus colurna*, *Euphorbia hercegovina*, *Minuartia bosniaca*, *Dianthus prenjus*, *D. petraeus*, *Silene sendtneri*, *Aquilegia dinarica*, *Helleborus hercegovinus*, *Ranunculus scutatus*, *Barbarea bosniaca*, *Plantago reniformis*, *Viola elegantula*, *V. biflora*, *Acer intermedium*, *Rhamnus illyrica*, *Dryas octpetala*, *Oxytropis dinarica*, *Genista dalmatica*, *Petteria ramentacea*, *Daphne laureola*, *Panicum serbica*, *Opoanax hironium*, *Atamantha haynaldi*, *Soldanella alpina*, *Onosma stellulata*, *Veronica saturejoides*, *Moelampyrum hoermannianum*, *Micromeria thymifolia*, *Asperula hercegovina*, *Scabiosa silenifolia*, *Campanula hercegovina*, *Achillea abrotanoides*, *Amphoricarpus autariatus*, *Orchis bosniaca* and other.

Concerning animals in this area, the characteristic and also very endangered ones include the brown bear (*Ursus arctos*), the wolf (*Canis lupus*), weasel (*Mustela nivalis*), the lynx (*Lynx lynx*), *Capreolus capreolus*, *Rupicapra rupicapra*, and many *Rhopalocera* species. When it comes to fish, the most important is *Salmo trutta m. fario*, which has preserved its original genetic-fund in the mountain creeks and rivers of this area.

Map showing the possible location of the Bjelašnica-Igman-Treskavica-Visočica National Park, and the wider area considered, indicating particularly sensitive and valuable sections in terms of biodiversity is provided on page 43. This relates to the sensitivity and high value of rare high mountain forests in the case of Bjelašnica, high mountainous ecosystems above forests in the case of Visočica, glacial lakes in the case of Treskavica, and inverse forests in the case of Igman. Each of these areas also generally hosts sensitive, endangered or rare forests, plants, mammals and birds, as well as sensitive habitats.

### **Basic socio-economic characteristics**

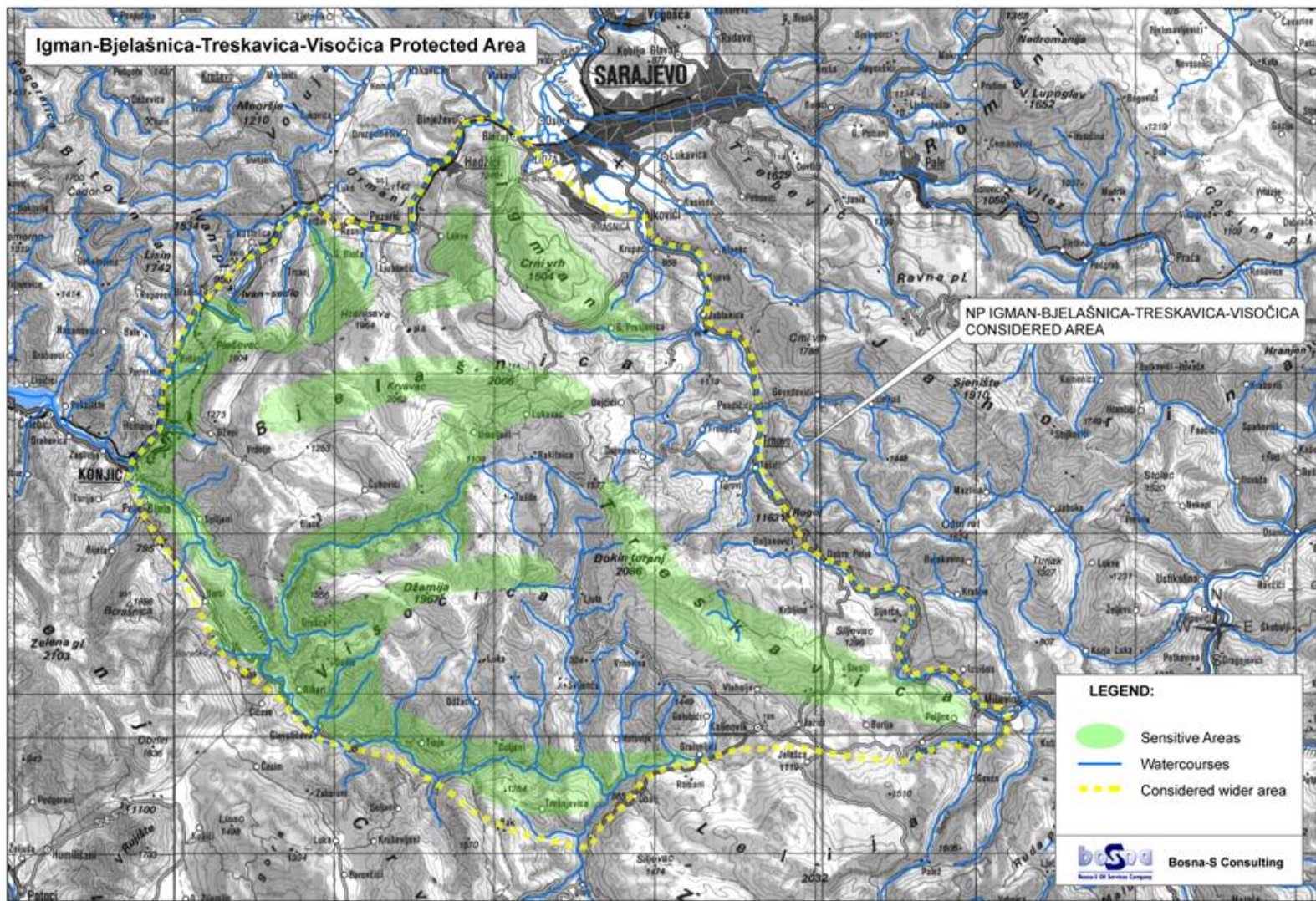
Residents of the mountain settlements are mostly involved in cattle breeding, but also produce dairy products of high quality. This area has a large potential for development of tourism.

Population within the age group 19 – 35 makes up 25%, while those older than 56 make up 24% of the total population. Gender structure is balanced. Unemployment rate is as high as 77%, and only 50% of the population has regular income. Among the employed ones, the majority work in the wider area, in the sector of services or in state institutions.<sup>16</sup>

*Remark:* new feasibility study for Bjelašnica-Igman-Treskavica-Visočica protected area was not finalized/available during the preparation of this document, and it has therefore not been considered here.

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<sup>16</sup> Data from Social Assessment Report for Forest and Mountain PA Project, 2005



## OTHER

Though to a varying extent, there are similar threats to biodiversity in all the project areas considered. These include uncontrolled and excessive logging, hunting and fishing, overexploitation of pastures, use of pesticides, improper disposal of hazardous waste, unexploded land mines remaining from the last war, and discharges of untreated wastewater.

BiH has not adopted a national Red List of endangered species, and no official inventories of wildlife have been compiled yet. Therefore precise quantification of habitats or species was not possible at the time of the preparation of this document. In view of this, it will be necessary to conduct as soon as possible thorough research activities, results of which will then represent a basis for proper monitoring of biodiversity.

## PROJECT DESCRIPTION

### General

The project-financed activities will range from developing and implementing management plans in the existing PAs, and analyzing options for their expansion, to establishing new PAs. In order to achieve local support, the project will provide incentives through a Small Grants Program for residents based near the PAs to either actively engage in conservation and sustainable land management, or get compensation for any losses occurring due to changes imposed with the implementation of the project.

The project comprises the following components:

*1. Physical Improvement of Existing Protected Areas, and Establishment and Operationalization of Critical New Priority Areas*, financing development and implementation of new management plans emphasizing ecosystem approaches and approaches for participatory land use planning, new „soft“ infrastructure, and limited small-scale building rehabilitation, necessary for improving the operations of existing PAs or for the newly created PAs. In this context, the currently known activities on individual project locations are explained in the following sections. In addition, the Project will finance some limited goods for PAs operation, technical assistance, support for improvement of tourism capacity, promotion and marketing activities, and assist with introduction of a standardized visitor fee structure for individual PAs.

*2. Strengthening of Capacity at Local, Entity and State Levels for Biodiversity Conservation and Sustainable Land Use Practices*, which will finance capacity building, learning and skill development at local, Entity and State levels in order to strengthen the institutions responsible for planning, establishment and management of PAs and to ensure the sustainability of the expanded PA network. Additional support will be aimed at building the institutional and technical capacity to access the different EU funding programs and instruments to finance nature conservation once BiH will become eligible to take advantage of these funds. In addition to the biodiversity monitoring system, the Project will under this component establish a Monitoring and Evaluation (M&E) system, based primarily on the GEF Protected Area Management Tracking Tool for Biodiversity. Component 2 also finances Project management and operating costs.

3. *Generation of Alternative Rural Livelihood Opportunities through Wise Multiple-use of Protected Areas*, which will provide financing to establish and operate a Small Grants Program (SGP) to support stakeholders living in and around PAs in small-scale tourism development activities directly or indirectly contributing to biodiversity conservation, and to provide incentives for stakeholders to change current unsustainable land use practices having adverse impacts on the natural resource base in or adjacent to the PAs and pose a threat to biodiversity. Sub-projects funded under the SGP will be targeted towards developing new livelihood options which promote ecologically friendly tourism and improve land use practices in support of the Project's overall objective of increasing PA sustainability. Sub-projects could include small-scale waste management and recycling initiatives, habitat restoration, alternative energy promotion, environmental and cultural education, ecotourism programs and facilities, and community-based monitoring. To ensure sustainability of the SGP, the Project will help beneficiaries with business planning advice, market research, and links to other tourism or rural development initiatives.

None of the Project components requires involuntary displacement of residents. Concerning all the considered project locations, it is obvious that the project is actually aimed at improving the environmental situation. In the case that no project activities would be implemented, due to insufficient management capacity, the already unsustainable practices of natural resources use would be continued and the magnitude of the present negative impacts would gradually increase.

### **5.1.1 Sutjeska National Park**

The project focus in this protected area will be placed on the preservation of large mammals, primarily large carnivores and bears. To accomplish this, it will be necessary to first compile a list of sensitive habitats, which will then allow commencement of activities aimed at protecting the habitats. This type of project is expected to create opportunities for the development of eco-tourism. The map of the Sutjeska NP is given in the previous chapter.

The Sutjeska NP Management Plan(2002) for the period 2003 – 2010, proposes that the Sutjeska NP be extended by approximately 7,500 ha, mainly eastwards by integrating the entire plateau of the Vučevu Mountain (a Management Plan would thereby be developed for the area of extension). This would allow establishment of control over the access to the attractive canyon of Tara, towards the Durmitor NP in Montenegro, which would - besides the overall positive effect on natural environment - significantly contribute to the development of tourism in this area. These two national parks would, in such a fashion, become connected and this would result in a larger protected area of an international character, which would have greater chances of obtaining investment funds. The development of tourism would to some extent provide compensation for the restrictions on natural resources use by the residents living within and around the area of extension, and possibly by some local companies. The forestry companies might object to this project alternative, but a compromise could be achieved if adequate compensation measures are identified. A substantial mitigation instrument is the Small Grants Program. According to the Sutjeska NP Management Plan, the extension could be accomplished within 4 years.



In compliance with the Sutjeska NP Management Plan (2002) for the period 2003 – 2010, the infrastructure that could be procured, installed, reconstructed or constructed within the project, includes IT equipment, vehicles, office space, furniture for administrative premises, fire-extinguishing equipment, trails, visitor centers, etc. This project alternative would provide for the capacity building for efficient management of the protected area, while the possible negative environmental impacts are of temporary, short-term character, and minor intensity.

A combination of the NP extension with procurement, installation, reconstruction, and construction of infrastructure for efficient management of the protected area, if feasible, would present the most favorable overall alternative.

### **5.1.2 Kozara National Park**

With the proximity of urban centers, this protected area has the possibility to develop educational and recreational activities. The current territory of the Kozara NP includes certain infrastructure for recreation, as well as a hotel complex and huts. Still, the current use is insufficient and it will be necessary to make additional investments in their reconstruction and improvement. There is no management plan for this protected area for the time being. The map of the Kozara NP is provided in the previous chapter.

The main project activity proposed so far for this area would be the establishment of a National Center of Excellence for Environmental Protection and Education. In addition to this, refurbishment and reorganization of the existing administrative building into a Nature Education Centre for schools, additional education facilities, as well as an Interpretation Center for visitors, would be supported. An Eco-Activity Incubator has also been proposed to support the residents of this area and of the immediate surrounding of the NP. This alternative would have minor or no negative impact on the environment. On the other hand, it would provide for sustainable development and institutional strengthening of the National Park, along with the initiation of alternative modes for income generation for the local population.

Another project activity (second alternative) could be related to infrastructure. The infrastructure which could be improved, procured and/or installed, includes interpretation boards, marked trails, bird and mammals observation hides, and various platforms. This project alternative would allow for the strengthening of capacities for efficient management of the protected area, while its possible negative environmental impacts are of temporary, short character and minor intensity.

The third alternative could provide support for the development of a Management Plan for the Kozara National Park. This alternative would be crucial, since no efficient protection of the area is possible without a proper management plan.

The fourth alternative could be an extension of the area under the formal protection of the National Park. Such an expansion, in terms of nature and biodiversity protection, would be the most favorable if wider Kozara area would be included. It would thereby be necessary to consider the number of local residents or enterprises subject to imposed restrictions on natural resources use, as well as the compensation possibilities.

Finally, an alternative that would finance the development of a Management Plan would according to many criteria represent a priority, but a phased combination of all the four alternatives would be the optimal approach. Thus, for instance, the establishment of an Eco-Activities Incubator could to some extent mitigate the negative impacts of a NP extension on the residents and local companies.

### **5.1.3 Janj and Lom Forest Reservations**

The project is currently expected to finance additional biological research as a part of the management plan development, and support preparation of extension studies for these reservations. It has also been planned for the project to assist local forestry companies at training and equipping forest rangers, who would ensure that the forests remain protected from illegal activities, and act as guides to limited groups of visitors. This project activity would significantly contribute to the capacity building for the management of these protected areas and it has no negative impacts.

Considering the particular sensitivity of these Forest Reservations to anthropogenic activities, and having in mind that their primary purpose is to allow research and protect pristine nature in its genuine form, development of visitor-related infrastructure is very limited. The Janj and Lom FR Study (Dr. Maumaga et al, 2001), recommends that any development activities in these areas be avoided. Therefore, this alternative should be considered with great care and avoided if possible.

Another alternative could be an extension of the areas under the formal protection of the Forest Reservations. This would significantly increase the biodiversity within the protected areas. From the nature protection and bio-diversity point of view, such an extension should preferably include some of the most sensitive or valuable areas in the direct adjacency, such as the areas of Vitorog or Ravna Gora. However, it would thereby be necessary to consider the number of local population or enterprises who could be subject to imposed restrictions on the use of natural resources, as well as the possibilities of compensation.

The alternative which would finance biological research within the development of a Management Plan, preparation of extension studies for the Reservations, and assistance at training/equipping the forest rangers is considered primary, since otherwise efficient long-term management and protection of the Forest Reservations within their current borders would not be possible, nor could planning for their extension be feasible. Maps of the Janj and Lom Forest Reservations are provided in the previous chapter.

### **5.1.4 Una National Park**

The second alternative is the establishment of a protected area in accordance with the proposals resulting from the Feasibility Study for Una National Park (Elektroprojekt, 2005). A part of this National Park is planned for the establishment of an Eco-Corridor towards the neighboring Plitvice National Park in Croatia. Aimed at providing support to local population for the development of new, environmentally-friendly activities, an Incubator of Eco-activities

and a Visitors' Center would be established within the project. The key project component would be related to the preservation of the river fauna and underwater biodiversity (one of the proposals is related to the preservation of the otter).

In view of nature and biodiversity protection, the establishment of a protected area would be the most favorable option. Still, it would thereby be necessary to consider the number of local population or enterprises who might be subject to imposed restrictions on natural resources use, as well as the possibilities of compensation. In this sense, the positive effects of the establishment of an Eco-Activities Incubator, as well as the possible application of the Small Grants Program should be taken into account. This project alternative also envisages infrastructure-related activities, including office furnishing, reconstruction and equipping of the existing buildings in Kulen Vakuf aimed at establishing an Interpretation Center for visitors and premises for studies, construction of gates, ranger stations at the entrance to NP, procurement of field equipment (fire extinguishers, communication equipment, cameras, binoculars) and transport means (motor-bikes) for rangers, works related to the improvement of basic infrastructure – e.g. marking and improvement of trails, construction of wildlife observation hides, platforms, construction of wooden lookout bridges and observation hides close to the Una River near Martin Brod and Štrbački Buk, reconstruction of roads and trails, and restoration of small rivermills, in accordance with the suggestions of the Feasibility Study for Una NP (Elektroprojekt, 2005). This study also proposes that an old steam train commuting between Martin Brod and Kulen Vakuf/Štrbački Buk be re-activated, as an environmentally acceptable alternative for the transport of tourists to the area of NP. Later on, it would be possible to extend the railway route towards the Plitvice NP. This project alternative would be preferred because it would allow for protection of biodiversity along with sustainable development of tourism in the area of the Una River, while its possible negative environmental impacts would be of a temporary and negligible character. The map of the proposed Una NP is provided in the previous chapter.

### **5.1.5 Bjelašnica-Igman-Treskavica-Visočica National Park**

Establishment of a national park in this area has been proposed and a feasibility study prepared. The precise boundaries of the proposed national park are not yet known, however, they are expected to be defined during the preparation of a National Park and Resources Use Management Plan. Various research activities will be necessary within the preparation of the Management Plan. The emphasis will be placed on the preservation of landscapes and traditional land uses. There are plans to establish Eco-Activities Incubators, which would provide support to local population based on careful approach to development activities, as well as two centers for support to the preservation of traditional farming techniques, one at the village of Lukomir and another at Ledići. This area is also significant for recreational activities, including skiing. Activities of this kind are compatible with the principles of landscape park protected area category that was also considered, but temporary negative environmental impacts of smaller intensity are possible during the construction of associated structures, such as hotels. However, the local population and/or companies who might be subject to restrictions on natural resources use, as well as the compensation options should thereby be carefully examined. In this context, the positive effects of the Eco-Activities Incubator establishment, and applicability of the Small Grants Program should be evaluated. Infrastructure-related activities within this alternative could include the reconstruction and

equipping of an existing building to be used as office space and Interpretation Center for visitors, construction of a doorman's booth, placement of marks and information boards, construction and marking of trails, marking of the protected area's borders, placement of waste containers, procurement of chainsaws, procurement of fire-extinguishing equipment, including a cistern truck and water pumps, procurement of ranger equipment, installation of observation hides, procurement of horses, construction of hunters' huts, camping area at Rakitnica, procurement of an off-road vehicle, a mini-bus, and several snowmobiles, etc. The background of this project proposal is that it would allow for efficient protection of biodiversity and nature in general, along with sustainable development of tourism in the area. Possible negative environmental impacts are of temporary and negligible character, and they would be largely superseded by the expected overall mid- and long-term positive impacts. The map of the proposed Bjelašnica-Igman-Visočica-Treskavica National Park is provided in the previous chapter.

## **ENVIRONMENTAL IMPACT ASSESSMENT FOR THE EXISTING PROTECTED AREAS**

As mentioned previously, uncontrolled and excessive logging, hunting and fishing, overexploitation of pastures, use of agricultural pesticides, and improper disposal of hazardous waste are the threats occurring to some extent in all the considered areas and their surroundings. Particularly sensitive forest, mountain and other areas, as well as major watercourses, are depicted in the maps provided in Chapter 4.

Having in mind that neither precise boundaries of possible extension of the existing protected areas nor the specific locations of individual project infrastructure-related activities are currently known, site or area specific impacts could not be described within the scope of this study. Therefore, a general approach was taken in the consideration of possible impacts. Wherever possible, guidelines for environmentally sound development of project-financed infrastructure were provided within the separate sections on different categories of impacts.

The intensity of individual impacts depends on both the magnitude and frequency of occurrence of their causes, as well as on the sensitivity and resilience of each subject of impacts. The identified possible positive and negative impacts of this project are as follows:

### **6.1 Impacts on aesthetics**

Reconstructed, installed or constructed infrastructure can by their visual characteristics affect the aesthetics of the landscape. This can be mitigated by careful selection of non-striking colors for the structures, as well as by planting locally available species of trees around the structures (natural fencing).

### **6.2 Impacts on soil**

Although of minimal extent, the works of infrastructure installation, reconstruction of the existing and the construction of new structures, e.g. visitors' centers, offices/administrative buildings, observation hides, toilets, access roads, trails or marks, can lead to erosion of soil or landslides. In order to prevent this, wherever possible, any construction of new structures should take place in sections that had already been altered. Wherever possible, the corrective soil levelling should be made by the soil already excavated during other works in the same area. In the event that clearing of land, removal of bushes, trees and other vegetation are necessary, the area's original appearance should be restored upon completion of the works by re-planting of same types of vegetation, since this stabilizes the soil. If larger, locally concentrated interventions on soil are required, wherever possible, prior expert consideration of the geo-morphological characteristics of the soil should be made. In the event of any dilemma, additional geological examination of the terrain should be conducted.

Due to the use of vehicles, machines and equipment during the works of reconstruction or limited construction, as well as during the later regular use, maintenance and management of the protected areas, occasional spills and leaks of fuel, oils and other working fluids may occur. There also may be spills of paint, varnish, bitumen or solvent during the works, but also due to improper storage or handling, which cause soil pollution. They can be prevented or minimized by provision of adequate, paved parking lots and garages (concrete) with side channels for containment of accidentally leaked oils or fuels, as well as roofed warehouses for fuel, oils, paint, varnish, and other fluids, with a secondary containment of spills. Warehouses must be stable with regard to the maximum winds and earthquakes registered in the area.

The use of stationary engines run on liquid mineral fuel, including power generators using liquid fuel, can also lead to fuel spills. Therefore, wherever possible, electric or solar energy should be used, or alternatively gaseous fuels.

Inadequate disposal of waste, in particular hazardous waste (e.g. used oils, used batteries and car accumulators, photography development chemicals, waste packaging of toilet cleaning agents containing agent residues, waste electric and electronic devices or parts – including old/dysfunctional TV and radio sets, computers, printers, cartridges, copying machines, monitors, refrigerators, etc.) by contractors during the reconstruction / construction phase, but also by a protected area's personnel, during regular functioning of the protected area, can cause significant negative impacts on the soil and water courses. It is therefore necessary to establish a waste management plan and strictly comply with it. This must include assignment of sites for the disposal of municipal and hazardous waste, and establishment of a system for waste collection and disposal on the nearest suitable waste disposal sites (i.e. existing or future regional sanitary landfills near Trebinje, Bihać, Sarajevo, Banja Luka) or arrange hand over to operators authorized for hazardous waste disposal. It is also recommended to consider the use of biomass for energy recovery.

Considering that the personnel a protected area must have chainsaws for regular maintenance, it is necessary to pay attention to the lubricating oils applied. These types of oils are inevitably lost during chainsaw operation (through burning with the primary fuel in two-stroke engine of the chainsaw, as well as through leaks and dissipation into the environment) and therefore cause soil pollution. To mitigate this negative impact,

biodegradable oils are recommended for such applications. This approach should also be taken when lubricating motor lawn mowers, where electric mowers are not available.

### **6.3 Impacts on watercourses and hydrologic characteristics of the terrain**

Ground pavement, construction or reconstruction of structures, access roads and trails, can change the regime of storm water flow in the given area (e.g. induced flow along roadsides, or accumulation of water in roadside pockets). Impacts of such changes should be carefully studied and, if necessary, corrective measures should be taken. These for instance may include construction of adequate drainage canals, or use of porous pavements instead of compact concrete layers.

Spills and leaks of fuel, oil, electric insulation (transformer) oils, paint, varnish, solvent or other fluids occurring during the use of vehicles, machines and equipment, but also during any works, as well as inadequate waste disposal, can lead to pollution of surface and groundwater. These impacts can be prevented or minimized as explained in the previous sections (Impacts on soil).

Intensified visits and human presence in the protected areas will lead to the occurrence of larger quantities of wastewater, which - due to the faecal and washing agents contents - can pollute surface and groundwater. Therefore, it is necessary to connect drains to the nearest sewage network or install septic tanks, with the regular emptying and transport of wastewater to the nearest sewage system. Besides this, it is recommended to consider the applicability of alternative wastewater management systems, such as constructed wetlands.

### **6.4 Impacts on air**

Vehicles and machines used during infrastructural works cause air emissions of dust and gaseous products fuel burning. Occurrence of excessive amounts of dust can be avoided by sprinkling water on the soil during the works. The negative impacts of exhaust gases from vehicles and machines can be mitigated by maximizing the use of machines running on electricity, and where this is not feasible, by using gaseous or liquid fuel of the best available quality (e.g. diesel fuel with minimum sulfur content).

The use of boilers run on oil or coal with high sulfur content can lead to significant air emission of particulates, oxides of nitrogen and sulfur, and other pollutants (some of which can further be transported with rain to the soil, surface or groundwater; as is the case with sulfuric acid resulting from the absorption of gaseous sulfur oxides by rain drops). Therefore, wherever possible, electric or solar energy should be used for heating and cooking, and where not possible, heating wood procured from legal sources.

### **6.5 Impacts on nature, biodiversity, habitats**

Infrastructure reconstruction and construction works can lead to occasional vegetation damage, disruption of migration routes of animals, fragmentation of habitats, injuring or

killing of animals by vehicles. Vegetation damage should be reduced to the extent possible, followed by re-planting of the original vegetation types upon the completion of works. Wherever possible, works related to the construction of new structures should be conducted in sections that had already been atrophied or altered previously. All works must be undertaken in accordance with the existing management plans for the given areas, in agreement with the Management of each individual protected area. All the specifics (e.g. periods of the year in which flora and fauna are particularly sensitive, particularly sensitive locations, zones of different restrictions, migration routes of certain species, fish spawning locations, etc.) should thereby be taken into account. When constructing access roads, it is particularly important to consider the migration routes of animals and, where needed, place fences along the roads aimed at preventing the collision of vehicles with animals, as well as to construct underground passages or bridges for animals to cross from one to the other side of the road. The Management of the protected area should alert the contractors regarding the speed limits for vehicles driving through the area during the works, but also arrange placement of warning and speed limit traffic signs, and, where necessary, install speed ramps aimed at minimizing the possibility of damages to animals.

In the case that structures within the protected area or in the neighboring tampon zones are electrified, and transformer stations are installed, transformer oil leaks are possible. Transformers/transformer oils containing PCBs (polychlorinated or poly-brominated biphenyls, triphenyls and terphenyls) represent a source of pollution of extraordinary intensity. PCBs are carcinogenic compounds, pollutants with a multiple, long term cumulative effect in the tissue of living organisms (Persistent Organic Pollutants). Once PCB from oil spills reaches plants and watercourses, it ends up in the tissue of animals (and humans) which consume the given plants or water. Because of this, in the event of transformer stations installation, only PCB free (< 50 ppm) transformers, i.e. transformer oils should be employed. Regardless of this, secondary containment structures for collection of any spills of the transformer oil should be built in under the stations.

Inadequate storage and use of fuel, lubricants, paints, varnishes, solvents and other harmful flammable liquids during reconstruction and construction works, but also during regular functioning and maintenance of the protected areas, can lead to fires with very harmful consequences for the biodiversity of the area. In order to prevent this, it is necessary to introduce adequate measures for management of these working fluids. Where storage premises are constructed for these materials, fire-extinguishers and equipment should be installed/made available in and around the warehouses, and a safety band with no trees or bushes should be formed around the structure.

When undertaking works on rivers (construction of bridges, adaptation of river banks, etc.), the local habitats may be damaged, e.g. refuges/shelters of certain species in warm-water pockets, in zones of thermal water, may be destroyed. In order to prevent this, all aspects of the planned activities should be considered with the Management of the protected area.

Noise generated by the works may cause disturbance of animals, and it should therefore be minimized and localized by use of sound barriers. Works should be performed during daylight hours. The impact of noise should also be considered with regards to regular traffic on roads passing through the protected area, or in its direct adjacency and, where needed in

particularly sensitive sections, permanent sound barriers should be installed besides the roads.

Aimed at minimizing the intensity and duration of negative impacts on the flora and fauna, a plan defining optimized schedule of activities should be prepared prior to works start-up together with the management of the given protected area. Installation of effusive electric illumination in the protected area may have a negative impact on the fauna (light pollution). The Management of the protected area should consider this, where necessary in consultation with biology experts from the nearest University.

The improvement of the access roads will primarily provide for a more efficient management of the protected areas and easier access for visitors, yet it also may facilitate unwanted occurrences, such as inadequate trafficking through the protected areas (higher speeds - disruption of fauna, traffic accidents and run over animals) and illegal logging and hunting. Therefore, it is essential to establish an efficient system of monitoring and protection of the area, possibly combined with engagement of inspection teams, placement of speed limit signs, and speed ramps.

An increased number of visitors in the area can occasionally result in generation of excessive noise, unintentional or deliberate disturbance and injuring of animals and plants (including more frequent killing of fish due to collision with the river boats), dumping of waste, and increased fire risk. Negative impacts of inadequate waste disposal can be prevented or mitigated by the establishment of an efficient waste management system in the entire area. The measures aimed at minimizing the risk of fire include informing visitors about the possible hazards - in person, but also via information boards and signs prohibiting disposal of burning objects; programs for the protection of vegetation by forming cleared bands (bands free of trees and bushes, regularly maintained) around structures to prevent fire spreading; installation of fire-extinguishers (regularly maintained, periodically checked), and placement of containers with sand in critical spots. It is recommended to conduct registration of all visitors (tourists), as well as to introduce methods for communicating prohibitions and restrictions imposed in the area of protection (individually - in person, through signs and information boards), and mechanisms of corrective sanctioning.

The possible aesthetic impact of new or rehabilitated structures on fauna should be mitigated applying paints in colors similar to those of the environment, but also by the planting locally available trees around the structures (natural fencing).

The whole biodiversity or specific species, habitats, and ecosystems within the project areas or in the surrounding are not expected to be subject to significant negative impacts due to the project activities.

Efficient management of the protected areas and natural resources will significantly reduce the overexploitation of pastures and forests, uncontrolled hunting and fishing, inadequate use of pesticides and waste disposal, and it will in the long run contribute to a more sustainable use of natural resources and, ultimately, protection of biodiversity on the project locations.



## 6.6 Impacts on land use

Prohibition/restriction on the standard synthetic agricultural pesticides and fertilizers use in the protected areas and the adjacent tampon zones will reduce pollution of the soil and groundwater. If the Management of a protected area allows the use of biodegradable, less harmful natural products for these purposes in the wider surrounding of the protected area, the acceptable products will have to be identified in consultation with agriculture experts from the nearest university. In order to ensure consistent compliance with the imposed restrictions, the Management of each protected area will have to perform periodical monitoring, for instance by engaging inspectors or agriculture experts from the nearest university for field check-ups of the agricultural land. Where needed monitoring wells should be installed to monitor the quality of groundwater within and around the protected area. According to representatives of the BiH forestry sector, forestry pesticides applications in the country are already in compliance with the FSC<sup>17</sup> requirements, which still needs to be occasionally checked up employing forestry inspection teams. The project is not expected to alter the land carrying capacity or cause a burden on the soil in the surrounding of the protected areas.

By preventing and eliminating the occurrence of illegal waste disposal sites, as well as by later removal of the remaining landmines from the formally protected areas, not only will negative impacts on soil and groundwater be prevented but opportunities for alternative land use will be created on the locations concerned.

## 6.7 Impacts on residents and development

The introduction of drinking water to structures within a protected area can disturb the water supply of other users in the wider area. Therefore, this has to be done carefully, in consultation with the local public utility company (or the water supply company) as to ensure sustainable use of drinking water.

Restrictions on the use of land and natural resources can lead to a loss of income, revenue or means for basic subsistence of the local population. Cash compensations or provision of assistance at identifying and initiating alternative income generating activities can be used to mitigate this negative impact. A Process Framework, aimed at defining the principles of participation of local population in the project implementation, as well as the methodology for the identification of compensation measures and eligibility criteria together with the local population, will be developed under a separate Terms of Reference for the Protected Forest and Mountain Areas project.

With the implementation of measures for the efficient protection of water courses, soil, and flora at the existing, extended, or new protected areas, a positive overall mid- and long-term impact of the project on the health of the local population is expected.

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<sup>17</sup> FSC – Forest Stewardship Council

Based on the social assessment conducted for this project, the residents of all the considered protected areas and their immediate surrounding expect positive effects due to improved quality of natural resources as a result of more sustainable land use, better planning and management, as well as creation of new income generating possibilities related to tourism development. The improved infrastructure alone (roads, water supply, waste management) could also contribute to a revival of the local communities, as well as to reduction of the population drain. The project is also expected to create better opportunities for the sales of “organic” agricultural products and forest products exploited in allowed amounts.

An induced development of settlements within or around the areas may pose excessive burden on the environment in terms of wastewater, solid waste, traffic intensity, and other anthropogenic impacts on the environment. Therefore, it is necessary to establish mechanisms for environmentally sustainable development, based on a consensus of residents of the given settlements, the Management of the protected area, and the authorized municipal officials.

Finally, it must be emphasized that the overall, short-, mid- and long-term positive environmental impacts of this project, whose main goal is to preserve the biodiversity and improve the use of natural resources, largely supersede the mentioned negative impacts, which are mostly of local, short-term, or temporary character and of minor intensity. These negative impacts can be completely avoided or minimized by consistent implementation of the proposed mitigating measures. By accomplishing efficient management of the protected areas and natural resources, emissions of pollutants onto soil, into watercourses and air will be reduced and prevented on a long term basis, which will ultimately lead to a reduction of negative impacts on flora and fauna, as well as on humans living in the wider surrounding.

Most negative impacts that may arise during the phase of reconstruction, installation or construction of infrastructure, can be avoided or substantially mitigated by ensuring consistent compliance of the contractors with the environmental protection measures agreed upon. Proposed protective measures are provided in Appendix 1 - Environmentally Sound Clauses for Contractors.

### **6.8 Impacts on commercial activities**

Since the establishment of new or eventual extension of existing protected areas can have significant impact on existing commercial activities in areas concerned, specific project proposals of this kind must be individually and timely considered together with representatives of the commercial enterprises/activities in the zone concerned. This particularly refers to forestry activities, which are sometimes closely related to the protected area sustainability issues

### **6.9 Screening Process for Small Grants Program**

The following screening process is recommended for the activities nominated for Small Grants Program:

1. The nominator of each activity must submit the following information to the Project Implementation Unit (PIU) in charge:

- technical description of the envisaged activity with data on all inlet/outlet parameters of importance for the consideration of environmental impacts of the activity, in particular the qualitative and quantitative data on all raw materials used, end products, energy sources, emissions of pollutants into air, watercourses and onto soil, including any solid waste; in the case of substantial emissions, information on the planned environmental protection measures, including waste management, is to be provided

- information on the location planned for implementation of the activity

- information on the timeframe planned for the start up of the activity; where phased approach is planned, information on the timeframe for each phase is to be provided

2. Upon receipt of proposals for all activities, the PIU should consider each of the activities in respect of the contents of this Environmental Assessment/Environmental Management Plan Framework document, in consultation with the Management of the Protected Area concerned, and where necessary also involving additional biodiversity, hydrology and environmental protection experts, in order to analyze in detail the possible negative impacts of the proposed activity. All proposed activities must thereby be ranked according to magnitude of impacts, i.e. expected intensity, duration, and territorial extent of environmental impacts. When screening activities, besides this criterion, it is necessary to also consider ranking in terms of expected positive economic effect. However, the environmental rank factor must be dominant in the decision making process. In case of any doubts, the PIU should request additional information by the nominator of the activities.

3. The PIU notifies all the nominators, Management of the Protected Area, and the Country World Bank Office on the screening results, justifying the decisions made. A 15-day period should be given for submission of complaints. Any complaint submitted in a timely manner must be considered within 7 days by a commission comprised of representatives of the PIU and Country World Bank Office. Following this, the PIU notifies once more the individual complainant on the decision made. In the case that the complaint has been accepted and the list of chosen activities amended accordingly, the PIU also has to notify all the other nominators of project activities, as well as the Management of the Protected Area.

## ENVIRONMENTAL MANAGEMENT PLAN FRAMEWORK

The proposed environmental management plan framework is applicable to projects on the locations of or in the surrounding of the existing Protected Areas (PA), as well as to any new project locations that may be identified later on. The envisaged project activities are explained in Chapter Project Description.

### Mitigation Plan

Project: Forest and Mountain Protected Areas				Cost	Institutional responsibility
Phase	Issue	Mitigating measure	Comments		
Construction	Construction activities may affect overall traffic safety and endanger safety of wild animals	Clearly display informative/warning signs around construction area. Limit works to daytime (daylight) intervals. Allocate possible alternative traffic routes (diversions). Install speed ramps and introduce speed limit on the territory and in surrounding of PA		Included in construction costs	Construction Contractor
Construction	Dust generated during construction works may impact environment and health of humans and animals	If possible, use closed or covered trucks for transportation of construction materials. Sprinkle earth with water to prevent dust generation, remove excess materials and clean sites upon completion of activities. Where possible, use protective cloth covers or screens in dust generation areas.		Minor/included in construction costs	Construction Contractor
Construction	Noise and vibration disturbances due to construction works can upset wild animals	Limit construction activities to regular daytime intervals. Establish schedule and/or other specific restrictions on works. If necessary, use noise barriers and/or noise suppressors on equipment.		Minor/included in construction costs	Construction Contractor

Project: Forest and Mountain Protected Areas				Cost	Institutional responsibility
Phase	Issue	Mitigating measure	Comments		
Construction	New buildings/infrastructure can affect the aesthetics of the landscape and negatively impact animals and/or their migration routes	Use non-striking colours, place natural fences around buildings/structures. Install tunnels or bridges for undisturbed transfer of animals from one to the other side of the road.		Minor/included in construction costs	Construction Contractor, PA Management
Construction	Generated waste may pose an environmental pressure if not disposed of properly	All wastes generated during construction activities, including hazardous wastes, need to be disposed of on approved landfills or handed over to operators authorized for disposal of hazardous waste		Should be included in construction costs; Cost estimate: 1KM/ton*km for transport, 50KM/t for disposal	Construction Contractor. Environmental inspector must ensure all regulations and procedures are met.
Construction	Pollution of earth and surface water by leaks/spills of fuel, lubricants, coolants, paint, solvents and bitumen	Periodically check technical condition of vehicles and all equipment. Store fuel, lubricants, coolants, paint, solvents and bitumen safely, handle cautiously. Any spills must be contained and cleaned up. Migration pathways for fuel, lubricants, coolants, paint and solvents have to be determined to prevent occasional leaks from escaping into the environment. Fuel and lubricants change or top-up should be made in dedicated adequate places		Minor/included in construction costs	Construction Contractor
Construction	Exhaust gases from equipment may pollute air and have negative impact on flora and fauna	Use proper, functional machinery. Where possible, use electric power of fuel of best available quality. Limit works in terms of timing.		Minor	Construction Contractor
Construction	Erosion may occur as a result of excavation, stockpiling or backfilling of excavated material	Careful control of excavated materials through stockpiling on the uphill side of the trench.		Included in construction costs	Construction Contractor
Construction	Hydrological characteristics of the location can be affected as a result of construction works	Analyse location features prior to works commencement. Install corrective drainage canals.		Included in construction costs	Construction Contractor, PA Management

Project: Forest and Mountain Protected Areas				Cost	Institutional responsibility
Phase	Issue	Mitigating measure	Comments		
Construction	Landslides due to construction works	Conduct geotechnical investigation and analyze results prior to works start. Respect safety rules during works.		Should be included in construction costs	Construction Contractor, External Consultant
Construction	Damage to trees and other vegetation during construction activities	Minimize vegetation clearing. Restore and replace all damaged trees or vegetation.		Cost estimate: 100-300 KM/m <sup>2</sup> for vegetation restoration	Construction Contractor
Construction	Works can damage habitats	Analyze the specific biodiversity features on work locations prior to start up of works		Minor	Construction Contractor, PA Management
Construction	Introduction of drinking water to the PA can disturb water supply to other consumers	Prior consultations with the PA Management and Cimmunal (Utility) Company		Minor	Construction Contractor, PA Management
Construction	Although unlikely, chance findings of ordnances, mass graves or cultural heritage items are possible	Cease all construction works in the area, contact police/civil protection/authorities. Arrange necessary site preservation measures.		None or minor	Construction Contractor
Operation of PA	Increased number of visitors can upset animals or lead to damage to biodiversity, improper waste disposal and increased generation of waste.	Registration and proper informing of visitors. Introduction of sanctions measures. Introduction of a waste management system, installation of sufficient numbr of waste containers. Connection of wastewater releases with nearest sewage network or installation of adequate septic tanks.		Included in regular operation costs.	PA Management
Operation of PA	Occasional intensifying of traffic due to higher number of visitors can upset animals or lead to its injurinig or run-over.Povremeno intenziviranje saobraćaja uslijed većeg broja posjeta može uznemiriti divljačili dovesti do njenog ranjavanja i gašenja	Speed limit on the territory of PA, installation of speed ramps, protective fences and sound barriers on critical spots.		Included in regular operation costs.	PA Management

Project: Forest and Mountain Protected Areas				Cost	Institutional responsibility
Phase	Issue	Mitigating measure	Comments		
Operation of PA	Use of vehicles, equipment and materials during regular PA operation and maintenance works can cause air, soil and watercourses pollution, and upset or damage flora and fauna	<p>Efficient PA Management Plan. Periodicalloy check condition of vehicles and equipment. Proper storage and handling of lubricants, fuel, paint, solvents and other chemicals.</p> <p>In the case of spills, isolate location and clean up. Determine migration pathways for all chemicals/ liquids, install secondary containment to prevent dissipation in environment.</p> <p>Change fuel and lubricants in dedicated places. Use electric power as much as possible, or quality, low sulfur fuel</p>		Included in regular operation and maintenance costs	PA Management
Operation of PA	Use of inadequate fuel for heating and cooking can cause air emission of harmful gases.	To the extent possible, use electric or solar power for this purpose. Where not possible, use heating wood procured from acceptable sources.		Included in regular operation and maintenance costs	PA Management
Operation of PA	Improper disposal of solid waste can lead to pollution of soil and watercourses	<p>Establish waste management system (collection, treatment, disposal, reuse).</p> <p>Install sufficient number of waste bins/containers on key spots. Try to minimize waste generation (implement“zero waste” principle, to the extent possible)</p>		Estimated cost of bins: 10-30 KM/piece	PA Management
Operation of PA	Occurrence of sporadic illegal activities ofn the territory of PA	Efficient PA Management Plan.		Included in regular operation and maintenance costs	PA Management, Rangers
Operation of PA	Inadequate use of pesticides in the surrounding of PA can lead to pollution of soil and watercourses, and harm flora and fauna	<p>Efficient PA Management Plan.</p> <p>If allowed by the PA management plan, use of natural, biodegradable substances to the extent possible.</p>		Included in regular operation and maintenance costs	PA Management, Rangers
Operation of PA	Restrictions on natural resources use can have negative impact on the standard of living of local residents.	Identify alternative, environmentally acceptable income generating activites. Cash compensations in the case of loss of revenue/income. Small Grants Program.		To be determined upon identification of exact project activities .Compensations in accordance with the Proces Framework.	Project Implementation Unit in charge
Operation of PA	Induced development of villages can result in greater load to environment	Identify sustainable development masures by consensus of the PA Management, authorized municipal authority or local residents		Minor	PA Management

## Monitoring Plan

<i>Phase</i>	<i>What parameter is to be monitored</i>	<i>Where is the parameter to be monitored</i>	<i>How is the parameter to be monitored</i>	<i>When is the parameter to be monitored</i>	<i>Why is the parameter to be monitored</i>	<i>Cost</i>	<i>Responsibility</i>
Construction	General traffic safety, safety of wild animals	On site, around site	Complaints from neighbors, traffic monitoring	Regularly during construction, daily or as appropriate	Safety of traffic participants, workers and PA personnel, safety of animals	Minor/ included in construction costs	Construction Contractor, Site Overseer/ Supervisor, Rangers
Construction	Dust generation	On site, around site	Visual inspection, irritation of respiratory system	Daily or as required during construction works	Minimization of dust dissipation in the area, minimization of irritation of respiratory systems of the workers, PA personnel and animals	Minor/ included in construction costs	Construction Contractor, Site Supervisor
Construction	Anxiety of wild animals due to noise and vibrations generated	On site, around site	Aural inspection, regular patrolling through the area	Daily or as required during construction works	Minimization of induced anxiety in animals	Minor/ included in construction costs	Construction Contractor, Site Supervisor, Rangers
Construction	Aesthetics of the area	On site	Visual inspection	During construction works U toku izvođenja radova	In order to minimize negative impacts on the aesthetics, and induced anxiety in animals	Minor/ included in construction costs	Construction Contractor, Site Supervisor
Construction	Waste management quality	On site	Visual inspection, disposal records or receipts from landfills or from authorized hazardous waste operators	Regular daily control	Protection of soil, groundwater, surface water, aesthetic reasons, prevention of negative impacts on flora and fauna	Included in construction costs	Construction Contractor, Site Supervisor, Rangers
Construction	Leaks/spills of fuel, lubricants, coolants, and other harmful liquids	On and around site.	Visual inspection. In case of frequent and substantial spills or leaks, detailed lab analysis of the contaminated media and groundwater should be conducted	Visual inspection daily during works. Lab analysis as required.	Protection and prevention of environmental pollution, workers safety	Should be included in construction costs; cost of additional lab testing: approximately 500-1000 KM	Construction Contractor, Site Supervisor



<i>Phase</i>	<i>What parameter is to be monitored</i>	<i>Where is the parameter to be monitored</i>	<i>How is the parameter to be monitored</i>	<i>When is the parameter to be monitored</i>	<i>Why is the parameter to be monitored</i>	<i>Cost</i>	<i>Responsibility</i>
Construction	Air emissions from equipment and vehicles	On site, around site	Sensory inspection, air quality meters	Weekly during construction	Protection of biodiversity, health of workers and PA personnel, air quality protection	Portable air emission monitors: approximately 3000 KM	Construction Contractor, Site Supervisor
Construction	Land erosion and sedimentation	On site	Geotechnical investigation, visual inspection	Daily visual inspection during works	Protection of soil, surface water, groundwater, workers safety, construction safety	Minor; investigation cost: approx. 500-1500 KM	Construction Contractor, Site Supervisor, Rangers
Construction	Hydrologic characteristics of the site	On site, around site	Visual inspection	Regularly during works	Protection of habitats and biodiversity	Minor	Construction Contractor, Site Supervisor
Construction	Landslides	On site	Visual inspection	As required during works	Protection of configuration of terrain, protection of habitats, general safety	Minor	Construction Contractor, Site Supervisor, Rangers
Construction	Cut down and damaged trees/vegetation restoration	On site, around site	Visual inspection, photographs prior to start up of construction works	Before and after construction works	Natural resources preservation, aesthetic reasons	Minor/ included in construction costs	Construction Contractor, Site Supervisor
Construction	Alterations/ perturbations of habitats	On site, around site	Visual inspection	Daily during works	Preservation of habitats	Minor/ included in construction costs	Construction Contractor, Site Supervisor, Rangers
Construction	Chance findings of graves, archeological items, cultural heritage items	On site, around site	Visual inspection	Regularly during construction works	Protection of cultural heritage, identification/location of missing persons	Negligible	Construction Contractor, Site Supervisor
PA Operation	Disturbance, injuries and running over of animals, alterations in biodiversity, improper waste disposal, increased wastewater quantities	On site, around site	Visual inspection	Regularly in accordance with the PA Management Plan, plus as required during intensified visits	Biodiversity protection, prevention of environmental pollution	Included in regular operational costs	PA Personnel/ Rangers

<i>Phase</i>	<i>What parameter is to be monitored</i>	<i>Where is the parameter to be monitored</i>	<i>How is the parameter to be monitored</i>	<i>When is the parameter to be monitored</i>	<i>Why is the parameter to be monitored</i>	<i>Cost</i>	<i>Responsibility</i>
PA Operation	Pollution of air, watercourses, damages to flora and fauna	On site, around site	Visual inspection, air quality meters	Regularly in accordance with the PA Management Plan	Prevention of environmental pollution, biodiversity protection	Included in regular operational costs; cost of installation of groundwater monitoring wells: approx. 1000 KM/piece	PA Personnel/ Rangers
PA Operation	Illegal activities inside PA	On site, around site	Visual inspection	Regularly in accordance with the PA Management Plan	Environmental and biodiversity protection	Included in regular operational costs	PA Personnel/ Rangers
PA Operation	Standard of living of local population	On site, around site	Consultations with the residents in accordance with the Process Framework for Participation of Local Population	Prior to start up of any project activities, and later on during PA operation	Protection of standard of living of local population	Included in project budget	Project Implementation Unit, Rangers, Monitoring Committee
PA Operation	Various environmental loads caused by induced development of settlements	On site, around site	Visual inspection, groundwater quality monitoring	Quarterly	Preservation of environment and biodiversity	Included in regular operational costs	PA Personnel/ Management, Rangers

## **Institutional Strengthening**

### **Federation of Bosnia and Herzegovina**

The staff required for efficient implementation of impact mitigation measures and monitoring should include the Project Implementation Unit (PIU) of Ministry of Environment and Tourism FBiH, personnel of Forest Planning Unit and Forestry Department of Federal Ministry of Agriculture, Waterworks and Forestry, including the Inspectorate in the cases of protected natural areas and national parks, or personnel of cantonal Ministry of Environment in charge in the case of protected landscapes and monuments of nature, Management/personnel of the Protected Area and rangers (during reconstruction or construction activities also the site supervisor), personnel of Forestry Companies of the Sarajevo, Una-Sana and Herzegovina-Neretva cantons, with occasional engagement of cantonal or municipal inspectors in charge of environmental protection, agriculture or forestry issues, and - if required – experts from the Universities of Sarajevo, Tuzla, Mostar, Zenica or Bihać. For efficient monitoring of impacts on residents, as well as efficacy of compensation measures according to the *Process Framework for Mitigating Potential Adverse Livelihood Impacts* for this project, it is recommended to use rangers as primary sources of information and field reporting to the extent possible. The rangers will be introduced and trained within the Project. They should be elected jointly by the PIU and PA Management. In addition to this, for each PA a Monitoring Committee (MC) should be formed. The MC should comprise representatives of a PIU representative, as/when required representative of the country World Bank Office, PA Management, local (municipal) authorities, local residents, and major local NGOs, plus a ranger upon protected area management's choice. The MCs should be based at PA Management premises (contact telephone, fax, etc.).

### **Republika Srpska**

The staff required for efficient implementation of impact mitigation measures and monitoring should include: the Project Implementation Unit (PIU) of the Ministry of Physical Planning, Urbanism, Civil Works and Ecology RS; personnel of the RS Ministry of Agriculture, Waterworks and Forestry, including its Inspectorate, Farming Development Agency and Agency for Expert Services in Agriculture; Management/personnel of the Protected Area and rangers (during reconstruction or construction activities also the site supervisor); personnel of Forestry Company Srpske Šume, with occasional engagement of municipal inspectors in charge of environmental protection, agriculture or forestry issues, and - if required – experts from the Universities of Banja Luka, Istočno Sarajevo or Bijeljina. For efficient monitoring of impacts on residents, as well as efficacy of compensation measures according to the *Process Framework for Mitigating Potential Adverse Livelihood Impacts* for this project, it is recommended to use rangers as primary sources of information and field reporting. The rangers will be introduced and trained within the Project. They should be elected jointly by the PIU and PA Management. In addition to this, for each PA a Monitoring Committee (MC) should be formed. The MC should comprise representatives of a PIU representative, as/when required representative of the country World Bank Office, PA Management, local (municipal) authorities, local residents, and major local NGOs, plus a ranger upon protected

area management's choice. The MCs should be based at PA Management premises (contact telephone, fax, etc.).

The following institutional needs have been identified for both Entities:

a) Equipment procurement

Type of Equipment	Units (#)	Unit Cost (KM)	Total Cost (KM)	Local or International Procurement
Air Quality Monitoring Equipment	1 set	3000	3000	international
Groundwater Monitoring Wells, incl. installation	3-5 per PA	1000	3000 – 5000 per PA	local

b) Training and consulting services

Type of Training:	<ul style="list-style-type: none"> <li>- Training on environmental protection</li> <li>- Training on national legislation and standards</li> <li>- Training on environmental monitoring</li> </ul>
Attendees:	<ul style="list-style-type: none"> <li>- Rangers</li> <li>- Key personnel of PA managements</li> <li>- Project Implementation Units (coordination)</li> </ul>
Purpose:	Support for efficient management and monitoring.
Duration:	Two to four segments, each 2-3 days.
Start/end dates:	
Venue:	Depends on the number of attendees. It is probably best to have a single program in BiH, with a venue in a central location such as Sarajevo, Zenica, or another location with greatest number of registered attendees.
Institute of organization to provide training:	Local organizations and consultants with adequate experience, and a foreign expert on protected areas, who would convey experiences gained in other countries.
Topics to be covered:	<ul style="list-style-type: none"> <li>- Importance of biodiversity and environmental preservation</li> <li>- Requirements of applicable legislation</li> <li>- Environmental impacts</li> <li>- Environmental protection measures, including safe handling, storage and use of working materials, equipment maintenance, fire prevention measures, action in incident situations</li> <li>- Importance of monitoring and the ways to conduct it</li> </ul>
Training methods:	The training should be organized to include theoretical lectures, but to focus on active participation and interaction of the trainees, coupled with specific project examples. In this manner the attendees shall be stimulated to implement the knowledge gained at this training in a group-learning environment, which shall serve as a preliminary session for some of the newer concepts.
Training material:	It is recommended to prepare simple booklets with training material and distribute them during the training.

### Training costs

Description	Cost (KM)	
	With use of local consultants (2)	With use of foreign consultants (2)
Lectures	3000	6000
Literature / handouts	500	500
Room hire / technical support	1000	1000
Overnight of participants (if needed)	50 / participant x 20 = 1000	50 / participant x 20 = 1000
Refreshments and Meals	500	500
<b>TOTAL COST:</b>	<b>6000</b>	<b>9000</b>

c) For efficient biodiversity protection and better planning of development activities the following approach is recommended:

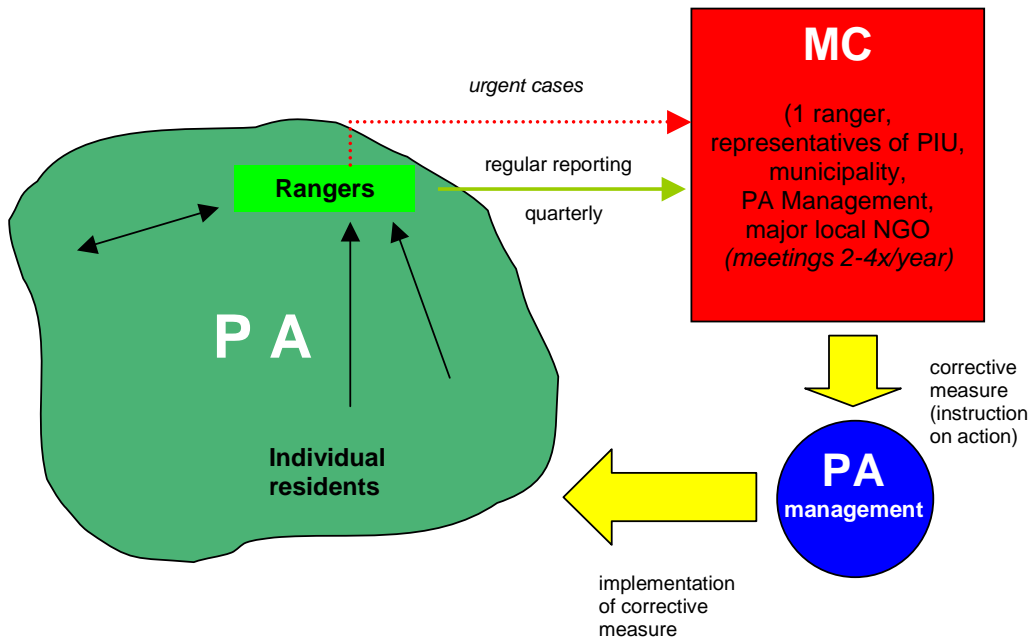
- Permanent support to research activities, in particular biological research,
- Close cooperation of the Entity PIUs and Managements of PAs from the territories of both Entities, establishment of coordination bodies at the state level,
- Where possible, territorial connection of neighboring PAs within BiH,
- Promotion of regionalization through connection of PAs in BiH and neighboring countries.

### Schedule of activities

Activity	Start date	Duration	End date
Mitigation measures	<p>Start date for mitigation measures is the date of construction activities/PA operation start up. End date for mitigation measures during construction phase is 10 days upon completion of works, or as appropriate until any remaining soil or water pollution is removed.</p> <p>Start date for monitoring activities is the date of commencement of construction activities. End of monitoring activities for construction phase is one month after completion of works or after consequent removal of all soil/water pollutants.</p> <p>Start date for monitoring activities for PA operation phase is the effective date of project commencement on the given location, or the date of effective start-up of operation in the case of new PAs. End date: not applicable since no decommissioning of PAs can be expected. The frequency of monitoring is given in the Monitoring Plan table.</p>		
Monitoring activities			
Training	At latest two months prior to effective start-up of physical project activities.		

### Institutional Arrangements

As primary source of information, rangers will report quarterly to Monitoring Committee of the given PA. Local residents should be motivated to communicate with rangers, however, a parallel mechanism should be provided for information flow from residents upwards to Monitoring Committee (through Mjesna Zajednica – local neighborhood community) in the case of inadequate monitoring/reporting by rangers. For efficient monitoring and reporting, it is recommended that the PIUs adopt standard forms to be completed by rangers. Each Monitoring Committee (MC) should have 2-4 regular annual meetings for assessment of all project implementation aspects based on established success indicators. Additional, extraordinary meetings should be organized as required. The following monitoring and reporting mechanism is recommended:



## **APPENDICES**



## APPENDIX 1 - Environmental Clauses for Civil Works Contractors

Most environmental impacts occurring during the phases of construction and decommissioning can be avoided or substantially mitigated by taking the environmental protection measures agreed. Such protective measures should be included in the civil/performance works contract as environmental clauses addressing the following, but not limited to, issues:

1. All activities must be carried out in accordance with the current environmental legislation applicable.
2. Necessary measures should be taken for the protection of natural habitats or other areas of importance. This must include measures aimed at minimizing degradation of vegetation on the location or in the surrounding due to the works performed, as well as measures for vegetation restoration upon completion of works.
3. Necessary measures must be taken to protect cultural heritage items.
4. Accommodation camp for the workers must be located in agreement with local municipal authorities.
5. Use of potable water from the public supply network must be agreed upon with the local utility services company responsible.
6. Use of access roads should be agreed upon with the local municipal authorities, whereby main and alternative roads, as well as traffic regime should be specified.
7. All works should be scheduled in agreement with the local authorities. If possible, all activities should be carried out during regular daytime (daylight) intervals.
8. All construction waste, including excavated material, must be properly disposed of. This includes its disposal on a landfill, as well as use of excavated soil for filling of holes, canals, etc. on other locations, where such material may be required. If waste is disposed of on a landfill, receipts should be kept. Burning of construction waste on the construction site is not permitted.
9. The works contractor must only use fully operational and well maintained equipment, machines and vehicles. If diesel fuel is used, best available quality, low sulfur fuel should be used.
10. The works contractor must take effective measures to prevent leaks and spills of fuel, coolant, lubricating oils, bitumen, paints, varnishes, solvents or other liquids during the works, as well as during transport and storage of such materials. In case of spills or leaks on soil, the contaminated soil should be isolated in order to prevent migration of the contaminant. The contaminated soil should be disposed of on adequate landfill. Burning of contaminated soil, i.e. liquid spills or leaks, is strictly prohibited.

11. If necessary, the works contractor should obtain air emission equipment (monitors for sulfur oxides, nitrogen oxides and particulate matter in air) and conduct regular monitoring in agreement with the PA Management.

12. The works contractor is obliged to acquaint all his/her workers with the measures for minimization of noise and dust generation.

13. Upon completion of all works, all waste generated must be completely removed from the location and disposed of adequately by the works contractor.

## **APPENDIX 2 – Records of Public Consultations**

<b>Public consultation held:</b>	June 7, 2007, Hotel Marsal Bjelasnica near Sarajevo
<b>Announcement made:</b>	In daily newspapers Dnevni Avaz and Oslobođenje. Electronic version of the draft document was placed on a publicly accessible Internet site, mentioned in the newspaper announcements, and additionally mailed to key stakeholders prior to public consultation meeting. Hard copies were also disseminated at the venue prior to meeting.
<b>Invitations sent:</b>	Individual invitations of key stakeholders.
<b>Summary:</b>	
<p>Bosna-S team presented the draft EA/EMP document focusing on requirements of WB Operational Policies vs. BiH legislation, potential Project related environmental impacts, framework environmental management plan and institutional arrangements.</p> <p>Attendees of the meeting addressed numerous sectoral issues. With regard to the draft document contents, the following key remarks and recommendations were made:</p> <ul style="list-style-type: none"> <li>- section with the the BiH legislation review should be updated/corrected, indicating the new secondary legislation related to Protected Areas introduced in 2005 and 2006, as well as mentioning the regulations on hunting, freshwater migrations, new law on waters, the Law on National Park Una pending parliamentary approval, additional cantonal environmental legislation, etc. (Mrs. Azra Korac, Federal Ministry of Environment and Tourism)</li> <li>- new feasibility study for Bjelasnica-Igman-Treskavica-Visocica Protected Area and the proposed borders, pending approval, should be mentioned (Mrs. Azra Korac, Federal Ministry of Environment and Tourism)</li> <li>- the term <i>logging</i>, as used in the draft text, should be replaced with the more appropriate term <i>inadequate forest management</i> (Mr. Omer Pasalic, Federal Forestry Directorate)</li> <li>- Instead of the “Local Monitors”, as initially suggested in the draft document, Rangers would be more appropriate for on-site monitoring and reporting upwards to Monitoring Committees (comment made by most participants of the meeting)</li> <li>- Mr. Dautbasic of Forestry Faculty Sarajevo questioned parts of the baseline conditions description lacking quantification, whereas Mrs. Ploco (SNV-Dutch Development Organization) suggested that the document should call for the establishment of baseline figures for future monitoring purposes, where/if such figures are currently not available</li> </ul> <p>Besides these, several suggestions were made regarding minor corrections of the text.</p>	

<b>Public consultation held:</b>	June 14, 2007, Hotel Monument Mrakovica/Kozara near Prijedor
<b>Announcement made:</b>	In daily newspapers Glas Srpske and Nezavisne novine. Electronic version of the draft document was placed on a publicly accessible Internet site, mentioned in the newspaper announcements, and additionally mailed to key stakeholders prior to public consultation meeting. Hard copies were also disseminated at the venue prior to meeting.
<b>Invitations sent:</b>	Individual invitations of key stakeholders.
<b>Summary:</b>	
<p>Bosna-S team presented the draft EA/EMP document focusing on requirements of WB Operational Policies vs. BiH legislation, potential Project related environmental impacts, framework environmental management plan and institutional arrangements. Like in the FBiH meeting, the participants addressed several issues pertaining to protected areas. Regarding the draft document contents, the following key remarks and recommendations were made:</p> <ul style="list-style-type: none"> <li>- updates and corrections should be made in the legislation review section (Mr. Laganin, Ministry of Physical Planning, Urbanism - Civil Works and Ecology RS)</li> <li>- the document should spell out the need to establish the precise PA borders, where not yet known (Mr. Stojanovic of PIU Forestry RS)</li> <li>- like in the FBiH meeting, Rangers were seen as more appropriate for on-site monitoring and reporting upwards instead of the "Local Monitors", however, it was stressed that local population should still have the possibility to report to higher instances if rangers' monitoring/reporting is deemed inappropriate (agreed upon by most participants of the meeting)</li> <li>- other protected areas in BiH should also be mentioned in the document (Mr. Maunaga, Forestry Faculty Banja Luka)</li> <li>- attention should be paid to wastewater discharges in and around the PAs, and the need to contain/treat them adequately, "zero waste" concept should be pursued to the extent possible (Mr. Bijeli, Environmental Center/Ekomreza BiH)</li> </ul> <p>Additional comments were made concerning the wider, long term context, including the need for profound public awareness activities and education of wider population (schools, general population, etc.), as well as with respect to preliminary Project scope (issues of equitable allocating of Project activities' extent in individual PAs, possibility to finance small scale feasibility studies for additional, smaller PAs within the SGP?), and the need to develop Red List (if possible as one of Project activities).</p>	

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